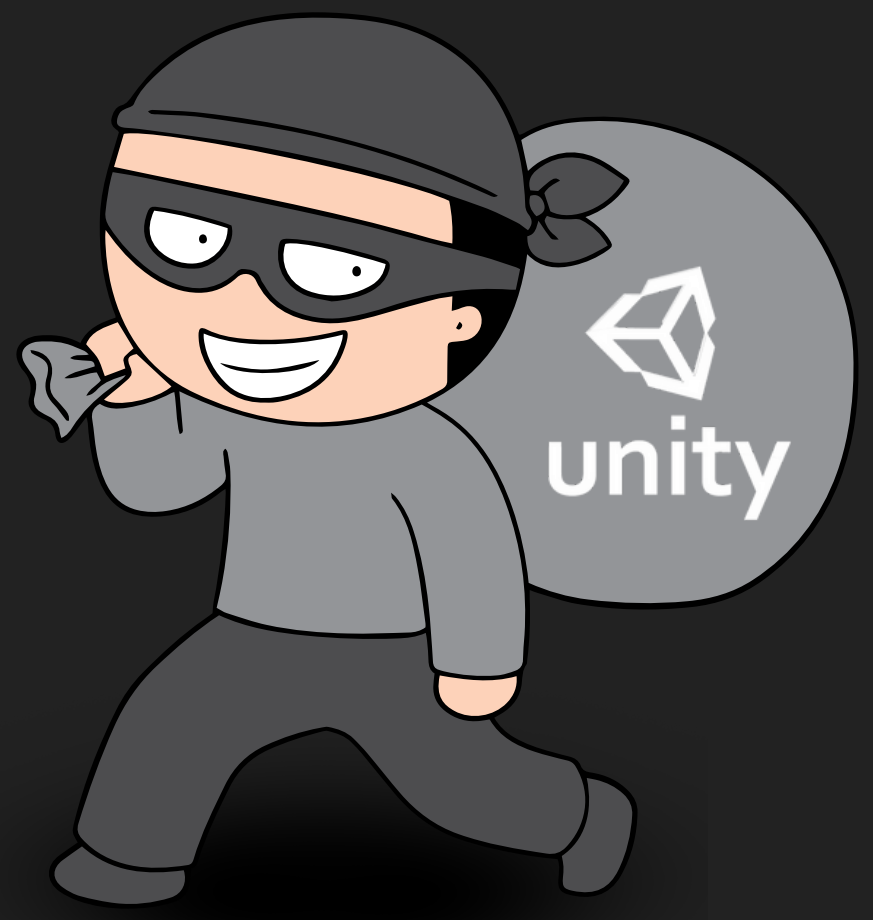
50

UNITY CHEAT-SHEETS



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UNITY CHEAT-SHEET

EVENT FUNCTIONS

```
// Unity Event Functions Bible
public class EventFunctionsCheatSheet : MonoBehaviour
{
    // Initialization & Lifecycle
    void Awake() { }          // First: Core setup & references
    void OnEnable() { }       // When object/component activates
    void Start() { }          // Before first frame, after all Awake()
    void OnDisable() { }      // When object/component deactivates
    void OnDestroy() { }      // Final cleanup before destruction

    // Update Loops
    void Update() { }         // Every frame - main game logic
    void FixedUpdate() { }    // Fixed timestep - physics only
    void LateUpdate() { }     // After Updates - cameras & final adjustments

    // Physics & Collisions
    void OnCollisionEnter(Collision other) { }  // First contact
    void OnCollisionStay(Collision other) { }   // During contact
    void OnCollisionExit(Collision other) { }   // Contact ends
    void OnTriggerEnter(Collider other) { }     // Enter trigger zone
    void OnTriggerStay(Collider other) { }      // Inside trigger
    void OnTriggerExit(Collider other) { }      // Exit trigger

    // Rendering & Visibility
    void OnBecameVisible() { }     // Object enters any camera view
    void OnBecameInvisible() { }   // Object exits all camera views
    void OnRenderObject() { }      // After camera renders scene
    void OnWillRenderObject() { } // Before each camera render
    void OnGUI() { }               // IMGUI rendering (Editor/Debug)

    // Application Events
    void OnApplicationFocus(bool focus) { }   // Window focus change
    void OnApplicationPause(bool pause) { }   // App pause/resume
    void OnApplicationQuit() { }              // Before app closes
}
```

UNITY's VILLAINS CHEAT-SHEET:
COMPONENT COMMUNICATION

```
public class ComponentCommunicationGuide : MonoBehaviour
{
    // Direct Component Access
    GetComponent<T>();
    GetComponents<T>();
    GetComponentInChildren<T>();
    GetComponentInParent<T>();

    // Scene-Wide Component Search
    FindObjectOfType<T>();
    FindObjectsOfType<T>();

    // GameObject Search
    GameObject.Find(string name);
    GameObject.FindWithTag(string tag);
    GameObject.FindGameObjectsWithTag(string tag);

    // Direct References (Recommended)
    [SerializeField] componentRef;
    cachedComponent;
}
```

DATA STRUCTURES
UNITY CHEAT-SHEET

```
// Unity Data Structures Cheat Sheet
public class DataStructuresGuide : MonoBehaviour
{
    // Basic Collections
    int[] fixedArray;                          // Fixed size, contiguous memory
    List<T> dynamicList;                       // Flexible size, GC allocated
    Dictionary<K,V> lookupTable;               // Key-value pairs, hash-based

    // Specialized Unity Collections
    [SerializeField]
    SerializedDictionary<K,V> editorDict;      // Inspector-friendly dictionary

    ObservableList<T> reactiveList;            // Event-driven list
    CircularBuffer<T> ringBuffer;              // Fixed-size wraparound
    ObjectPool<T> recyclePool;                 // Object recycling

    // High Performance (Native Collections)
    NativeArray<T> burstArray;                 // Burst-compatible array
    NativeList<T> burstList;                   // Dynamic native list
    NativeHashMap<K,V> burstDict;              // Native dictionary

    // Memory Layout Patterns
    struct ComponentData                       // Cache-friendly parallel arrays
    {
        float[] positions;
        float[] velocities;
        float[] health;
    }

    // Spatial Partitioning
    SpatialHash<T> worldPartition;             // Space-based lookups
}
```

UNITY CHEAT-SHEET
INSPECTOR ATTRIBUTES

PART-4

```
public class UnityAttributesCheatSheet : MonoBehaviour{
    // Data Serialization
    [SerializeField]                    // Make private fields visible in Inspector
    [Serializable]                      // Mark class/struct for serialization
    [Range(min, max)]                   // Add numeric range constraints
    [Header("Header Text")]             // Add section headers
    [Tooltip("Tooltip Text")]           // Show hover information
    [HideInInspector]                   // Hide public fields
    [Space(10)]                         // Add vertical spacing
    [TextArea]                          // Multi-line text with scrollbar
    [Multiline]                         // Multi-line text without scrollbar
    [ColorUsage(true, true)]            // Customize color picker (HDR, alpha)
    [Min(0)]                            // Set minimum value
    [Max(100)]                          // Set maximum value
    [FormerlySerializedAs("oldName")] // Maintain serialization after rename
    [ContextMenu("Function")]           // Add Inspector context menu
    [ContextMenuItem("Menu", "Function")] // Add field context menu
    [Delayed]                           // Update only after edit complete
    [NonSerialized]                     // Prevent serialization

    // Custom Editor Attributes
    [CustomEditor(typeof(Type))]    // Create custom Inspector
    [PropertyDrawer(typeof(Type))] // Custom property rendering
    [CanEditMultipleObjects]        // Enable multi-object editing
    [ExecuteInEditMode]             // Run in Editor mode
    [ExecuteAlways]                 // Run in Editor and Play mode
    [CreateAssetMenu]               // Create custom assets
    [AddComponentMenu("Path")]      // Add to Component menu
    [DisallowMultipleComponent]     // Prevent component duplication
    [DefaultExecutionOrder(0)]      // Set script execution order
    [HelpURL("URL")]                // Add help documentation link
    [InitializeOnLoad]              // Execute on Editor load
    [InitializeOnLoadMethod]        // Method called on load
    [SelectionBase]                 // Set primary selection target
}
```

UNITY CHEAT-SHEET
DEBUGGING

PART-5

```
// Unity Debugging Cheat Sheet
public class DebuggingGuide : MonoBehaviour
{
    // Console Debug Functions
    Debug.Log("message");                                   // General information logging
    Debug.LogWarning("warning");                            // Non-critical issues
    Debug.LogError("error");                                // Critical problems
    Debug.LogAssertion("assert");                           // Condition validation
    Debug.LogException(exception);                          // Exception handling
    Debug.ClearDeveloperConsole();                          // Clear the console logs
    Debug.Break();                                          // Pause the editor for inspection

    // Scene View Debug
    Debug.DrawLine(start, end, color);                      // Draw lines in the scene
    Debug.DrawRay(origin, direction, color);                // Visualize raycasts
    Debug.DrawLine(transform.position, targetPos, Color.green, 2f);  // Line with duration
    Debug.DrawRay(transform.position, Vector3.forward * 10, Color.red);  // Directional ray

    // Editor Gizmos
    void OnDrawGizmos() =>                                  // Draw a sphere at object position
            Gizmos.DrawSphere(transform.position, 1f);

    void OnDrawGizmosSelected() =>                          // Draw wireframe cube
            Gizmos.DrawWireCube(transform.position, Vector3.one);


    // Performance Profiling
    ProfilerMarker marker = new ProfilerMarker("PerformanceMarker");
    marker.Begin();                                         // Begin profiling a section of code
    marker.End();                                           // End profiling

    Profiler.BeginSample("SampleTask");                     // Start a custom profiler sample
    Profiler.EndSample();                                   // End the sample

    // Physics Debugging
    Debug.Break();                                          // Pause the editor on a specific frame
    Physics.IgnoreCollision(collider1, collider2, true);    // Temporarily ignore collisions
    Physics.OverlapSphere(transform.position, 5f);          // Visualize overlapping objects

    // Network Debugging
    Debug.Log($"Network status: {Application.internetReachability}");  // Check network status
    Debug.Log($"Host name: {SystemInfo.deviceName}");       // Log the host name

    // Additional Utility
    Debug.Log($"Active scene: {UnityEngine.SceneManagement.SceneManager.GetActiveScene().name}"); // Active scene
    Debug.Log($"Frame count: {Time.frameCount}");           // Log current frame count
    Debug.Log($"Delta time: {Time.deltaTime}");             // Log time between frames
}
```

UNITY CHEAT-SHEET

PART-6/50

1/2 NEW INPUT SYSTEM

```
// Unity Input System Bible
// Setup & Configuration
[SerializeField] InputActionAsset inputAsset;          // Asset reference
[SerializeField] PlayerInput playerInput;              // Player Input Component
InputActionMap gameplayMap;                            // Action Map reference
InputAction moveAction;                                // Single action

// Action Maps & Bindings
new InputActionMap("GameplayMap");                     // Create map
action.AddBinding("<Keyboard>/w");                     // Basic binding
action.AddBinding("<Gamepad>/leftStick");              // Controller binding
action.AddBinding("<Mouse>/delta");                    // Mouse binding
action.AddBinding("<Touchscreen>/primaryTouch");       // Touch binding
action.AddBinding("<XRController>/trigger");           // VR binding

// Composite Bindings
action.AddCompositeBinding("2DVector")                 // WASD/Arrow Setup
    .With("Up", "<Keyboard>/w")
    .With("Down", "<Keyboard>/s")
    .With("Left", "<Keyboard>/a")
    .With("Right", "<Keyboard>/d");

// Input Path Syntax Examples
"<Gamepad>/"                                           // All gamepad inputs
"<Keyboard>/anyKey"                                    // Any keyboard key
"<Mouse>/leftButton"                                   // Mouse buttons
"<XRController>{LeftHand}/trigger"                     // VR controls

// Reading Input Values
action.ReadValue<Vector2>();                           // Get vector input
action.ReadValue<float>();                             // Get scalar input
action.IsPressed();                                    // Button state
action.WasPressedThisFrame();                          // Frame check
action.WasReleasedThisFrame();                         // Release check
action.IsInProgress();                                 // Action status

// Input Events & Callbacks
action.performed += ctx => { };                        // Input performed
action.started += ctx => { };                          // Input started
action.canceled += ctx => { };                         // Input canceled
InputSystem.onDeviceChange += (d,c) => { };            // Device events
playerInput.onActionTriggered += ctx => { };           // PlayerInput events
```

MORE ABOUT NEW INPUT SYSTEM IN NEXT SHEET

UNITY CHEAT-SHEET

PART-7/50

2/2 NEW INPUT SYSTEM

```
// Interaction Types
action.AddBinding().WithInteraction("Tap");          // Quick press
action.AddBinding().WithInteraction("Hold");         // Press and hold
action.AddBinding().WithInteraction("SlowTap");      // Delayed tap
action.AddBinding().WithInteraction("MultiTap");     // Multiple taps

// Device Management
InputSystem.devices;                                 // All devices
Gamepad.all;                                         // All gamepads
Gamepad.current;                                     // Active gamepad
InputSystem.EnableDevice(device);                    // Enable device
InputSystem.DisableDevice(device);                   // Disable device

// Haptic Feedback
gamepad.SetMotorSpeeds(leftMotor, rightMotor);       // Set vibration
gamepad.PauseHaptics();                              // Pause haptics
gamepad.ResumeHaptics();                             // Resume haptics
gamepad.ResetHaptics();                              // Stop haptics

// Control Schemes
playerInput.SwitchCurrentControlScheme("Gamepad");   // Switch to gamepad
playerInput.currentControlScheme;                    // Current scheme
playerInput.devices;                                 // Active devices

// Input Settings
InputSystem.settings.updateMode;                     // Update timing
InputSystem.settings.filterNoiseOnCurrent;           // Noise filtering
action.processors = "normalize(min=0,max=1)";        // Input processing

// Debugging Tools
Debug.Log(action.enabled);                           // Action state
Debug.Log(action.controls);                          // Bound controls
Debug.Log(InputSystem.devices.Count);                // Device count
```

