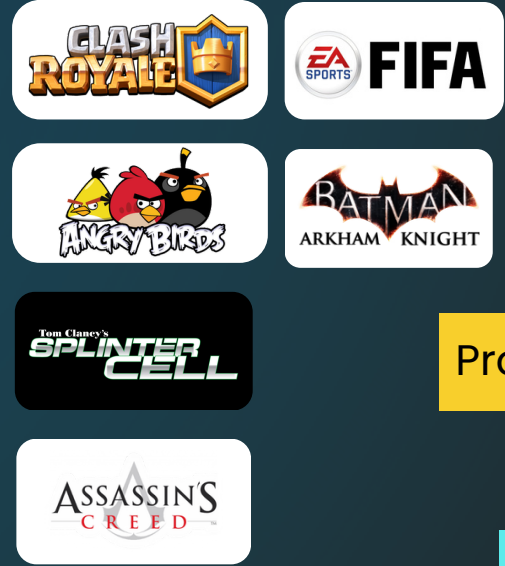


# GAME DEV ROADMAP



## Game Programmer

## Game Mathematics & Physics

## Programming Languages

## Game Engines

### C++

### C#

- Pointers
- Manual Memory
- STL
- Templates
- Move Semantics

- OOP
- Memory Management
- Data Structures & Algorithms
- Multithreading
- Exception Handling

- Properties
- GC
- LINQ
- Async/Await
- Events

## Design Patterns

- Singleton
- Command
- Service Locator
- Strategy
- Decorator
- Flyweight
- MVC
- Object Pooling
- Observer
- Dependency Injection
- State Machine
- Factory

## Graphic Programming

### OpenGL/Vulkan/WebGL

- Post Processing
- Ray Tracing
- Optimization

### Rendering Pipeline

### Lighting Models

### Shaders HLSL/GLSL

## Unity

## Unreal

- Scene Management
- Physics System
- Animation System
- Particle System
- Asset Management
- Build Systems
- Rendering Pipeline

- MonoBehaviour
- Prefabs
- Coroutines
- Cinemachine
- Scriptable Objects
- Shader Graph
- Profiler
- URP/HDRP
- DOTS
- Unity Cloud Build

- Blueprints
- Material Graph
- Niagara
- Metahumans
- Landscape Tool
- C++ API & Macros
- Gameplay Framework
- Procedural Content Generation
- Performance Profiler
- Multi-Process Cook

- Linear Algebra
- Vectors/Matrices
- Quaternions

## Mathematics

- Geometry
- Trigonometry
- Statistics
- Transformations

- Kinematics
- Forces
- Collisions

## Physics

- Rigid Bodies
- Particle Physics
- Ray Casting
- Constraints



## Multiplayer

## Networking

### Fundamentals

- TCP/IP Stack
- UDP Protocol

### Network Protocols

### Security

#### Anti-Cheat

#### Authentication

#### Data Encryption

#### Socket Programming

## Tools

### Testing

#### Profiler

#### Debugging

### Analytics

#### Leaderboard

#### Matchmaking

## Architecture

### Client-Server

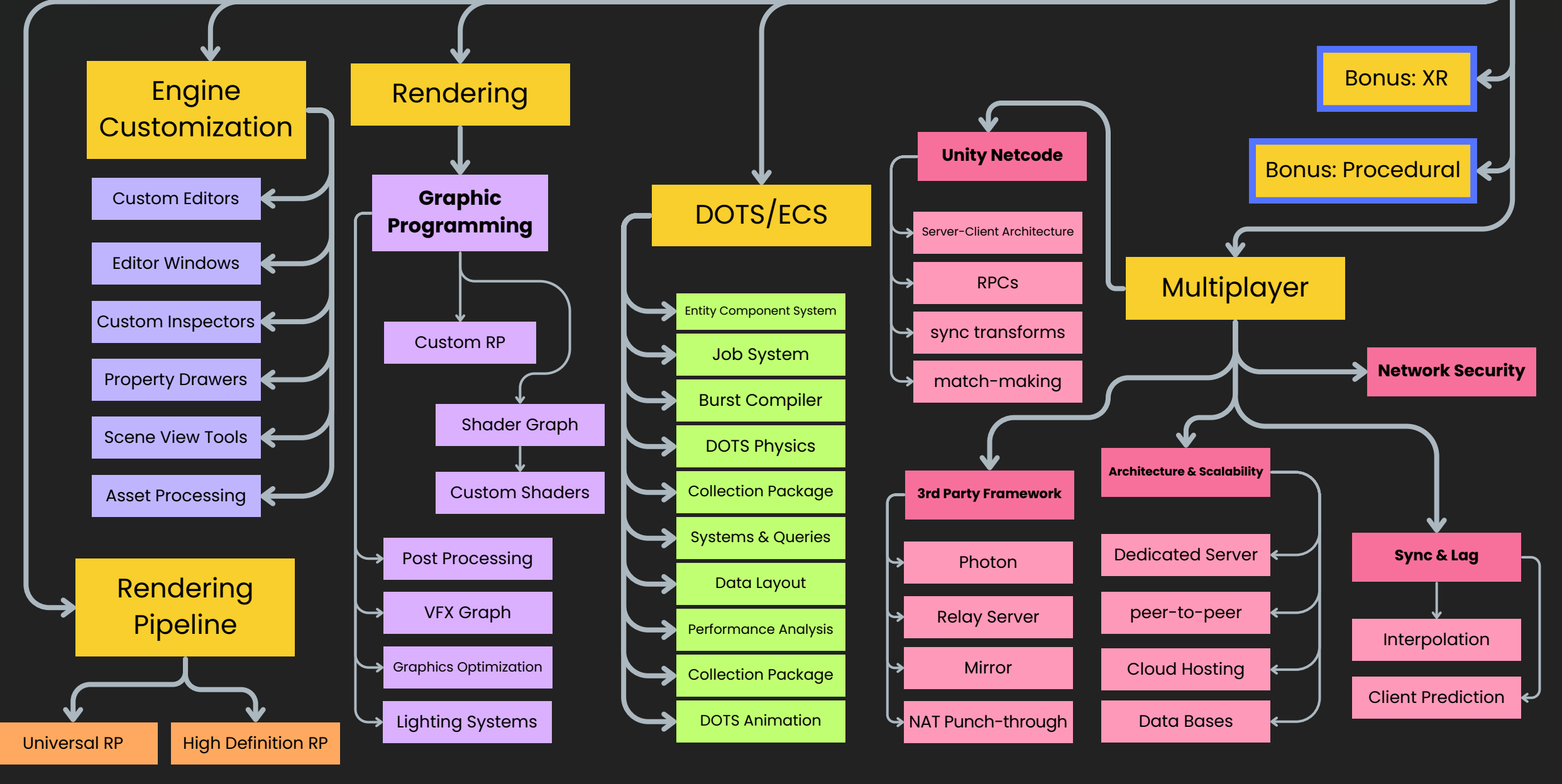