MORE ABOUT NEW INPUT SYSTEM IN PREVIOUS SHEET

UNITY CHEAT-SHEET
RENDERING PIPELINE

PART-8/50

```cpp
public class UnityRenderPipeline : MonoBehaviour
{
    // === Camera === //
    Camera.main.RenderWithShader();     // Renders the camera's view using a replacement shader.
    Camera.main.allowHDR;               // Indicates if High Dynamic Range (HDR) rendering is enabled.
    Camera.main.allowMSAA;              // Indicates if Multi-Sample Anti-Aliasing (MSAA) is enabled.
    Camera.main.renderingPath;          // Specifies the rendering path used by the camera.

    // === QualitySettings === //
    QualitySettings.SetQualityLevel();  // Sets the current quality level by index.
    QualitySettings.antiAliasing;       // Gets or sets the level of Multi-Sample Anti-Aliasing (MSAA).
    QualitySettings.softParticles;      // Indicates if soft blending is used for particles.
    QualitySettings.shadows;            // Specifies the shadow quality.
    QualitySettings.shadowResolution;   // Defines the resolution of shadows.
    QualitySettings.shadowDistance;     // Sets the maximum distance at which shadows are visible.
    QualitySettings.shadowCascades;     // Determines the number of cascades used for directional light shadows.

    // === Light === //
    light.renderMode;                   // Specifies whether the light uses per-pixel or per-vertex rendering.
    light.shadows;                      // Determines the type of shadows the light casts.

    // === ReflectionProbe === //
    reflectionProbe.mode;               // Sets the probe to real-time or baked reflections.
    reflectionProbe.resolution;         // Specifies the resolution of the reflection probe.
    reflectionProbe.refreshMode;        // Determines when the reflection probe updates its reflections.

    // === RenderSettings === //
    RenderSettings.ambientMode;         // Sets the mode of ambient light in the scene.
    RenderSettings.ambientProbe;        // Provides the ambient light data for the scene.

    // === Shader === //
    Shader.globalRenderPipeline;        // Specifies the name of the current render pipeline.
    Shader.Find();                      // Retrieves a shader by its name.

    // === Material === //
    material.EnableKeyword();           // Enables a shader keyword for this material.
    material.globalIlluminationFlags;   // Controls how the material interacts with global illumination.
    material.enableInstancing;          // Indicates if GPU instancing is enabled for this material.

    // === Graphics === //
    Graphics.DrawMeshInstanced();       // Renders multiple instances of a mesh with the same material.
    Graphics.DrawProceduralNow();       // Draws procedural geometry immediately.

    // === LODGroup === //
    LODGroup.ForceLOD();                // Forces the LOD group to display a specific LOD level.
    new LOD();                          // Initializes a new Level of Detail (LOD) instance.
}
```

UNITY CHEAT-SHEET
ANIMATIONS

PART-9/50

```cs
public class Animations : MonoBehaviour
{
    // === Animator === //
    animator.SetBool();                         // Sets a boolean parameter.
    animator.SetFloat();                        // Sets a float parameter.
    animator.SetInteger();                      // Sets an integer parameter.
    animator.SetTrigger();                      // Sets a trigger parameter.
    animator.ResetTrigger();                    // Resets a trigger parameter.
    animator.Play();                            // Plays an animation by name.
    animator.CrossFade();                       // Crossfades to another animation.
    animator.PlayInFixedTime();                 // Plays an animation at a fixed time.
    animator.StopPlayback();                    // Stops current playback.
    animator.IsInTransition();                  // Checks if a layer is in transition.
    animator.GetCurrentAnimatorStateInfo();     // Gets the current state info of a layer.
    animator.GetNextAnimatorStateInfo();        // Gets the next state info of a layer.
    animator.GetCurrentAnimatorClipInfo();      // Gets the current clip info of a layer.
    animator.Rebind();                          // Rebinds the animator.
    animator.Update();                          // Updates the animator with delta time.
    animator.SetLayerWeight();                  // Sets blending weight for a layer.
    animator.GetLayerWeight();                  // Gets blending weight of a layer.
    animator.GetLayerName();                    // Gets the name of a layer.
    animator.GetLayerIndex();                   // Gets the index of a layer.
    animator.applyRootMotion;                   // Enables or disables root motion.
    animator.bodyPosition;                      // Gets or sets animator's body position.
    animator.bodyRotation;                      // Gets or sets animator's body rotation.
    animator.updateMode;                        // Sets how the animator is updated.
    animator.stabilizeFeet;                     // Enables foot stabilization.

    // === Animator.StringToHash === //
    Animator.StringToHash();                    // Converts a parameter name to hash for performance.

    // === AnimationEvent === //
    AnimationEvent.functionName;                // Name of the callback function.
    AnimationEvent.floatParameter;              // Float argument for the callback.
    AnimationEvent.intParameter;                // Int argument for the callback.
    AnimationEvent.stringParameter;             // String argument for the callback.
    AnimationEvent.time;                        // Time in seconds when event triggers.

    // === AnimationCurve === //
    AnimationCurve.Linear();                    // Creates a linear animation curve.
    AnimationCurve.EaseInOut();                 // Creates an ease-in-out curve.
    AnimationCurve.AddKey();                    // Adds a keyframe.
    AnimationCurve.RemoveKey();                 // Removes a keyframe by index.
    AnimationCurve.MoveKey();                   // Moves a keyframe to a new time.
    animationCurve.Evaluate();                  // Evaluates the curve at a given time.
}
```

UNITY CHEAT-SHEET

PART-10/50

AI: NAVMESH AGENT

```
public class AINavmesh : MonoBehaviour
{
    // === NavMeshAgent === //
    agent.SetDestination();              // Sets the target destination.
    agent.ResetPath();                   // Clears the current navigation path.
    agent.Move();                        // Moves the agent manually.
    agent.Warp();                        // Warps the agent to a specific position.
    agent.CompleteOffMeshLink();         // Completes movement across an off-mesh link.
    agent.isStopped;                     // Checks if agent is currently stopped.
    agent.velocity;                      // Current velocity of the agent.
    agent.remainingDistance;             // Distance remaining to the destination.
    agent.pathPending;                   // Whether a path is being computed.
    agent.hasPath;                       // Whether the agent has a current path.
    agent.pathStatus;                    // The status of the current path.
    agent.isOnOffMeshLink;               // Checks if agent is on an off-mesh link.
    agent.currentOffMeshLinkData;        // Data about the current off-mesh link.
    agent.speed;                         // Speed of the agent.
    agent.angularSpeed;                  // Angular rotation speed.
    agent.acceleration;                  // Acceleration rate.
    agent.stoppingDistance;              // Distance to stop before reaching destination.
    agent.autoBraking;                   // Enables or disables slowing near destination.
    agent.radius;                        // Collision radius of the agent.

    // === NavMesh === //
    NavMesh.CalculatePath();             // Calculates a path between two points.
    NavMesh.SamplePosition();            // Finds the closest point on the NavMesh.
    NavMesh.FindClosestEdge();           // Finds the nearest NavMesh edge from a point.
    NavMesh.GetAreaFromName();           // Gets area index by name.
    NavMesh.AddNavMeshData();            // Adds NavMesh data to the scene.
    NavMesh.RemoveAllNavMeshData();      // Removes all NavMesh data.
    NavMesh.Raycast();                   // Performs line trace to check NavMesh collisions.

    // === NavMeshPath === //
    agent.CalculatePath();               // Calculates path and stores in NavMeshPath.
    path.status;                         // Gets the current path status.

    // === NavMeshHit === //
    hit.position;                        // Position where the raycast hit.
    hit.normal;                          // Surface normal at hit point.
    hit.mask;                            // Area mask of the hit.
    hit.distance;                        // Distance from origin to hit.

    // === NavMeshQueryFilter === //
    filter.areaMask;                     // Defines area mask for queries.
    filter.agentTypeID;                  // Specifies agent type ID.

    // === NavMeshObstacle === //
    obstacle.carving;                    // Enables dynamic carving for obstacle.
    obstacle.carveOnlyStationary;        // Carves only when stationary.
    obstacle.shape;                      // Shape of the obstacle.
}
```

UNITY CHEAT-SHEET

PART-11/50

UI

```
public class UI : MonoBehaviour
{
    // === Canvas === //
    Canvas.renderMode;                  // Canvas render mode.
    Canvas.worldCamera;                 // Camera used for rendering.
    Canvas.pixelPerfect;                // Enables pixel-perfect rendering.
    Canvas.sortingOrder;                // Canvas sorting order.
    Canvas.ForceUpdateCanvases();       // Forces canvas layout update.

    // === RectTransform === //
    rectTransform.anchoredPosition; // Pivot position relative to anchors.
    rectTransform.anchorMin;        // Lower anchor point.
    rectTransform.anchorMax;        // Upper anchor point.
    rectTransform.offsetMin;        // Offset from lower anchor.
    rectTransform.offsetMax;        // Offset from upper anchor.
    rectTransform.sizeDelta;        // Size between anchors.
    rectTransform.pivot;            // Pivot point for rotation/scaling.

    // === CanvasGroup === //
    canvasGroup.alpha;              // Canvas transparency.
    canvasGroup.interactable;       // Enables UI interaction.
    canvasGroup.blocksRaycasts;     // Allows raycast detection.

    // === TextMeshProUGUI === //
    tmp.text;                       // Text content.
    tmp.fontSize;                   // Font size.
    tmp.alignment;                  // Text alignment.
    tmp.color;                      // Text color.

    // === RawImage === //
    rawImage.texture;               // Displayed texture.
    rawImage.color;                 // Tint color.
    rawImage.uvRect;                // UV mapping rectangle.

    // === Button === //
    button.onClick.AddListener();   // Button click listener.
    button.interactable;            // Button interactivity.

    // === Image === //
    image.sprite;                   // Displayed sprite.
    image.color;                    // Image tint color.
    image.fillAmount;               // Fill amount (e.g., progress).
}
```

UNITY CHEAT-SHEET
COLLISIONS

PART-12/50

```
public class UnityCollisions : MonoBehaviour
{
    // === Collider === //
    collider.enabled;                       // Enables or disables the collider.
    collider.isTrigger;                     // Collider acts as a trigger, not a solid object.
    collider.material;                      // Physics material for friction and bounce.
    collider.bounds;                        // World-space bounding box of the collider.
    collider.sharedMaterial;                // Shared physics material across colliders.
    collider.contactOffset;                 // Skin width padding for collision detection.

    // === BoxCollider === //
    boxCollider.size;                       // Defines the dimensions of the box.
    boxCollider.center;                     // Set the center of the box collider.

    // === SphereCollider === //
    sphereCollider.radius;                  // Radius of the sphere collider.
    sphereCollider.center;                  // Center of the sphere collider.

    // === CapsuleCollider === //
    capsuleCollider.radius;                 // Radius of the capsule.
    capsuleCollider.height;                 // Height of the capsule.
    capsuleCollider.direction;              // Axis of capsule height (X=0, Y=1, Z=2).
    capsuleCollider.center;                 // Center of the capsule collider.

    // === MeshCollider === //
    meshCollider.sharedMesh;                // Mesh assigned to the mesh collider.
    meshCollider.convex;                    // Should be set to true for dynamic rigidbodies.

    // === TerrainCollider === //
    terrainCollider.terrainData;            // Assign terrain data to the terrain collider.
    terrainCollider.bounds;                 // World-space bounds of the terrain collider.

    // === WheelCollider === //
    wheelCollider.motorTorque;              // Applies motor torque to the wheel.
    wheelCollider.brakeTorque;              // Applies brake torque to the wheel.
    wheelCollider.steerAngle;               // Steering angle in degrees.
    wheelCollider.suspensionSpring;         // Suspension settings for the wheel collider.

    // === Collision Events === //
    OnCollisionEnter();                     // Called on collision start.
    OnCollisionStay();                      // Called while colliding.
    OnCollisionExit();                      // Called when collision ends.
    OnTriggerEnter();                       // Called when entering trigger collider.
    OnTriggerStay();                        // Called while staying in trigger.
    OnTriggerExit();                        // Called when exiting trigger collider.

    // === Physics (Static Methods) === //
    Physics.IgnoreCollision();              // Prevent collision between two colliders.
    Physics.IgnoreLayerCollision();         // Ignore collisions between layers.
    Physics.OverlapSphere();                // Returns all colliders within a sphere.
    Physics.CheckBox();                     // Checks if a box overlaps colliders.
    Physics.CheckSphere();                  // Checks if a sphere overlaps colliders.
    Physics.CheckCapsule();                 // Checks if a capsule overlaps colliders.
    Physics.Raycast();                      // Casts a ray and checks for collision.
    Physics.RaycastAll();                   // Returns all ray hits.
    Physics.RaycastNonAlloc();              // Raycast without allocating new array.
    Physics.BoxCast();                      // Casts a box and checks for collision.
}
```

UNITY CHEAT-SHEET

PART-13/50

CAMERA

```
public class UnityCameraCheatSheet : MonoBehaviour
{
    // === Camera Properties === //
    camera.fieldOfView;                         // View angle in degrees.
    camera.orthographic;                        // Enables orthographic mode.
    camera.orthographicSize;                    // Half height of the camera view.
    camera.aspect;                              // Width-to-height ratio.
    camera.nearClipPlane;                       // Closest render distance.
    camera.farClipPlane;                        // Farthest render distance.
    camera.depth;                               // Rendering order.
    camera.cullingMask;                         // Layers the camera renders.
    camera.backgroundColor;                     // Camera clear color.
    camera.clearFlags;                          // How the screen is cleared.

    // === Rendering and Effects === //
    camera.allowHDR;                            // Enables HDR rendering.
    camera.allowMSAA;                           // Enables MSAA.
    camera.renderingPath;                       // Rendering technique used.
    camera.targetTexture;                       // Output render texture.
    camera.depthTextureMode;                    // Depth texture generation.

    // === Camera Transformations === //
    camera.WorldToScreenPoint();                // World to screen position.
    camera.ScreenToWorldPoint();                // Screen to world position.
    camera.ScreenToViewportPoint();             // Screen to viewport position.
    camera.ViewportToScreenPoint();             // Viewport to screen position.
    camera.ViewportToWorldPoint();              // Viewport to world position.
    camera.ScreenPointToRay();                  // Screen point to ray.
    camera.ViewportPointToRay();                // Viewport point to ray.

    // === Physical Camera Properties === //
    camera.usePhysicalProperties;               // Enables physical camera mode.
    camera.focalLength;                         // Lens focal length (mm).
    camera.sensorSize;                          // Camera sensor size (mm).
    camera.lensShift;                           // Offset lens horizontally/vertically.
    camera.gateFit;                             // Fit mode for gate and sensor.

    // === Multi-Display Settings === //
    camera.targetDisplay;                       // Display index to render to.

    // === Camera Events === //
    OnPreCull();                                // Before culling.
    OnPreRender();                              // Before rendering.
    OnPostRender();                             // After rendering.

    // === Multi-Pass and Custom Renders === //
    camera.AddCommandBuffer();                  // Adds a custom render pass.
    camera.RemoveCommandBuffer();               // Removes a render pass.
}
```

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PHSIYCS: RIGIDBODY

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```
// Basic Movement
rb.velocity = new Vector3(5f, 0f, 0f);
rb.AddForce(Vector3.up * 500f);
rb.AddForce(Vector3.up * 10f, ForceMode.Impulse);
rb.MovePosition(transform.position + movement * Time.fixedDeltaTime);
Vector3 pointVel = rb.GetPointVelocity(worldPoint);
Vector3 relativeVel = rb.GetRelativePointVelocity(relativePoint);

// Rotation
rb.angularVelocity = new Vector3(0f, 90f, 0f);
rb.AddTorque(transform.up * 50f);
rb.AddRelativeTorque(Vector3.up * 10f);
rb.MoveRotation(Quaternion.Euler(0f, 90f, 0f));

// Impact & Physics State
rb.AddExplosionForce(1000f, explosionCenter, 10f, 2f);
rb.AddForceAtPosition(Vector3.up * 10f, transform.position + offset);
rb.Sleep();
rb.WakeUp();
bool isSleeping = rb.IsSleeping();

// Properties & Constraints
rb.mass = 5f;
rb.drag = 1f;
rb.angularDrag = 0.5f;
rb.useGravity = true;
rb.isKinematic = false;
rb.constraints = RigidbodyConstraints.FreezePositionX |
                 RigidbodyConstraints.FreezeRotationZ;

// Center of Mass
rb.centerOfMass = new Vector3(0f, 1f, 0f);
rb.ResetCenterOfMass();

// Velocity Operations
rb.GetPointVelocity(worldPoint);
rb.GetRelativePointVelocity(relativePoint);
```

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SHADERS AND MATERIALS

```
public class ShadersAndMaterials : MonoBehaviour
{
    // === Material === //
    material.SetColor();                        // Set color.
    material.SetTexture();                      // Set texture.
    material.SetFloat();                        // Set float.
    material.mainTexture;                       // Main texture.
    material.mainTextureScale;                  // Texture scale.
    material.mainTextureOffset;                 // Texture offset.
    material.shader;                            // Assigned shader.

    // === Shader Keywords === //
    material.EnableKeyword();                   // Enable keyword.
    material.DisableKeyword();                  // Disable keyword.
    material.IsKeywordEnabled();                // Check keyword state.

    // === Shader Properties === //
    material.SetMatrix();                       // Set matrix.
    material.SetVector();                       // Set vector.

    // === GPU Instancing === //
    material.enableInstancing;                  // GPU instancing toggle.

    // === Rendering === //
    material.renderQueue;                       // Render queue.
    material.globalIlluminationFlags;           // GI flags.

    // === Shader Utilities === //
    Shader.PropertyToID();                      // Get property ID.
    Shader.SetGlobalFloat();                    // Set global float.
    Shader.SetGlobalVector();                   // Set global vector.
    Shader.SetGlobalColor();                    // Set global color.
    Shader.SetGlobalTexture();                  // Set global texture.
    Shader.EnableKeyword();                     // Enable global keyword.
    Shader.DisableKeyword();                    // Disable global keyword.
    Shader.WarmupAllShaders();                  // Precompile shaders.

    // === Advanced Shader Properties === //
    material.SetOverrideTag();                  // Override render tag.
    material.GetTag();                          // Get render tag.

    // === Shader Debugging === //
    material.shader.isSupported;                // Shader supported?
    material.shader.passCount;                  // Pass count.
    material.shader.name;                       // Shader name.

    // === Shader Graph === //
    material.SetVector();                       // Set Shader Graph vector.
    material.SetTexture();                      // Set Shader Graph texture.

    // === Shader Passes & Pipeline === //
    material.SetShaderPassEnabled();            // Enable pass.
    material.GetShaderPassEnabled();            // Check pass state.
    Shader.Find();                              // Find shader.
    material.shader.name;                       // Pipeline shader name.
    material.CopyPropertiesFromMaterial();      // Copy material props.
    material.doubleSidedGI;                     // Enable double-sided GI.
}
```

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PARTICLE SYSTEM

```
public class ParticleSystem : MonoBehaviour
{
    // === Main Module === //
    main.duration;                          // System duration.
    main.loop;                              // Looping enabled.
    main.prewarm;                           // Prewarm enabled.
    main.startLifetime;                     // Initial particle lifetime.
    main.startSpeed;                        // Initial particle speed.
    main.startSize;                         // Initial particle size.
    main.startRotation;                     // Initial particle rotation.
    main.startColor;                        // Initial particle color.
    main.gravityModifier;                   // Gravity multiplier.

    // === Emission Module === //
    emission.enabled;                       // Emission enabled.
    emission.rateOverTime;                  // Emission rate over time.
    emission.rateOverDistance;              // Emission rate over distance.
    emission.SetBursts();                   // Set burst emissions.
    emission.GetBursts();                   // Get burst emissions.

    // === Shape Module === //
    shape.enabled;                          // Shape module enabled.
    shape.shapeType;                        // Shape of emission.
    shape.angle;                            // Angle of cone emission.
    shape.radius;                           // Radius of shape.
    shape.arc;                              // Arc angle for emission.

    // === Velocity over Lifetime === //
    velocityOverLifetime.enabled;           // Velocity over lifetime enabled.
    velocityOverLifetime.x;                 // X-axis velocity curve.
    velocityOverLifetime.y;                 // Y-axis velocity curve.
    velocityOverLifetime.z;                 // Z-axis velocity curve.

    // === Limit Velocity over Lifetime === //
    limitVelocityOverLifetime.enabled;      // Limit velocity over lifetime enabled.
    limitVelocityOverLifetime.limit;        // Velocity limit.
    limitVelocityOverLifetime.dampen;       // Dampen factor.

    // === Inherit Velocity Module === //
    inheritVelocity.enabled;                // Inherit velocity enabled.
    inheritVelocity.mode;                   // Inherit velocity mode.
    inheritVelocity.curve;                  // Velocity inheritance curve.

    // === Force over Lifetime Module === //
    forceOverLifetime.enabled;              // Force over lifetime enabled.
    forceOverLifetime.x;                    // X-axis force curve.
    forceOverLifetime.y;                    // Y-axis force curve.
    forceOverLifetime.z;                    // Z-axis force curve.

    // === Noise Module === //
    noise.enabled;                          // Noise module enabled.
    noise.strength;                         // Strength of noise.
    noise.frequency;                        // Frequency of noise.
    noise.scrollSpeed;                      // Scroll speed of noise.
}
```

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TIMELINE AND CINEMACHINE

```
public class TimelineAndCinemachine : MonoBehaviour
{
    // === PlayableDirector === //
    playableDirector.playableAsset;                    // Assigns a timeline asset to the director.
    playableDirector.time;                             // Sets the current time on the timeline.
    playableDirector.Play();                           // Starts playing the timeline.
    playableDirector.Pause();                          // Pauses timeline playback.
    playableDirector.Stop();                           // Stops the timeline.
    playableDirector.Evaluate();                       // Evaluates timeline at the current time.
    playableDirector.playOnAwake;                      // Plays the timeline on Awake.
    playableDirector.extrapolationMode;                // Sets out-of-range time behavior.
    playableDirector.timeUpdateMode;                   // Sets how the timeline updates.
    playableDirector.duration;                         // Returns the duration of the timeline.
    playableDirector.state;                            // Gets the current state of the timeline.
    playableDirector.RebuildGraph();                   // Rebuilds the PlayableGraph for the timeline.

    // === Timeline Track Binding === //
    playableDirector.SetGenericBinding();              // Binds a track to a GameObject or component.
    playableDirector.ClearGenericBinding();            // Clears a previously bound track.
    timeLineAsset.CreateTrack();                       // Creates a new track (e.g., AnimationTrack).

    // === CinemachineVirtualCamera === //
    cinemachineVirtualCamera.m_Lens.FieldOfView;       // Sets the field of view.
    cinemachineVirtualCamera.m_Lens.Orthographic;      // Toggles orthographic mode.
    cinemachineVirtualCamera.m_Lens.NearClipPlane;     // Sets near clip plane distance.
    cinemachineVirtualCamera.m_Lens.FarClipPlane;      // Sets far clip plane distance.
    cinemachineVirtualCamera.Priority;                 // Sets camera priority.
    cinemachineVirtualCamera.m_FollowOffset;           // Sets the camera follow offset.
    cinemachineVirtualCamera.m_LookAtTargetAttachment; // Sets look-at target strength.

    // === CinemachineTransposer === //
    cinemachineTransposer.m_FollowOffset;              // Sets the follow offset.
    cinemachineTransposer.m_XDamping;                  // Sets damping on X-axis.
    cinemachineTransposer.m_YDamping;                  // Sets damping on Y-axis.
    cinemachineTransposer.m_ZDamping;                  // Sets damping on Z-axis.

    // === CinemachineComposer === //
    cinemachineComposer.m_TrackedObjectOffset;         // Sets the tracked object offset.
    cinemachineComposer.m_SoftZoneWidth;               // Width of the soft zone.
    cinemachineComposer.m_DeadZoneWidth;               // Width of the dead zone.
    cinemachineComposer.m_BiasX;                       // Bias along the X-axis.
    cinemachineComposer.m_BiasY;                       // Bias along the Y-axis.

    // === Follow and LookAt === //
    cinemachineVirtualCamera.Follow;                   // Sets the object to follow.
    cinemachineVirtualCamera.LookAt;                   // Sets the object to look at.

    // === CinemachineBlendDefinition === //
    blendDef.m_Style;                                  // Blend style (EaseInOut, etc).
    blendDef.m_Time;                                   // Blend duration.
    virtualCamera.SetBlendOverride();                  // Applies custom blend settings.
}
```

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GAME OBJECTS

Problem: To find Object in scene

Solution:

```
// Finding GameObjects
GameObject.Find("ObjectName")
GameObject.FindWithTag("TagName")
GameObject.FindGameObjectsWithTag("TagName")
```

Problem: Getting Attached Components

Solution:

```
// Component Management
gameObject.AddComponent<T>()
gameObject.GetComponent<T>()
gameObject.GetComponents<T>()
gameObject.GetComponentInChildren<T>()
gameObject.GetComponentInParent<T>()
```

Problem: Creating and Destroying Game Objects

Solution:

```
// Instantiation and Destruction
Instantiate(gameObject)
Destroy(gameObject)
Destroy(gameObject, float delay)
DontDestroyOnLoad(gameObject)
```

Problem: Creating and Destroying Game Objects

Solution:

```
// ═══ Hierarchy Control Functions with Child, Sibling, or Parent Keywords ═══ //
gameObject.transform.SetParent(parentTransform, worldPositionStays);
gameObject.transform.parent = parentTransform;
gameObject.transform.DetachChildren();
gameObject.transform.Find("ChildName");
gameObject.transform.GetChild(0);
int childCount = gameObject.transform.childCount;
gameObject.transform.IsChildOf(parentTransform);
gameObject.transform.GetSiblingIndex();
gameObject.transform.SetSiblingIndex(2);
gameObject.transform.root;
```

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TERRAIN SYSTEM

```
public class TerrainSystem : MonoBehaviour
{
    // === Terrain Properties === //
    terrain.terrainData;                        // Assigns terrain data.
    terrain.heightmapPixelError;                // LOD accuracy.
    terrain.basemapDistance;                    // Distance to display base map.
    terrain.shadowCastingMode;                  // Enables/disables terrain shadows.
    terrain.materialTemplate;                   // Assigns custom terrain material.
    terrain.drawTreesAndFoliage;                // Toggles tree/foliage rendering.
    terrain.reflectionProbeUsage;               // Reflection probe mode.
    terrain.collectDetailPatches;               // Enables detail patch collection.
    terrain.allowAutoConnect;                   // Auto-connects to neighboring terrains.
    terrain.groupingID;                         // Group ID for terrain auto-connection.

    // === TerrainData Properties === //
    terrainData.heightmapResolution;            // Heightmap resolution.
    terrainData.size;                           // Terrain dimensions.
    terrainData.alphamapResolution;             // Splat map resolution.
    terrainData.baseMapResolution;              // Base map resolution.
    terrainData.SetHeights();                   // Set terrain heightmap.
    terrainData.SetAlphamaps();                 // Set alpha/splat map.
    terrainData.SetDetailResolution();          // Set detail map resolution.
    terrainData.wavingGrassStrength;            // Grass wave strength.
    terrainData.wavingGrassSpeed;               // Grass wave speed.
    terrainData.wavingGrassAmount;              // Grass wave amount.
    terrainData.wavingGrassTint;                // Grass tint color.
    terrainData.GetHeights();                   // Get terrain heightmap.

    // === Terrain Layers === //
    terrainLayer.diffuseTexture;                // Base texture.
    terrainLayer.normalMapTexture;              // Normal map.
    terrainLayer.maskMapTexture;                // Mask map.
    terrainLayer.tileSize;                      // Texture tile size.
    terrainLayer.tileOffset;                    // Texture tile offset.

    // === Tree and Detail Management === //
    terrainData.treeInstances;                  // All tree instances.
    terrainData.treePrototypes;                 // Tree prefab prototypes.
    terrainData.detailObjectDistance;           // Detail object draw distance.
    terrainData.detailObjectDensity;            // Detail object density.
    terrainData.RefreshPrototypes();            // Refresh prototype data.
    terrainData.SetDetailLayer();               // Set specific detail map layer.

    // === Terrain Physics === //
    terrainData.SetHeightsDelayLOD();           // Update heights with LOD.
    terrainData.SyncHeightmap();                // Sync physics with heightmap.
    terrain.terrainData.ContainsPosition();     // Check if point is within terrain.

    // === Terrain Texture Blending === //
    terrainData.GetAlphamaps();                 // Get splat/alpha map.
    terrainData.SetAlphamaps();                 // Set splat/alpha map.

    // === Terrain Debugging === //
    terrainData.GetInterpolatedHeight();        // Height at normalized coords.
    terrainData.GetInterpolatedNormal();        // Normal at normalized coords.
    terrainData.GetTreeInstance();              // Get specific tree instance.
}
```

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AUDIO SYSTEM

```
public class AudioSystem : MonoBehaviour
{
    // === AudioSource === //
    audioSource.clip;                   // Assigned clip.
    audioSource.volume;                 // Set volume.
    audioSource.pitch;                  // Set pitch.
    audioSource.loop;                   // Enable looping.
    audioSource.mute;                   // Mute toggle.
    audioSource.spatialBlend;           // 2D/3D blend.
    audioSource.priority;               // Playback priority.
    audioSource.Play();                 // Play audio.
    audioSource.Stop();                 // Stop audio.
    audioSource.Pause();                // Pause audio.

    // === AudioListener === //
    AudioListener.pause;                // Pause all audio.
    AudioListener.volume;               // Global volume.
    AudioListener.GetSpectrumData();    // Get FFT spectrum data.
    AudioListener.GetOutputData();      // Get raw audio output.

    // === AudioClip === //
    audioClip.length;                   // Clip length in seconds.
    audioClip.channels;                 // Number of audio channels.
    audioClip.frequency;                // Sampling frequency.
    audioClip.LoadAudioData();          // Load audio to memory.
    audioClip.UnloadAudioData();        // Unload clip data.

    // === AudioMixer === //
    audioMixer.SetFloat();              // Set exposed param.
    audioMixer.GetFloat();              // Get exposed param.
    audioMixer.ClearFloat();            // Reset param to default.
    audioMixer.TransitionToSnapshots(); // Crossfade to snapshot.

    // === AudioMixerGroup === //
    audioSource.outputAudioMixerGroup;  // Assign mixer group.

    // === Microphone === //
    Microphone.devices;                 // Available microphones.
    Microphone.Start();                 // Start recording.
    Microphone.End();                   // Stop recording.
    Microphone.IsRecording();           // Is recording?
    Microphone.GetPosition();           // Current record position.

    // === AudioSettings === //
    AudioSettings.GetConfiguration();   // Audio config.
    AudioSettings.Reset();              // Reset audio system.
    AudioSettings.dspTime;              // DSP time.

    // === Audio Rolloff === //
    audioSource.minDistance;            // Min rolloff dist.
    audioSource.maxDistance;            // Max rolloff dist.
    audioSource.rolloffMode;            // Attenuation mode.
}
```

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MULTIPLAYER NETCODE

```
public class UnityNetcode : MonoBehaviour
{
    // === NetworkManager === //
    NetworkManager.Singleton;                          // Singleton instance of the NetworkManager.
    NetworkManager.StartHost();                        // Starts server and local client.
    NetworkManager.StartServer();                      // Starts the server only.
    NetworkManager.StartClient();                      // Starts the client only.
    NetworkManager.Shutdown();                         // Shuts down the network session.
    NetworkManager.OnServerStarted += ();              // Triggered when the server starts.
    NetworkManager.OnClientConnectedCallback += ();    // Called when a client connects.
    NetworkManager.OnClientDisconnectCallback += ();   // Called when a client disconnects.

    networkManager.IsHost;                             // True if running as host.
    networkManager.IsServer;                           // True if running as server.
    networkManager.IsClient;                           // True if running as client.
    networkManager.IsListening;                        // True if listening for connections.
    networkManager.IsConnectedClient;                  // True if the client is connected.
    networkManager.LocalClientId;                      // Local client's unique ID.
    networkManager.ConnectedClients;                   // Dictionary of connected clients.
    networkManager.ConnectedClientsList;               // List of connected clients.
    networkManager.ConnectedClientsIds;                // List of connected client IDs.
    networkManager.NetworkConfig;                      // Configuration for networking.
    networkManager.SceneManager;                       // Scene manager for network loading.
    networkManager.CustomMessagingManager;             // Manager for custom messages.
    networkManager.NetworkTimeSystem;                  // Tracks synced network time.
    networkManager.NetworkTickSystem;                  // Tracks synced tick count.
    networkManager.ConnectionApprovalCallback += ();   // Callback for client approval.

    // === NetworkObject === //
    networkObject.Spawn();                             // Spawns the object on the network.
    networkObject.SpawnWithOwnership(0);               // Spawns the object with a specific owner.
    networkObject.Despawn();                           // Despawns the object.
    networkObject.NetworkObjectId;                     // Unique ID of the object.
    networkObject.OwnerClientId;                       // Client ID that owns the object.
    networkObject.IsOwner;                             // True if this client owns the object.
    networkObject.IsOwnedByServer;                     // True if the server owns the object.
    networkObject.IsSpawned;                           // True if the object is spawned.
    networkObject.TrySetParent(transform);             // Sets the parent of the object (server only).
    networkObject.RemoveParent();                      // Removes the object's parent (server only).
    networkObject.ChangeOwnership(1);                  // Transfers ownership to a client.
    networkObject.RemoveOwnership();                   // Removes client ownership.
}
```

UNITY CHEAT-SHEET

PART-22/50

PHYSICS PART 2

```
public class UnityPhysics : MonoBehaviour
{
    // === Rigidbody === //
    rigidbody.AddForce();                   // Apply force.
    rigidbody.AddTorque();                  // Apply torque.
    rigidbody.interpolation;                // Motion smoothing.
    rigidbody.collisionDetectionMode;       // Collision detection mode.
    rigidbody.isKinematic;                  // Toggle kinematic state.
    rigidbody.Sleep();                      // Put to sleep.
    rigidbody.WakeUp();                     // Wake up.
    rigidbody.useGravity;                   // Enable gravity.
    rigidbody.constraints;                  // Set movement/rotation constraints.

    // === Physics === //
    Physics.Raycast();                      // Perform raycast.
    Physics.OverlapSphere();                // Detect colliders in radius.
    Physics.autoSimulation;                 // Enable/disable auto simulation.
    Physics.Simulate();                     // Manually simulate physics.
    Physics.gravity;                        // Set custom gravity.
    Physics.IgnoreCollision();              // Ignore collisions.

    // === PhysicMaterial === //
    PhysicMaterial.bounciness;              // Bounciness level.
    PhysicMaterial.frictionCombine;         // Friction combine mode.

    // === Collider === //
    collider.material;                      // Assign physics material.
    collider.isTrigger;                     // Set as trigger.

    // === Joint === //
    hingeJoint.useSpring;                   // Enable spring.
    hingeJoint.spring;                      // Set spring properties.

    // === LayerMask === //
    LayerMask.GetMask();                    // Create layer mask.
    LayerMask.NameToLayer();                // Convert name to layer index.
    LayerMask.LayerToName();                // Convert layer index to name.
    LayerMask.value;                        // Layer mask bitmask value.
    LayerMask.op_Implicit();                // Implicit conversion between LayerMask and int.
}
```

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PART-23/50

UI - Part 2

```
public class UnityUIPart2 : MonoBehaviour
{
    // === Slider === //
    slider.value;                                   // Current value.
    slider.minValue;                                // Minimum value.
    slider.maxValue;                                // Maximum value.
    slider.wholeNumbers;                            // Use whole numbers only.
    slider.onValueChanged.AddListener();            // Listener for value change.

    // === Toggle === //
    toggle.isOn;                                    // Toggle state.
    toggle.onValueChanged.AddListener();            // Listener for toggle change.
    toggle.graphic;                                 // Target graphic for toggle.
    toggle.interactable;                            // Is toggle interactable?

    // === ScrollRect === //
    scrollRect.content;                             // Scrollable content.
    scrollRect.vertical;                            // Enable vertical scroll.
    scrollRect.horizontal;                          // Enable horizontal scroll.
    scrollRect.normalizedPosition;                  // Scroll position (0-1).
    scrollRect.velocity;                            // Current scroll velocity.
    scrollRect.onValueChanged.AddListener();        // Listener for scroll movement.

    // === InputField === //
    inputField.text;                                // Input text.
    inputField.placeholder;                         // Placeholder graphic/text.
    inputField.characterLimit;                      // Max characters allowed.
    inputField.lineType;                            // Line type (single/multi-line).
    inputField.contentType;                         // Content type (standard, password, etc.).
    inputField.onValueChanged.AddListener();        // Listener for text change.
    inputField.onEndEdit.AddListener();             // Listener for edit completion.

    // === Dropdown === //
    dropdown.options;                               // List of dropdown options.
    dropdown.AddOptions();                          // Add options to dropdown.
    dropdown.value;                                 // Selected index.
    dropdown.captionText;                           // Label displaying selected option.
    dropdown.onValueChanged.AddListener();          // Listener for selection change.

    // === EventSystem === //
    EventSystem.current.SetSelectedGameObject();    // Set selected UI object.
    EventSystem.current.currentSelectedGameObject;  // Currently selected object.
    EventSystem.current.IsPointerOverGameObject();  // Is pointer over any UI?

    // === Scrollbar === //
    scrollbar.value;                                // Scrollbar value.
    scrollbar.direction;                            // Scrollbar direction.
    scrollbar.numberOfSteps;                        // Discrete scroll steps.
    scrollbar.onValueChanged.AddListener();         // Listener for scrollbar value.

    // === GraphicRaycaster === //
    graphicRaycaster.ignoreReversedGraphics;        // Ignore backfacing UI elements.
    graphicRaycaster.blockingObjects;               // Blocking object settings.
    graphicRaycaster.enabled;                       // Enable or disable raycaster.
}
```

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ANIMATIONS - Part 2

```
public class UnityAnimation : MonoBehaviour
{
    // === PlayableGraph === //
    PlayableGraph.Create();                                  // Creates a new PlayableGraph.
    playableGraph.Play();                                    // Starts the playable graph.
    playableGraph.Stop();                                    // Stops the playable graph.
    playableGraph.IsValid();                                 // Checks if the graph is valid.
    playableGraph.Destroy();                                 // Destroys the playable graph.
    playableGraph.IsPlaying();                               // Checks if the graph is playing.
    playableGraph.Evaluate();                                // Manually evaluates the graph.

    // === AnimationPlayableOutput === //
    AnimationPlayableOutput.Create();                        // Creates an animation output for a graph.
    animationOutput.SetTarget();                             // Sets the Animator target.
    animationOutput.GetTarget();                             // Gets the Animator target.

    // === AnimationClipPlayable === //
    AnimationClipPlayable.Create();                          // Creates a playable from an AnimationClip.
    animationClipPlayable.SetApplyFootIK();                  // Enables/disables foot IK.
    animationClipPlayable.SetRemoveStartOffset();            // Removes clip start offset.
    animationClipPlayable.SetTime();                         // Sets playback time.
    animationClipPlayable.SetSpeed();                        // Sets playback speed.
    animationClipPlayable.GetAnimationClip();                // Returns the AnimationClip used.

    // === AnimationMixerPlayable === //
    AnimationMixerPlayable.Create();                         // Creates a new mixer playable.
    mixerPlayable.ConnectInput();                            // Connects an input to the mixer.
    mixerPlayable.SetInputWeight();                          // Sets input weight on the mixer.

    // === AnimationLayerMixerPlayable === //
    AnimationLayerMixerPlayable.Create();                    // Creates a new layer mixer.
    layerMixerPlayable.SetLayerMaskFromAvatarMask();         // Sets layer mask from avatar mask.
    layerMixerPlayable.SetLayerAdditive();                   // Sets a layer to additive blending.

    // === AnimatorControllerPlayable === //
    AnimatorControllerPlayable.Create();                     // Creates an animator controller playable.
    animatorControllerPlayable.Play();                       // Plays a state by name.
    animatorControllerPlayable.GetCurrentAnimatorStateInfo();// Gets current state info.
    animatorControllerPlayable.GetNextAnimatorStateInfo();   // Gets next state info.

    // === AnimatorStateInfo === //
    stateInfo.IsName();                                      // Checks if state matches given name.
    stateInfo.IsTag();                                       // Checks if state has specified tag.
    stateInfo.normalizedTime;                                // Normalized time (0-1).
    stateInfo.length;                                        // Length of the animation state.
    stateInfo.loop;                                          // Indicates if state loops.

    // === AvatarMask === //
    avatarMask.AddTransformPath();                           // Adds a transform path to the mask.
    avatarMask.RemoveTransformPath();                        // Removes a transform path by index.
    avatarMask.GetTransformPath();                           // Gets transform path by index.
    avatarMask.transformCount;                               // Number of transforms in the mask.

    // === AnimationMode (Editor only) === //
    AnimationMode.StartAnimationMode();                      // Starts Unity animation mode.
    AnimationMode.StopAnimationMode();                       // Stops Unity animation mode.
    AnimationMode.SampleAnimationClip();                     // Samples clip on GameObject at time.
}
```

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VECTOR3 OPERATIONS

```
public class UnityVector3Operations : MonoBehaviour
{
    // === Vector3 Constants === //
    Vector3.zero;                                   // Zero vector.
    Vector3.one;                                    // Vector with all components 1.
    Vector3.up;                                     // Unit vector up.
    Vector3.forward;                                // Unit vector forward.
    Vector3.right;                                  // Unit vector right.

    // === Vector3 Static Methods === //
    Vector3.Dot();                                  // Dot product of two vectors.
    Vector3.Cross();                                // Cross product of two vectors.
    Vector3.Lerp();                                 // Linear interpolation.
    Vector3.Slerp();                                // Spherical interpolation.
    Vector3.MoveTowards();                          // Move towards target.
    Vector3.Distance();                             // Distance between vectors.
    Vector3.Reflect();                              // Reflect vector off normal.
    Vector3.Project();                              // Project one vector onto another.
    Vector3.Angle();                                // Angle between vectors.
    Vector3.SignedAngle();                          // Signed angle between vectors.
    Vector3.SmoothDamp();                           // Gradual interpolation.
    Vector3.Scale();                                // Component-wise multiplication.
    Vector3.ClampMagnitude();                       // Clamp vector magnitude.
    Vector3.Min();                                  // Component-wise minimum.
    Vector3.Max();                                  // Component-wise maximum.
    Vector3.RotateTowards();                        // Rotate vector toward another.

    // === Vector3 Instance Methods === //
    position.Normalize();                           // Normalize this vector.
    position.ToString();                            // Format vector as string.
    position.Set();                                 // Set vector components.

    // === Vector3 Arithmetic Operations === //
    Vector3.one + Vector3.up;                       // Vector addition.
    Vector3.one - Vector3.up;                       // Vector subtraction.
    Vector3.one* 2;                                 // Scale vector.
    Vector3.one / 2;                                // Divide vector.

    // === Vector3 Comparisons === //
    Vector3.one == Vector3.up;                      // Equality comparison.
    Vector3.one != Vector3.up;                      // Inequality comparison.

    // === Vector3 Utilities === //
    -Vector3.one;                                   // Invert vector.
    (Vector3.one - Vector3.zero).normalized;        // Normalize direction.
    Vector3.Lerp();                                 // Interpolation between vectors.
}
```

UNITY CHEAT-SHEET

PART-26/50

PARTICLE SYSTEM - PART 2

```
public class ParticleSystem2 : MonoBehaviour
{
    // === Color over Lifetime Module === //
    colorOverLifetime.enabled;                  // Color over lifetime enabled.
    colorOverLifetime.color;                    // Color gradient over lifetime.

    // === Size over Lifetime Module === //
    sizeOverLifetime.enabled;                   // Size over lifetime enabled.
    sizeOverLifetime.size;                      // Size curve over lifetime.

    // === Lights Module === //
    lights.enabled;                             // Lights module enabled.
    lights.ratio;                               // Ratio of particles with lights.
    lights.intensity;                           // Intensity of lights.

    // === Custom Data Module === //
    customData.enabled;                         // Custom data enabled.
    customData.SetColor();                      // Set custom color data.
    customData.SetVector();                     // Set custom vector data.

    // === Renderer Module === //
    renderer.renderMode;                        // Rendering mode.
    renderer.material;                          // Material used for rendering.
    renderer.trailMaterial;                     // Material used for trails.
    renderer.mesh;                              // Mesh used for rendering.

    // === Collision Module === //
    collision.enabled;                          // Collision enabled.
    collision.type;                             // Type of collision.
    collision.dampen;                           // Dampen on collision.
    collision.bounce;                           // Bounce on collision.
    collision.lifetimeLoss;                     // Lifetime loss on collision.

    // === Trigger Module === //
    trigger.enabled;                            // Trigger module enabled.
    trigger.SetCollider();                      // Set collider for trigger.
    trigger.GetCollider();                      // Get collider for trigger.

    // === Sub Emitters Module === //
    subEmitters.enabled;                        // Sub emitters enabled.
    subEmitters.AddSubEmitter();                // Add a sub emitter.
    subEmitters.RemoveSubEmitter();             // Remove a sub emitter.

    // === Texture Sheet Animation Module === //
    textureSheetAnimation.enabled;              // Texture sheet animation enabled.
    textureSheetAnimation.numTilesX;            // Number of tiles in X-axis.
    textureSheetAnimation.numTilesY;            // Number of tiles in Y-axis.
    textureSheetAnimation.animation;            // Animation type.
}
```

UNITY CHEAT-SHEET

PART-27/50

ASSET MANAGEMENT

```
public class UnityAssetManagement : MonoBehaviour
{
    // === Resources === //
    Resources.Load();                           // Loads an asset from the Resources folder.
    Resources.LoadAll();                        // Loads all assets from a folder.
    Resources.UnloadAsset();                    // Unloads a specific asset.
    Resources.UnloadUnusedAssets();             // Unloads unused assets from memory.

    // === AssetBundle === //
    AssetBundle.LoadFromFile();                 // Loads an AssetBundle from a file.
    assetBundle.LoadAsset();                    // Loads an asset from the bundle.
    assetBundle.Unload();                       // Unloads the AssetBundle from memory.

    // === Addressables === //
    Addressables.LoadAssetAsync();              // Loads an Addressable asset asynchronously.
    Addressables.InstantiateAsync();            // Instantiates an Addressable asset.
    Addressables.ReleaseInstance();             // Releases an Addressable instance.

    // === AssetDatabase (Editor Only) === //
    AssetDatabase.LoadAssetAtPath();            // Loads an asset using its path.
    AssetDatabase.CreateAsset();                // Creates a new asset file.
    AssetDatabase.SaveAssets();                 // Saves all asset changes.
    AssetDatabase.Refresh();                    // Refreshes the AssetDatabase.

    AssetDatabase.AddObjectToAsset();           // Adds an object to an existing asset.
    AssetDatabase.ImportAsset();                // Imports or reimports an asset.
    AssetDatabase.DeleteAsset();                // Deletes an asset by path.
    AssetDatabase.MoveAsset();                  // Moves an asset to a new location.
    AssetDatabase.FindAssets();                 // Finds assets by type or label.
    AssetDatabase.GetAssetPath();               // Gets the path of a loaded asset.
    AssetDatabase.IsValidFolder();              // Checks if a folder exists.
    AssetDatabase.GetMainAssetTypeAtPath();     // Gets the type of the main asset.
    AssetDatabase.GetDependencies();            // Gets all dependencies for an asset.
    AssetDatabase.Contains();                   // Checks if an asset exists at path.
    AssetDatabase.AssetPathToGUID();            // Converts asset path to GUID.
    AssetDatabase.IsOpenForEdit();              // Checks if asset is open for edit.

    // === AssetImporter === //
    AssetImporter.GetAtPath();                  // Gets the importer for a given path.

    // === TextureImporter === //
    textureImporter.textureType;                // Sets the texture import type.
    textureImporter.mipmapEnabled;              // Enables or disables mipmaps.
    textureImporter.SaveAndReimport();          // Applies and reimports changes.
}
```

UNITY CHEAT-SHEET

PART-28/50

PROFILER - OPTIMIZATION

```
public class UnityProfilerCheatSheet : MonoBehaviour
{
    // === Profiler === //
    Profiler.BeginSample();                          // Starts a custom sample block.
    Profiler.EndSample();                            // Ends the current sample.
    Profiler.GetTotalAllocatedMemoryLong();          // Gets total allocated memory.
    Profiler.GetTotalReservedMemoryLong();           // Gets total reserved memory.
    Profiler.GetTotalUnusedReservedMemoryLong();     // Gets unused reserved memory.
    Profiler.GetMonoHeapSizeLong();                  // Gets Mono heap size.
    Profiler.GetMonoUsedSizeLong();                  // Gets used Mono memory.
    Profiler.GetRuntimeMemorySizeLong();             // Gets runtime memory size of an object.
    Profiler.SetAreaEnabled();                       // Enables profiling for a specific area.
    Profiler.logFile;                                // Path to Profiler log file.
    Profiler.enableBinaryLog;                        // Enables binary logging.
    Profiler.enabled;                                // Enables or disables the Profiler.

    // === CustomSampler === //
    CustomSampler.Create();                          // Creates a custom sample marker.
    customSampler.Begin();                           // Begins a custom sampling section.
    customSampler.End();                             // Ends the custom sampling section.

    // === FrameTimingManager === //
    FrameTimingManager.CaptureFrameTimings();        // Captures current frame timings.
    FrameTimingManager.GetLatestTimings();           // Gets most recent frame timings.

    // === MemoryProfiler === //
    MemoryProfiler.TakeSnapshot();                   // Takes a memory snapshot.
    MemoryProfiler.SnapshotFinished += ();           // Callback when snapshot is complete.

    // === ProfilerDriver === //
    ProfilerDriver.GetAvailableProfilers();          // Lists available profilers.
    ProfilerDriver.connectedProfiler;                // ID of the connected profiler.

    // === Performance Optimization === //
    Profiler.maxUsedMemory;                          // Max memory used by Profiler.
    Profiler.maxNumberOfSamplesPerFrame;             // Max number of samples per frame.
}
```

UNITY CHEAT-SHEET

PART-29/50

POST PROCESSING

```
public class UnityPostProcessing : MonoBehaviour
{
    // === Bloom === //
    bloom.enabled.value;                                    // Enables Bloom effect.
    bloom.intensity.value;                                  // Intensity of Bloom.
    bloom.threshold.value;                                  // Brightness threshold for Bloom.
    bloom.softKnee.value;                                   // Softness of the threshold edge.

    // === ColorGrading === //
    colorGrading.enabled.value;                             // Enables Color Grading.
    colorGrading.postExposure.value;                        // Adjusts scene exposure.
    colorGrading.contrast.value;                            // Adjusts image contrast.
    colorGrading.saturation.value;                          // Adjusts color saturation.
    colorGrading.hueShift.value;                            // Shifts overall hue.

    // === DepthOfField === //
    depthOfField.enabled.value;                             // Enables Depth of Field.
    depthOfField.focusDistance.value;                       // Distance to focal plane.
    depthOfField.aperture.value;                            // Aperture (f-stop).
    depthOfField.focalLength.value;                         // Focal length in mm.

    // === Vignette === //
    vignette.enabled.value;                                 // Enables Vignette effect.
    vignette.intensity.value;                               // Intensity of vignette.
    vignette.smoothness.value;                              // Smoothness of vignette edges.

    // === ChromaticAberration === //
    chromaticAberration.enabled.value;                      // Enables Chromatic Aberration.
    chromaticAberration.intensity.value;                    // Intensity of the aberration.

    // === MotionBlur === //
    motionBlur.enabled.value;                               // Enables Motion Blur.
    motionBlur.shutterAngle.value;                          // Shutter angle in degrees.
    motionBlur.sampleCount.value;                           // Number of blur samples.

    // === LensDistortion === //
    lensDistortion.enabled.value;                           // Enables Lens Distortion.
    lensDistortion.intensity.value;                         // Distortion strength.
    lensDistortion.center.value;                            // Center point of distortion.

    // === AmbientOcclusion === //
    ambientOcclusion.enabled.value;                         // Enables Ambient Occlusion.
    ambientOcclusion.intensity.value;                       // Intensity of occlusion.
    ambientOcclusion.thicknessModifier.value;               // Occlusion thickness modifier.

    // === AutoExposure === //
    autoExposure.enabled.value;                             // Enables Auto Exposure.
    autoExposure.minLuminance.value;                        // Minimum luminance threshold.
    autoExposure.maxLuminance.value;                        // Maximum luminance threshold.

    // === ScreenSpaceReflection === //
    screenSpaceReflection.enabled.value;                    // Enables Screen Space Reflections.
    screenSpaceReflection.maximumMarchDistance.value;       // Max ray distance for reflection.
    screenSpaceReflection.thickness.value;                  // Thickness of reflective surfaces.
}
```

UNITY CHEAT-SHEET

PART-30/50

EDITOR SCRIPTING

```
public class UnityEditorScriptingCheatSheet : MonoBehaviour
{
    // === EditorWindow === //
    EditorWindow.GetWindow();                       // Creates and shows a custom editor window.
    editorWindow.Show();                            // Displays the custom editor window.

    // === EditorGUILayout === //
    EditorGUILayout.Toggle();                       // Adds a toggle field to the inspector.
    EditorGUILayout.IntField();                     // Adds an int field to the inspector.
    EditorGUILayout.FloatField();                   // Adds a float field to the inspector.
    EditorGUILayout.TextField();                    // Adds a text field to the inspector.
    EditorGUILayout.EnumPopup();                    // Adds an enum dropdown in the inspector.
    EditorGUILayout.ColorField();                   // Adds a color field to the inspector.
    EditorGUILayout.Vector3Field();                 // Adds a Vector3 field to the inspector.
    EditorGUILayout.BeginVertical();                // Starts a vertical layout group.
    EditorGUILayout.EndVertical();                  // Ends a vertical layout group.
    EditorGUILayout.BeginHorizontal();              // Starts a horizontal layout group.
    EditorGUILayout.EndHorizontal();                // Ends a horizontal layout group.
    EditorGUILayout.LabelField();                   // Displays a label inside a layout.

    // === EditorApplication === //
    EditorApplication.update += ();                 // Subscribes to the editor update loop.
    EditorApplication.isPlaying;                    // Checks if the editor is in Play mode.
    EditorApplication.isPaused;                     // Checks if the editor is paused.
    EditorApplication.Beep();                       // Plays a system beep.
    EditorApplication.RepaintHierarchyWindow();     // Repaints the hierarchy view.

    // === Handles === //
    Handles.DrawLine();                             // Draws a line in the Scene view.
    Handles.DrawWireDisc();                         // Draws a wire disc in the Scene view.
    Handles.DrawSolidDisc();                        // Draws a solid disc in the Scene view.
    Handles.PositionHandle();                       // Displays a position handle.
    Handles.RotationHandle();                       // Displays a rotation handle.

    // === EditorUtility === //
    EditorUtility.ClearConsole();                   // Clears the Unity console.
    EditorUtility.DisplayDialog();                  // Shows a dialog box.
    EditorUtility.DisplayProgressBar();             // Shows a progress bar.
    EditorUtility.ClearProgressBar();               // Clears the progress bar.
    EditorUtility.PingObject();                     // Pings the object in the Project window.

    // === AssetDatabase === //
    AssetDatabase.CreateAsset();                    // Creates a new asset.
    AssetDatabase.DeleteAsset();                    // Deletes an asset at path.
    AssetDatabase.RenameAsset();                    // Renames an asset.
    AssetDatabase.CopyAsset();                      // Copies an asset to a new path.
    AssetDatabase.MoveAsset();                      // Moves an asset.
    AssetDatabase.LoadAssetAtPath();                // Loads an asset by path.
}
```

UNITY CHEAT-SHEET

PART-31/50

LOCALIZATION SYSTEM

```
public class UnityLocalizationCheatSheet : MonoBehaviour
{
    // === LocalizationSettings === //
    LocalizationSettings.SelectedLocale;                    // Active locale.
    LocalizationSettings.AvailableLocales.GetLocale();      // Retrieves a locale by identifier.
    LocalizationSettings.AvailableLocales.Locales.Count;    // Number of available locales.
    LocalizationSettings.AvailableLocales.GetLocales();     // Gets all available locales.
    LocalizationSettings.StringDatabase.GetTableAsync();    // Loads a string table asynchronously.
    LocalizationSettings.StringDatabase.GetLocalizedString(); // Gets localized string.
    LocalizationSettings.StringDatabase.GetTable();         // Retrieves a string table by name.
    LocalizationSettings.AssetDatabase.GetTableAsync();     // Loads asset table asynchronously.
    LocalizationSettings.AssetDatabase.GetLocalizedAsset(); // Retrieves localized asset.
    LocalizationSettings.InitializationOperation;           // Initialization async operation.
    LocalizationSettings.FallbackLocale;                    // Fallback locale.

    // === LocalizedString === //
    new LocalizedString();                                  // Creates a new LocalizedString instance.
    localizedString.TableReference;                         // Table to fetch string from.
    localizedString.TableEntryReference;                    // Entry key in the string table.
    localizedString.StringChanged += ();                    // Subscribes to updates.
    localizedString.GetLocalizedString();                   // Retrieves localized string synchronously.
    localizedString.GetLocalizedStringAsync();              // Retrieves localized string asynchronously.
    localizedString.PreferredLocale;                        // Preferred locale for the string.
    localizedString.IsEmpty;                                // Checks if the localized string is empty.
    localizedString.Clear();                                // Clears the current localized string.

    // === LocalizedAsset<T> === //
    new LocalizedAsset<Sprite>();                           // Creates a LocalizedAsset for a Sprite.
    localizedSprite.TableReference;                         // Table reference for asset.
    localizedSprite.TableEntryReference;                    // Entry reference for asset.
    localizedSprite.AssetChanged += ();                     // Subscribes to asset updates.
    localizedSprite.GetLocalizedAsset();                    // Retrieves localized asset synchronously.
    localizedSprite.IsEmpty;                                // Checks if the localized asset is empty.
    localizedSprite.Clear();                                // Clears the current localized asset.

    // === LocalizedAudioClip === //
    new LocalizedAudioClip();                               // Creates a new LocalizedAudioClip instance.
    localizedAudioClip.TableReference;                      // Table reference for audio.
    localizedAudioClip.TableEntryReference;                 // Entry reference for audio.
    localizedAudioClip.AssetChanged += ();                  // Subscribes to audio updates.

    // === Locale === //
    LocalizationSettings.SelectedLocale.Identifier.Code;    // Current locale code.
    Locale.Identifier;                                      // Locale identifier.
    Locale.LocaleName;                                      // Locale name.

    // === LocaleManager === //
    LocaleManager.AddLocale();                              // Adds a new locale.
    LocaleManager.RemoveLocale();                           // Removes a locale.
    LocaleManager.SetLocaleFallback();                      // Sets fallback locale.
}
```

UNITY CHEAT-SHEET

PART-32/50

MULTISCENE EDITING

```
public class UnityMultiSceneEditing : MonoBehaviour
{
    // === SceneManager === //
    SceneManager.LoadScene();                          // Loads a scene (single or additive).
    SceneManager.LoadSceneAsync();                     // Loads a scene asynchronously.
    SceneManager.UnloadSceneAsync();                   // Unloads a scene asynchronously.
    SceneManager.MergeScenes();                        // Merges one scene into another.
    SceneManager.MoveGameObjectToScene();              // Moves a GameObject to another scene.
    SceneManager.GetActiveScene();                     // Gets the currently active scene.
    SceneManager.GetSceneAt();                         // Gets the scene at the given index.
    SceneManager.GetSceneByName();                     // Gets a scene by its name.
    SceneManager.SetActiveScene();                     // Sets a specific scene as active.
    SceneManager.sceneCount;                           // Number of currently loaded scenes.
    SceneManager.sceneCountInBuildSettings;            // Number of scenes in build settings.
    SceneManager.sceneLoaded += ();                    // Triggered when a scene is loaded.
    SceneManager.sceneUnloaded += ();                  // Triggered when a scene is unloaded.
    SceneManager.activeSceneChanged += ();             // Triggered when active scene changes.

    // === Scene === //
    scene.IsValid();                                   // Checks if the scene is valid.
    scene.isLoaded;                                    // Checks if the scene is loaded.
    scene.isDirty;                                     // Checks if the scene has unsaved changes.
    scene.buildIndex;                                  // Gets the build index of the scene.
    scene.name;                                        // Gets the name of the scene.
    scene.path;                                        // Gets the path of the scene asset.
    scene.handle;                                      // Gets the internal handle of the scene.
    scene.GetRootGameObjects();                        // Gets all root GameObjects in the scene.
    scene.GetRootGameObjects();                        // Fills a list with root GameObjects.

    // === EditorSceneManager === //
    EditorSceneManager.OpenScene();                    // Opens a scene in the Editor.
    EditorSceneManager.SaveScene();                    // Saves a specific scene.
    EditorSceneManager.SaveOpenScenes();               // Saves all currently open scenes.
    EditorSceneManager.CloseScene();                   // Closes the specified scene.
    EditorSceneManager.NewScene();                     // Creates a new scene.
    EditorSceneManager.MarkSceneDirty();               // Marks a scene as dirty.
    EditorSceneManager.IsSceneOpen();                  // Checks if a scene is open in the editor.
    EditorSceneManager.IsSceneInPlayMode();            // Checks if a scene is part of the play mode setup.
    EditorSceneManager.sceneOpened += ();              // Triggered when a scene is opened in the editor.
    EditorSceneManager.sceneClosed += ();              // Triggered when a scene is closed in the editor.
    EditorSceneManager.sceneDirtied += ();             // Triggered when a scene is modified.
    EditorSceneManager.RestoreSceneManagerSetup();     // Restores the scene setup from stored data.
    EditorSceneManager.GetSceneManagerSetup();         // Gets the current scene setup for multi-scene editing.

    // === Multi-Scene Editing Utilities === //
    EditorSceneManager.PlayPreviewScene();             // Enters play preview mode for a scene.
    EditorSceneManager.CreatePreviewScene();           // Creates a temporary preview scene.
    EditorSceneManager.SetSceneCullingMask();          // Sets the culling mask for a specific scene view.
}
```

UNITY CHEAT-SHEET

PART-33/50

TILEMAPS

```
public class UnityTilemapSystem : MonoBehaviour
{
    // === Tilemap === //
    Tilemap.ResizeBounds();                         // Adjusts the tilemap's size to fit all tiles.
    tilemap.SetTile();                              // Places a tile at a specific position.
    tilemap.SetTileFlags();                         // Sets flags for a specific tile.
    tilemap.SetColor();                             // Changes the color of a specific tile.
    tilemap.GetTile();                              // Retrieves the tile at a given position.
    tilemap.GetTileFlags();                         // Gets flags of the tile at the specified position.
    tilemap.SwapTile();                             // Swaps two types of tiles throughout the tilemap.
    tilemap.ClearAllTiles();                        // Clears all tiles in the tilemap.
    tilemap.cellBounds;                             // Retrieves the tilemap’s bounds.
    tilemap.compressionType;                        // Retrieves the current compression type.

    // === TilemapRenderer === //
    tilemapRenderer.sortOrder;                      // Sets tile rendering order.
    tilemapRenderer.maskInteraction;                // Configures how the tilemap interacts with sprite masks.
    tilemapRenderer.detectChunkCullingBounds;       // Enables chunk culling for performance.
    tilemapRenderer.chunkSize;                      // Defines the size of rendering chunks.
    tilemapRenderer.sortingLayerID;                 // Gets or sets the sorting layer ID for rendering.
    tilemapRenderer.material;                       // Gets or sets the material used for rendering tiles.

    // === TilemapCollider2D === //
    tilemapCollider2D.usedByComposite;              // Enables use with CompositeCollider2D.
    tilemapCollider2D.extrusionFactor;              // Defines collider extrusion depth.
    tilemapCollider2D.isTrigger;                    // Determines if the collider is a trigger.
    tilemapCollider2D.offset;                       // Sets the collider's offset.
    tilemapCollider2D.sharedMaterial;               // Gets or sets the material used by the collider.

    // === Grid === //
    grid.cellSize;                                  // Defines the size of each grid cell.
    grid.cellGap;                                   // Sets the gap between grid cells.
    grid.cellLayout;                                // Sets the grid layout type.
    grid.cellSwizzle;                               // Sets the swizzling order of the grid cells.
    grid.cellRotation;                              // Sets the rotation of the grid cells.

    // === AnimatedTile === //
    animatedTile.m_AnimatedSprites;                 // Assigns animation sprites to animated tile.
    animatedTile.m_MinSpeed;                        // Sets the minimum animation speed for the tile.
    animatedTile.m_MaxSpeed;                        // Sets the maximum animation speed for the tile.
    animatedTile.animationSpeed;                    // Gets or sets the speed of animation.
    animatedTile.loop;                              // Gets or sets if the animation should loop.

    // === Tilemap Queries === //
    tilemap.WorldToCell();                          // Converts world position to tilemap coordinates.
    tilemap.CellToWorld();                          // Converts tilemap coordinates to world position.
    tilemap.GetTileCount();                         // Gets the count of tiles in the map.
    tilemap.GetTileAtPosition();                    // Gets the tile at the specified position.
}
```

UNITY CHEAT-SHEET

PART-34/50

VFX GRAPH

```
public class UnityVFXGraph : MonoBehaviour
{
    // === VisualEffect Control === //
    visualEffect.Play();                        // Starts the VFX effect.
    visualEffect.Stop();                        // Stops the VFX effect.
    visualEffect.Reinit();                      // Reinitializes the VFX component.
    visualEffect.pause;                         // Pauses the VFX effect.
    visualEffect.initialEventName;              // Sets the initial event to trigger on start.
    visualEffect.ResetEffect();                 // Resets and restarts the VFX effect.
    visualEffect.SendEvent();                   // Sends a custom event to trigger VFX.

    // === VisualEffect Property Setters === //
    visualEffect.SetFloat();                    // Sets a float property in VFX.
    visualEffect.SetInt();                      // Sets an integer property in VFX.
    visualEffect.SetUInt();                     // Defines instance count for GPU instancing.
    visualEffect.SetVector3();                  // Sets a Vector3 property in VFX.
    visualEffect.SetVector4();                  // Sets a Vector4 (RGBA) property.
    visualEffect.SetMatrix4x4();                // Sets a matrix property in VFX.
    visualEffect.SetTexture();                  // Assigns a texture property in VFX.
    visualEffect.SetMesh();                     // Assigns a mesh to the VFX graph.
    visualEffect.SetBool();                     // Toggles a boolean property in VFX.

    // === VisualEffect Property Access === //
    visualEffectAsset.HasFloat();               // Checks if a float property exists.
    visualEffect.HasVector3();                  // Checks if a Vector3 property exists.
    visualEffect.HasMatrix4x4();                // Checks if a Matrix property exists.
    visualEffect.HasTexture();                  // Checks if a texture property exists.
    visualEffect.HasMesh();                     // Checks if a mesh property exists.
    visualEffect.GetFloat();                    // Retrieves a float value from VFX Graph.
    visualEffect.GetInt();                      // Retrieves an int value from VFX Graph.
    visualEffect.GetVector3();                  // Retrieves a Vector3 value.
    visualEffect.GetVector4();                  // Retrieves a Vector4 (RGBA) value.

    // === VFX Spawner State === //
    vfxSpawnerState.playing;                    // Starts or stops the spawner.
    vfxSpawnerState.spawnCount;                 // Sets the number of particles spawned.
    vfxSpawnerState.delay;                      // Adds a delay before spawning particles.
    vfxSpawnerState.loopState;                  // Sets the spawner to trigger only once.
}
```

UNITY CHEAT-SHEET

PART-35/50

POST PROCESSING PART 2

```
public class UnityPostProcessingPart2 : MonoBehaviour
{
    // === Film Grain === //
    filmGrain.enabled.value;                        // Enables Film Grain effect.
    filmGrain.type.value;                           // Selects grain texture type.
    filmGrain.intensity.value;                      // Amount of grain.
    filmGrain.response.value;                       // Sensitivity to luminance.

    // === Panini Projection === //
    paniniProjection.enabled.value;                 // Enables Panini Projection.
    paniniProjection.distance.value;                // Controls perspective flattening.
    paniniProjection.cropToFit.value;               // Crops image to preserve framing.

    // === Lift, Gamma, Gain === //
    liftGammaGain.enabled.value;                    // Enables Lift/Gamma/Gain controls.
    liftGammaGain.lift.value;                       // Adjusts shadows.
    liftGammaGain.gamma.value;                      // Adjusts midtones.
    liftGammaGain.gain.value;                       // Adjusts highlights.

    // === Split Toning === //
    splitToning.enabled.value;                      // Enables Split Toning.
    splitToning.shadows.value;                      // Tint color for shadows.
    splitToning.highlights.value;                   // Tint color for highlights.
    splitToning.balance.value;                      // Balance between shadows and highlights.

    // === White Balance === //
    whiteBalance.enabled.value;                     // Enables White Balance.
    whiteBalance.temperature.value;                 // Adjusts color temperature.
    whiteBalance.tint.value;                        // Adjusts color tint (green-magenta).

    // === Tonemapping === //
    tonemapping.enabled.value;                      // Enables Tonemapping.
    tonemapping.mode;                               // Tonemapping algorithm (e.g., ACES, Neutral).

    // === Shadows, Midtones, Highlights === //
    shadowsMidtonesHighlights.enabled.value;        // Enables SMH control.
    shadowsMidtonesHighlights.shadows.value;        // Adjusts shadows color.
    shadowsMidtonesHighlights.midtones.value;       // Adjusts midtones color.
    shadowsMidtonesHighlights.highlights.value;     // Adjusts highlights color.
    shadowsMidtonesHighlights.shadowsStart.value;   // Start threshold for shadows.
    shadowsMidtonesHighlights.highlightsEnd.value;  // End threshold for highlights.

    // === Color Adjustments === //
    colorAdjustments.enabled.value;                 // Enables color adjustment controls.
    colorAdjustments.colorFilter.value;             // Applies a global color filter.
    colorAdjustments.postExposure.value;            // Additional exposure adjustment.

    // === Shadows – URP Specific === //
    screenSpaceShadows.enabled.value;               // Enables screen space shadows (URP only).
    screenSpaceShadows.blend.value;                 // Blending factor for shadows.

    // === Global Volume === //
    volume.weight;                                  // Blending weight of the volume.
    volume.isGlobal;                                // Sets volume to affect whole scene.
    volume.priority;                                // Determines which volume overrides others.
}
```

UNITY CHEAT-SHEET

PART-36/50

NETWORK OPTIMIZATION

```
public class UnityNetworkingOptimization : MonoBehaviour
{
    // === NetworkManager === //
    networkManager.NetworkConfig.TickRate;                // Sets the network tick rate to balance performance.
    networkManager.NetworkConfig.ConnectionApproval;      // Enables connection approval process.
    networkManager.ShutdownInProgress();                  // Checks if the network is shutting down.
    networkManager.LogLevel;                              // Enables detailed logging for debugging.
    networkManager.DontDestroy;                           // Prevents network manager from being destroyed.

    // === NetworkTime === //
    networkManager.NetworkTime.ServerTime;                // Retrieves the current server time.
    networkManager.NetworkTime.Time;                      // Retrieves the local client time.
    networkManager.NetworkConfig.TimeTicksPerSecond;      // Adjusts tick rate for better network synchronization.

    // === NetworkTransform === //
    networkObject.NetworkTransform.Interpolate;           // Enables interpolation for smooth movement.
    networkObject.NetworkTransform.TeleportThreshold;     // Defines teleport threshold to correct lag spikes.
    networkObject.NetworkTransform.InLocalSpace;          // Ensures transformation updates occur in local space.

    // === Network Bandwidth === //
    networkManager.EnableNetworkVariableCompression;      // Enables compression to reduce bandwidth usage.
    networkManager.EnableSceneManagement;                 // Disables automatic scene synchronization.
    networkManager.MaxReceiveEventsPerTickRate;           // Limits incoming network events per tick.
    networkManager.MaxSendQueuesPerTickRate;              // Limits outgoing packets per tick.

    // === Messaging === //
    networkManager.NetworkConfig.EnsureMessageOrder;      // Disables strict message ordering to reduce lag.
    networkManager.NetworkConfig.MaxConnections;          // Limits the number of active network connections.
    networkManager.NetworkConfig.ReceiveTimeoutMS;        // Sets the timeout for network disconnection handling.

    // === Interpolation & Sync === //
    networkObject.NetworkTransform.InterpolationDelay;    // Adds interpolation delay for smoother movement sync.
    networkObject.NetworkTransform.SynchronizePhysics;    // Ensures physics calculations remain in sync.

    // === Network Callbacks === //
    networkManager.OnClientDisconnectCallback;            // Attempts to reconnect automatically after disconnect.
    networkManager.OnClientConnectedCallback;             // Handles successful client connection.
    networkManager.OnTransportFailure;                    // Listens for transport failures and responds.

    // === Transport Layer Optimization === //
    networkManager.NetworkConfig.NetworkTransport;        // Sets custom transport for performance tuning.
    networkManager.NetworkConfig.ProtocolVersion;         // Ensures clients use compatible versions.

    // === Connection Handling === //
    networkManager.ConnectionApprovalCallback;            // Custom logic for connection approval.
    networkManager.OnServerStarted;                       // Triggered when the server has started.

    // === Custom Tick Settings === //
    networkManager.NetworkConfig.ClientBufferTimeout;     // Timeout before dropping slow clients.
    networkManager.NetworkConfig.SecondsHistory;          // Time buffer for network history.
}
```

UNITY CHEAT-SHEET

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BUILD PIPELINE

Problem: To automate key player settings

Solution:

```
PlayerSettings.productName = "My Game";
PlayerSettings.companyName = "My Company";
PlayerSettings.bundleVersion = "1.0.0";
PlayerSettings.fullScreenMode =
    FullScreenMode.FullScreenWindow;
PlayerSettings.runInBackground = true;
```

Problem: To include all scenes from build settings

Solution:

```
buildOptions.scenes = EditorBuildSettings.scenes
    .Where(scene => scene.enabled)
    .Select(scene => scene.path)
    .ToArray();
```

Problem: To configure the build type

Solution:

```
EditorUserBuildSettings.development = false;
EditorUserBuildSettings.allowDebugging = false;
```

Problem: To execute the build process

Solution:

```
BuildPipeline.BuildPlayer(buildOptions);
```

Problem: To log detailed Build Statistics

Solution:

```
BuildReport report = BuildPipeline.BuildPlayer(buildOptions);
BuildSummary summary = report.summary;
Debug.Log($"Build Result: {summary.result}");
```

Problem: To configure android specific build settings

Solution:

```
PlayerSettings.Android.bundleVersionCode += 1;
buildOptions.target = BuildTarget.Android;
buildOptions.options = BuildOptions.CompressWithLz4;
EditorUserBuildSettings.buildAppBundle = true;
```

UNITY CHEAT-SHEET

PART-38/50

AI NPC

Problem: To calculate and set a navigation path

Solution:

```
if (NavMesh.SamplePosition(target.position, out hit, 2.0f, NavMesh.AllAreas))
{
    bool pathSuccess = NavMesh.CalculatePath(navMeshAgent.transform.position,
                                             hit.position, NavMesh.AllAreas, navMeshPath);
    if (pathSuccess)
        navMeshAgent.SetPath(navMeshPath);
}
```

Problem: To start the movement along the calculated path

Solution:

```
navMeshAgent.isStopped = false;
navMeshAgent.speed = 3.5f;
navMeshAgent.acceleration = 8f;
navMeshAgent.angularSpeed = 120f;
navMeshAgent.stoppingDistance = 1.5f;
```

Problem: To navigate through Gaps & Ledges

Solution:

```
navMeshAgent.autoTraverseOffMeshLink = true;
if (navMeshAgent.isOnOffMeshLink)
    navMeshAgent.CompleteOffMeshLink();
```

Problem: To setup obstacle avoidance

Solution:

```
navMeshObstacle.carving = true;
navMeshObstacle.carvingMoveThreshold = 0.1f;
navMeshObstacle.carvingTimeToStationary = 0.5f;
navMeshObstacle.carveOnlyStationary = false;
```

Problem: To visualize the navigation path

Solution:

```
Debug.DrawLine(navMeshAgent.transform.position,
               navMeshAgent.pathEndPosition, Color.red);
for (int i = 0; i < navMeshAgent.path.corners.Length - 1; i++)
    Debug.DrawLine(navMeshAgent.path.corners[i],
                   navMeshAgent.path.corners[i + 1], Color.green);
```

UNITY CHEAT-SHEET

PART-39/50

ADS: REWARDED VIDEO ADS

Problem: To initialize the unity ads sdk with platform detection

Solution:

```
string gameId;
#if UNITY_IOS
    gameId = "YOUR_IOS_GAME_ID";
#elif UNITY_ANDROID
    gameId = "YOUR_ANDROID_GAME_ID";
#else
    gameId = null;
    Debug.LogError("Unsupported platform for Unity Ads");
    return;
#endif

bool testMode = true;
Advertisement.Initialize(gameId, testMode);
```

Problem: To load a rewarded video ad

Solution:

```
// Must be called from a class implementing IUnityAdsLoadListener
public void LoadRewardedAd() => Advertisement.Load("rewardedVideo", this);
```

Problem: To implement ads load success and failure callbacks

Solution:

```
// Required callbacks for IUnityAdsLoadListener
public void OnUnityAdsAdLoaded(string placementId) =>
    Debug.Log($"Ad loaded: {placementId}"); // Enable ad button

public void OnUnityAdsFailedToLoad(string placementId,
            UnityAdsLoadError error, string message) =>
    Debug.LogError($"Ad load failed: {error}"); // Handle failure
```

Problem: To display a rewarded video ad

Solution:

```
public void ShowRewardedAd()
{
    if (Advertisement.IsReady("rewardedVideo"))
    {
        Advertisement.Show("rewardedVideo", new ShowOptions
        {
            resultCallback = HandleAdResult
        });
    }
}
```

Problem: To handle rewarded ad completion

Solution:

```
void HandleAdResult(ShowResult result)
{
    switch (result)
    {
        case ShowResult.Finished:
            Debug.Log("Player watched the full ad - Reward them!");
            break;
        case ShowResult.Skipped:
            Debug.Log("Ad was skipped - No reward!");
            break;
        case ShowResult.Failed:
            Debug.LogError("Ad failed to play!");
            break;
    }
}
```

UNITY CHEAT-SHEET

PART-40/50

MATHEMATICS

Problem: Calculating Angles and Rotation

Solution:

```
Mathf.Sin(Mathf.PI / 2);   // Computes the sine of an angle (radians).
Mathf.Cos(0);              // Computes the cosine of an angle.
Mathf.Tan(Mathf.PI / 4);   // Computes the tangent of an angle.
Mathf.Asin(0.5f);          // Returns the arcsine (inverse sine).
Mathf.Acos(0.5f);          // Returns the arccosine (inverse cosine).
Mathf.Atan(1f);            // Returns the arctangent (inverse tangent).
Mathf.Atan2(1f, 2f);       // Returns the angle between x and y
```

Problem: Rounding, Scaling, and Logarithmic Computations

Solution:

```
Mathf.Round(4.7f);
Mathf.Ceil(4.2f);
Mathf.Floor(4.8f);
Mathf.Pow(2, 3);
Mathf.Sqrt(16f);
Mathf.Log(10f);
Mathf.Log10(100f);
Mathf.Sign(-5f);
```

Problem: Performing Vector and Matrix Calculations

Solution:

```
float3 a = new float3(1f, 2f, 3f);
float3 b = new float3(4f, 5f, 6f);
math.dot(a, b);
math.cross(a, b);
math.normalize(a);
math.length(a);
math.distance(a, b);

float4x4 matrix = math.mul(math.float4x4.identity,
    math.float4x4.identity);
float4 transformedVector = math.mul(matrix,
    new float4(1f, 2f, 3f, 1f));
```

Special Math Functions

```
Mathf.Abs(-10f);                  // Returns absolute value.
Mathf.Min(3.5f, 7.2f);            // Returns the smaller of two values.
Mathf.Max(3.5f, 7.2f);            // Returns the larger of two values.
Mathf.Clamp(15f, 0f, 10f);        // Clamps a value within a specified range.
Mathf.Clamp01(1.5f);              // Clamps a value between 0 and 1.
Mathf.Lerp(0f, 10f, 0.5f);        // Linearly interpolates between two values.
Mathf.MoveTowards(5f, 10f, 2f);   // Moves a value towards a target.
```

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PART-41/50

TAGS & LAYERS

Problem: Assigning and Checking Tags

Solution:

```
gameObject.tag = "Player";
bool isTagged = gameObject.CompareTag("Enemy");
```

Problem: Finding Objects by Tag

Solution:

```
GameObject foundObject = GameObject.FindWithTag("Player");
GameObject[] enemies = GameObject.FindGameObjectsWithTag("Enemy");
```

Problem: Ignoring Collisions Between Specific Layers

Solution:

```
public const int ENEMY_LAYER = 8;
Physics.IgnoreLayerCollision(ENEMY_LAYER, ENEMY_LAYER, true);
bool collisionState = Physics.GetIgnoreLayerCollision(ENEMY_LAYER, ENEMY_LAYER);
```

Problem: Controlling Camera Rendering with Layers

Solution:

```
// Makes the camera render only specified layers
Camera.main.cullingMask = LayerMask.GetMask("Default", "UI");
// Excludes specific layers from rendering
Camera.main.cullingMask &= ~LayerMask.GetMask("UI");
```

Problem: Finding Objects by Layer in a Specific Area

Solution:

```
// Creates a mask for enemy layer
int enemyLayerMask = 1 << ENEMY_LAYER;

// Gets all colliders within a sphere that match specific layers
Collider[] nearbyEnemies = Physics.OverlapSphere(
    transform.position,
    10f, // Radius
    enemyLayerMask
);
```

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PHYSICS PART 3

Problem: Applying forces to objects

Solution:

```
Rigidbody rb = GetComponent<Rigidbody>();
rb.AddForce(Vector3.forward * 10f, ForceMode.Force);
rb.AddForce(Vector3.up * 5f, ForceMode.Impulse);
rb.AddTorque(Vector3.up * 5f, ForceMode.Impulse);
rb.AddExplosionForce(10f, explosionCenter, 5f);
```

Problem: Creating bouncy surfaces

Solution:

```
PhysicMaterial bouncyMaterial = new PhysicMaterial("Bouncy");
bouncyMaterial.bounciness = 0.8f;
bouncyMaterial.frictionCombine = PhysicMaterialCombine.Average;
bouncyMaterial.bounceCombine = PhysicMaterialCombine.Maximum;
GetComponent<Collider>().material = bouncyMaterial;
```

Problem: Detecting objects with raycasts

Solution:

```
Ray ray = new Ray(transform.position, transform.forward);
Physics.Raycast(ray, out RaycastHit rayHit, 100f);
```

Problem: Finding objects in an area

Solution:

```
Collider[] colliders = Physics.OverlapSphere(transform.position, 5f); // Radius check
foreach (Collider col in colliders) {
    float distance = Vector3.Distance(transform.position, col.transform.position);
    if (col.CompareTag("Enemy")) {
        // Process each found enemy
    }
}

// Box-shaped check
Collider[] boxResults = Physics.OverlapBox(
    center: transform.position,
    halfExtents: new Vector3(2f, 1f, 2f),
    orientation: transform.rotation
);
```

UNITY CHEAT-SHEET

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PROJECT SETTINGS

```
public class ProjectSettings : MonoBehaviour
{
    // ═══ PlayerSettings ═══ //
    PlayerSettings.GetScriptingBackend();                // Gets scripting backend.
    PlayerSettings.SetScriptingBackend();                // Sets scripting backend.
    PlayerSettings.GetArchitecture();                    // Gets platform architecture.
    PlayerSettings.SetArchitecture();                    // Sets platform architecture.
    PlayerSettings.stripEngineCode;                      // Strips unused engine code.
    PlayerSettings.Android.forceInternetPermission;      // Forces internet permission on Android.
    PlayerSettings.Android.useAPKExpansionFiles;         // Enables APK expansion files.
    PlayerSettings.iOS.requiresPersistentWiFi;           // Requires persistent WiFi on iOS.
    PlayerSettings.iOS.allowHTTPDownload;                // Allows/disallows HTTP downloads on iOS.

    // ═══ Physics & Simulation ═══ //
    Physics.gravity;                                     // Sets global gravity.
    Physics.defaultSolverIterations;                     // Controls solver accuracy.
    Physics.defaultSolverVelocityIterations;             // Controls velocity solver accuracy.
    Physics.IgnoreLayerCollision();                      // Ignores collisions between layers.
    Physics.queriesHitTriggers;                          // Toggles raycast detection on triggers.
    Physics.autoSimulation;                              // Enables/disables automatic physics updates.
    Physics.defaultContactOffset;                        // Sets default collision offset.
    Physics.bounceThreshold;                             // Defines velocity threshold for bouncing.
    Physics.sleepThreshold;                              // Defines velocity threshold for sleep mode.
    Physics.reuseCollisionCallbacks;                     // Optimizes physics callbacks.

    // ═══ Application ═══ //
    Application.version;                                 // Gets app version.
    Application.productName;                             // Gets product name.
    Application.companyName;                             // Gets company name.
    Application.unityVersion;                            // Gets Unity version.
    Application.platform;                                // Gets current platform.
    Application.targetFrameRate;                         // Sets target frame rate.
    Application.internetReachability;                    // Checks internet status.
    Application.RequestUserAuthorization();              // Requests user permissions.
    Application.SetStackTraceLogType();                  // Configures stack trace logging.

    // ═══ QualitySettings (Performance) ═══ //
    QualitySettings.vSyncCount;                          // Toggles VSync.
    QualitySettings.antiAliasing;                        // Sets anti-aliasing level.
    QualitySettings.shadowDistance;                      // Sets max shadow distance.
    QualitySettings.lodBias;                             // Adjusts LOD scaling.
    QualitySettings.masterTextureLimit;                  // Sets texture quality.
    QualitySettings.realtimeReflectionProbes;            // Toggles real-time reflections.
    QualitySettings.pixelLightCount;                     // Sets max pixel lights.
    QualitySettings.softParticles;                       // Toggles soft particles.

    // ═══ AudioSettings (Audio & DSP) ═══ //
    AudioSettings.outputSampleRate;                      // Gets audio sample rate.
    AudioSettings.dspTime;                               // Gets DSP time.
    AudioSettings.GetConfiguration();                    // Gets audio config.
    AudioSettings.GetSpatializerPluginName();            // Gets spatializer plugin.
    AudioSettings.SetSpatializerPluginName();            // Sets spatializer plugin.
    AudioSettings.speakerMode;                           // Gets/sets speaker mode.

    // ═══ Input System ═══ //
    Input.simulateMouseWithTouches;                      // Simulates mouse with touch.
    Input.multiTouchEnabled;                             // Enables multi-touch.
    Input.touchPressureSupported;                        // Checks touch pressure support.
}
```

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PROBUILDER: MESH MODELING

```
public class ProBuilder : MonoBehaviour
{
    // == ProBuilderMesh == //
    ProBuilderMesh.Create();                    // Creates a new ProBuilder mesh instance.
    pbMesh.ToMesh();                            // Applies ProBuilder changes to the Unity Mesh.
    pbMesh.Refresh();                           // Refreshes mesh attributes like UVs and normals.
    pbMesh.Rebuild();                           // Rebuilds mesh topology.
    pbMesh.Extrude();                           // Extrudes selected faces along their normals.
    pbMesh.SubdivideFaces();                    // Subdivides selected faces into smaller faces.
    pbMesh.DeleteVertices();                    // Deletes vertices by their indices.
    pbMesh.MergeVertices();                     // Merges vertices that share the same position.
    pbMesh.FlipFaces();                         // Flips the normals of the mesh.

    // == ShapeGenerator == //
    ShapeGenerator.CreateShape();               // Generates a specified shape (e.g., Cube, Sphere).
    ShapeGenerator.GeneratePlane();             // Generates a plane with specified parameters.
    ShapeGenerator.GenerateStair();             // Generates a stair mesh with specified parameters.
    ShapeGenerator.GenerateArch();              // Generates an arch mesh with specified parameters.
    ShapeGenerator.GenerateDoor();              // Generates a door mesh with specified parameters.
    ShapeGenerator.GeneratePipe();              // Generates a pipe mesh with specified parameters.
    ShapeGenerator.GenerateCone();              // Generates a cone mesh with specified parameters.

    // == AutoUnwrapSettings == //
    AutoUnwrapSettings.useWorldSpace;           // Determines if UVs are in world space.
    AutoUnwrapSettings.flipU;                   // Flips UVs horizontally.
    AutoUnwrapSettings.flipV;                   // Flips UVs vertically.
    AutoUnwrapSettings.fill;                    // Sets the fill mode for UVs.
    AutoUnwrapSettings.anchor;                  // Sets the anchor point for UVs.
    AutoUnwrapSettings.scale;                   // Sets the scale for UVs.
    AutoUnwrapSettings.offset;                  // Sets the offset for UVs.

    // == BuiltinMaterials == //
    BuiltinMaterials.defaultMaterial;           // Accesses ProBuilder's default material.
    BuiltinMaterials.facePickerMaterial;        // Material used for face picking.
    BuiltinMaterials.vertexPickerMaterial;      // Material used for vertex picking.
    BuiltinMaterials.edgePickerMaterial;        // Material used for edge picking.
    BuiltinMaterials.triggerMaterial;           // Material used for triggers.
    BuiltinMaterials.colliderMaterial;          // Material used for colliders.
    BuiltinMaterials.noDrawMaterial;            // Material that is not drawn.

    // == Normals == //
    Normals.CalculateNormals();                 // Recalculates normals for the mesh.
    Normals.CalculateTangents();                // Recalculates tangents for the mesh.

    // == Projection == //
    Projection.PlanarProject();                 // Applies planar UV projection to faces.
    Projection.BoxProject();                    // Applies box UV projection to faces.

    // == MeshUtility == //
    MeshUtility.Optimize();                     // Optimizes the mesh for performance.
    MeshUtility.CollapseSharedVertices();       // Collapses vertices that share the same position.

    // == HandleUtility == //
    HandleUtility.FaceRaycast();                // Raycasts to detect a face under the cursor.
    HandleUtility.PickVertices();               // Picks vertices from a raycast.
}
```

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DOTS

```
public class UnityDOTS : MonoBehaviour
{
    // === World === //
    World.DefaultGameObjectInjectionWorld;  // The default World instance.
    World.CreateSystem();                   // Creates a new system.
    World.GetOrCreateSystem();              // Retrieves or creates a system.
    World.DestroySystem();                  // Destroys a system.

    // === EntityManager === //
    entityManager.CreateEntity();           // Creates a new Entity.
    entityManager.DestroyEntity();          // Destroys an Entity.
    entityManager.AddComponent();           // Adds a component to an Entity.
    entityManager.RemoveComponent();        // Removes a component from an Entity.
    entityManager.HasComponent();           // Checks if an Entity has a component.
    entityManager.GetComponentData();       // Gets component data from an Entity.
    entityManager.SetComponentData();       // Sets component data for an Entity.

    // === EntityQuery === //
    entityQuery.CalculateEntityCount();     // Gets the number of entities matching the query.
    entityQuery.ToEntityArray();            // Retrieves an array of entities from the query.
    entityQuery.SetChangedVersionFilter();  // Filters entities with changed component data.

    // === SystemBase === //
    systemBase.Enabled;                     // Checks if the system is enabled.
    systemBase.OnCreate();                  // Called when the system is created.
    systemBase.OnUpdate();                  // Called on each frame update.
    systemBase.OnDestroy();                 // Called when the system is destroyed.

    // === JobHandle === //
    jobHandle.Complete();                   // Ensures the job has completed.
    jobHandle.IsCompleted;                  // Checks if the job is completed.

    // === BurstCompiler === //
    BurstCompiler.CompileFunctionPointer()  // Compiles a function for Burst.
    BurstCompiler.IsEnabled;                // Checks if Burst is enabled.

    // === NativeArray === //
    nativeArray.Length;                     // Gets the length of the native array.
    nativeArray.Dispose();                  // Disposes of the native array.
    nativeArray.IsCreated;                  // Checks if the native array is created.

    // === NativeQueue === //
    nativeQueue.Enqueue();                  // Adds an item to the native queue.
    nativeQueue.Dequeue();                  // Removes an item from the native queue.
    nativeQueue.IsEmpty;                    // Checks if the native queue is empty.
}
```

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XR: PART 1

```
public class UnityXR : MonoBehaviour
{
    // === XRGeneralSettings === //
    XRGeneralSettings.Instance.Manager.activeLoader;        // Gets the active XR loader.
    XRGeneralSettings.Instance.Manager.activeLoader.name;   // Retrieves the current XR device name.

    // === XRDisplaySubsystem === //
    xrDisplaySubsystem.running;                             // Checks if XR is currently active.
    xrDisplaySubsystem.eyeTextureWidth;                     // Gets the width of the XR eye texture.
    xrDisplaySubsystem.eyeTextureHeight;                    // Gets the height of the XR eye texture.
    xrDisplaySubsystem.scaleOfAllViewports;                 // Adjusts the render resolution scale.
    xrDisplaySubsystem.renderViewportScale;                 // Adjusts the XR viewport scaling.
    xrDisplaySubsystem.stereoRenderingMode;                 // Defines the stereo rendering method.
    xrDisplaySubsystem.TryGetAppGPUTimeLastFrame();         // Retrieves GPU time for the last frame.
    xrDisplaySubsystem.TryGetDisplayRefreshRate();          // Gets display refresh rate.
    xrDisplaySubsystem.TryGetRenderPass();                  // Retrieves active render passes.
    xrDisplaySubsystem.TryGetFramePresentCount();           // Gets the number of presented frames.

    // === XRInputSubsystem === //
    xrInputSubsystem.TryRecenter();                         // Resets tracking origin.
    xrInputSubsystem.TrySetTrackingOriginMode();            // Sets tracking origin mode.
    xrInputSubsystem.GetTrackingOriginMode();               // Gets the current tracking origin mode.
    xrInputSubsystem.GetSupportedTrackingOriginModes();     // Lists available tracking origins.
    xrInputSubsystem.TryGetBoundaryPoints();                // Gets boundary points of the play area.
    xrInputSubsystem.trackingOriginUpdated;                 // Event when tracking origin is updated.
    xrInputSubsystem.boundaryChanged;                       // Event when boundary changes.

    // === InputDevices === //
    InputDevices.GetDevicesWithCharacteristics();           // Gets XR input devices by characteristics.
    InputDevices.GetDeviceAtXRNode();                       // Gets a specific XR device.
    InputDevices.deviceConnected;                           // Event when an input device connects.
    InputDevices.deviceDisconnected;                        // Event when an input device disconnects.
    InputDevices.deviceConfigChanged;                       // Event when an input device config changes.
    InputDevices.GetDevices();                              // Retrieves all connected XR devices.
    InputDevices.SendHapticImpulse();                       // Sends haptic feedback.
    InputDevices.TryGetFeatureValue();                      // Retrieves input feature values.

    // === XRStats === //
    XRStats.TryGetGPUTimeLastFrame();                       // Gets GPU time for the last frame.
    XRStats.TryGetFramePresentCount();                      // Retrieves number of presented frames.
    XRStats.TryGetDroppedFrameCount();                      // Retrieves number of dropped frames.
}
```

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XR: PART 2

```
public class UnityXRPart2 : MonoBehaviour
{
    // === ARTrackedImage === //
    arTrackedImage.referenceImage;                  // Gets detected reference image.
    arTrackedImage.size;                            // Gets detected image size.
    arTrackedImage.trackingState;                   // Gets tracking state of the image.
    arTrackedImage.transform;                       // Gets transform of detected image.

    // === ARFaceManager === //
    arFaceManager.enabled;                          // Enables/disables face tracking.
    arFaceManager.trackables;                       // Lists detected faces.
    arFaceManager.facePrefab;                       // Sets prefab for tracked faces.
    arFaceManager.maximumFaceCount;                 // Limits simultaneous face tracking.
    arFaceManager.supportedFaceCount;               // Gets max supported face tracking.

    // === ARFace === //
    arFace.vertices;                                // Gets face mesh vertices.
    arFace.normals;                                 // Gets face mesh normals.
    arFace.indices;                                 // Gets face mesh indices.
    arFace.uvs;                                     // Gets face mesh UVs.
    arFace.leftEye;                                 // Gets left eye transform.
    arFace.rightEye;                                // Gets right eye transform.

    // === ARSession === //
    ARSession.Reset();                              // Resets the AR session.
    arSession.enabled;                              // Enables/disables AR tracking.
    ARSession.state;                                // Gets the current AR session state.
    ARSession.notTrackingReason;                    // Gets the reason for lost tracking.
    arSession.matchFrameRate;                       // Matches AR frame rate to display.

    // === ARPlaneManager === //
    arPlaneManager.enabled;                         // Enables/disables plane detection.
    arPlaneManager.requestedDetectionMode;          // Sets plane detection mode.
    arPlaneManager.trackables;                      // Lists detected planes.
    arPlaneManager.planePrefab;                     // Sets the plane prefab.
    arPlaneManager.currentDetectionMode;            // Gets active plane detection mode.

    // === ARPlane === //
    arPlane.boundary;                               // Gets plane boundary points.
    arPlane.alignment;                              // Gets plane alignment (horizontal/vertical).
    arPlane.center;                                 // Gets plane center position.
    arPlane.extents;                                // Gets plane extents (half-size).
    arPlane.size;                                   // Gets plane width and height.

    // === ARTrackedImageManager === //
    arTrackedImageManager.referenceLibrary;         // Sets tracked image library.
    arTrackedImageManager.enabled;                  // Enables/disables image tracking.
    arTrackedImageManager.trackables;               // Lists detected images.
    arTrackedImageManager.maxNumberOfMovingImages;  // Limits tracked moving images.
    arTrackedImageManager.trackedImagePrefab;       // Sets prefab for tracked images.
}
```

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MULTIPLAYER NETCODE: PART - 2

```
public class UnityNetcode : MonoBehaviour
{
    // === NetworkManager === //
    NetworkManager.Singleton.StartHost();                  // Starts the server and client (host mode).
    NetworkManager.Singleton.StartServer();                // Starts the server.
    NetworkManager.Singleton.StartClient();                // Starts the client and connects to a server.
    NetworkManager.Singleton.Shutdown();                   // Shuts down the network session.
    NetworkManager.Singleton.ConnectedClients;             // Retrieves connected clients.
    NetworkManager.Singleton.IsHost;                       // Checks if running as host.
    NetworkManager.Singleton.IsServer;                     // Checks if running as server.
    NetworkManager.Singleton.IsClient;                     // Checks if running as client.
    NetworkManager.Singleton.ConnectionApprovalCallback; // Sets the approval callback for connections.
    NetworkManager.Singleton.OnClientConnectedCallback;  // Event triggered when a client connects.
    NetworkManager.Singleton.OnClientDisconnectCallback; // Event triggered when a client disconnects.

    // === NetworkBehaviour === //
    networkBehaviour.IsOwner;                              // Checks if this client owns the object.
    networkBehaviour.IsServer;                             // Checks if the object is on the server.
    networkBehaviour.NetworkObject;                        // Retrieves the NetworkObject component.
    networkBehaviour.NetworkManager;                       // Accesses the NetworkManager instance.
    networkBehaviour.OwnerClientId;                        // Gets the client ID of the object owner.
    networkBehaviour.NetworkVariable;                      // Networked variable for syncing state.

    // === NetworkObject === //
    networkObject.Spawn();                                 // Spawns the network object.
    networkObject.Despawn();                               // Despawns the network object.
    networkObject.IsSpawned;                               // Checks if the object is spawned.
    networkObject.ChangeOwnership();                       // Changes object ownership to a client.
    networkObject.IsOwner;                                 // Checks if this client owns the object.

    // === RPCs (Remote Procedure Calls) === //
    networkBehaviour.SendServerRpc();                      // Sends an RPC from client to server.
    networkBehaviour.SendClientRpc();                      // Sends an RPC from server to all clients.
    networkBehaviour.SendTargetRpc();                      // Sends an RPC to a specific client.

    // === NetworkVariable === //
    networkVariable.Value;                                 // Gets or sets the value of the variable.
    networkVariable.OnValueChanged;                        // Event triggered when value changes.
    networkVariable.Settings;                              // Configures the variable settings.
    networkVariable.ReadPerm;                              // Defines read permissions.
    networkVariable.WritePerm;                             // Defines write permissions.

    // === Scene Management === //
    NetworkManager.Singleton.SceneManager.LoadScene();   // Loads a scene across the network.
    NetworkManager.Singleton.SceneManager.OnSceneEvent;  // Event triggered for network scene events.
}
```

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RECORDER

```
public class UnityRecorder : MonoBehaviour
{
    // === RecorderController === //
    recorderController.StartRecording();                    // Starts recording.
    recorderController.StopRecording();                     // Stops recording.
    recorderController.IsRecording();                       // Checks if recording is in progress.
    recorderController.PrepareRecording();                  // Prepares the recorder before starting.

    // === RecorderControllerSettings === //
    recorderControllerSettings.AddRecorderSettings();   // Adds a recorder to the session.
    recorderControllerSettings.SetRecordModeToManual(); // Enables manual control over recording.

    // === RecorderSettings === //
    recorderSettings.FrameRate;                             // Sets the recording frame rate.
    recorderSettings.OutputFile;                            // Specifies the output file path.
    recorderSettings.CaptureEveryNthFrame;                  // Defines frame capture interval.
    recorderSettings.ImageWidth;                            // Sets output image width.
    recorderSettings.ImageHeight;                           // Sets output image height.

    // === MovieRecorderSettings === //
    movieRecorderSettings.OutputFormat;                     // Defines the video format (MP4, WebM, etc.).
    movieRecorderSettings.VideoBitrateMode;                 // Controls video bitrate settings.
    movieRecorderSettings.AudioInputSettings;               // Configures audio recording options.

    // === ImageRecorderSettings === //
    imageRecorderSettings.OutputFormat;                     // Sets image format (PNG, JPEG, EXR, etc.).
    imageRecorderSettings.CaptureAlpha;                     // Enables alpha channel capture.
    imageRecorderSettings.ColorSpace;                       // Sets the color space (sRGB, Linear).

    // === GifRecorderSettings === //
    gifRecorderSettings.FrameRate;                          // Sets the GIF frame rate.
    gifRecorderSettings.Quality;                            // Defines GIF compression quality.

    // === AudioRecorderSettings === //
    audioRecorderSettings.OutputFormat;                     // Defines audio format (WAV, MP3, etc.).
    audioRecorderSettings.AudioInputSettings;               // Configures microphone or in-game audio input.

    // === Recorder Inputs === //
    gameViewInputSettings.CaptureGameView();                // Captures Game View for recording.
    cameraInputSettings.CaptureCamera();                    // Captures a specific camera's output.
    renderTextureInputSettings.CaptureTexture();            // Captures RenderTexture for recording.

    // === Options === //
    Options.showLegacyRecorders;                            // Hides or shows legacy recorders.
    Options.showRecorderGameObject;                         // Displays the Recorder GameObject in Hierarchy.
    Options.verboseMode;                                    // Enables verbose logging for debugging.
}
```

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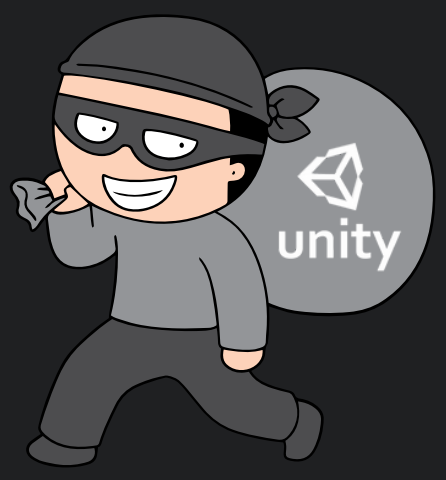
ANIMATION RIGGING

```
public class UnityAnimationRigging : MonoBehaviour
{
    // === RigBuilder === //
    rigBuilder.layers;                                  // Retrieves the layers in the RigBuilder.
    rigBuilder.Build();                                 // Builds the rig at runtime.
    rigBuilder.Clear();                                 // Clears the rig data.
    rigBuilder.enabled;                                 // Enables or disables RigBuilder.

    // === Rig === //
    rig.weight;                                         // Controls the overall weight of the rig.
    rig.layers;                                         // Retrieves layers applied to the rig.
    rig.SetWeight();                                    // Dynamically adjusts rig weight.

    // === TwoBoneIKConstraint === //
    twoBoneIK.target;                                   // Sets the target Transform for IK.
    twoBoneIK.hint;                                     // Sets the hint Transform for guiding IK.
    twoBoneIK.weight;                                   // Adjusts the overall influence of IK.
    twoBoneIK.targetPositionWeight;                     // Sets the influence of the target position.
    twoBoneIK.targetRotationWeight;                     // Sets the influence of the target rotation.
    twoBoneIK.hintWeight;                               // Controls how much the hint affects IK.

    // === MultiAimConstraint === //
    multiAimConstraint.data.constrainedObject;          // The object being constrained.
    multiAimConstraint.data.sourceObjects;              // List of sources influencing aim.
    multiAimConstraint.data.aimAxis;                    // Defines the aim direction.
    multiAimConstraint.data.offset;                     // Adds an offset to the aim direction.
    multiAimConstraint.data.rotationWeight;             // Adjusts influence of the constraint.

    // === MultiParentConstraint === //
    multiParentConstraint.data.constrainedObject;       // The object being constrained.
    multiParentConstraint.data.sourceObjects;           // List of parent sources.
    multiParentConstraint.data.positionWeight;          // Weight for position blending.
    multiParentConstraint.data.rotationWeight;          // Weight for rotation blending.

    // === MultiReferentialConstraint === //
    multiReferentialConstraint.data.constrainedObject;  // The object being controlled.
    multiReferentialConstraint.data.sourceObjects;      // List of references.
    multiReferentialConstraint.data.switchWeight;       // Blends between references.

    // === OverrideTransform === //
    overrideTransform.data.constrainedObject;           // The object being overridden.
    overrideTransform.data.sourceObject;                // The override source.
    overrideTransform.data.positionWeight;              // Influence of position override.
    overrideTransform.data.rotationWeight;              // Influence of rotation override.
}
```



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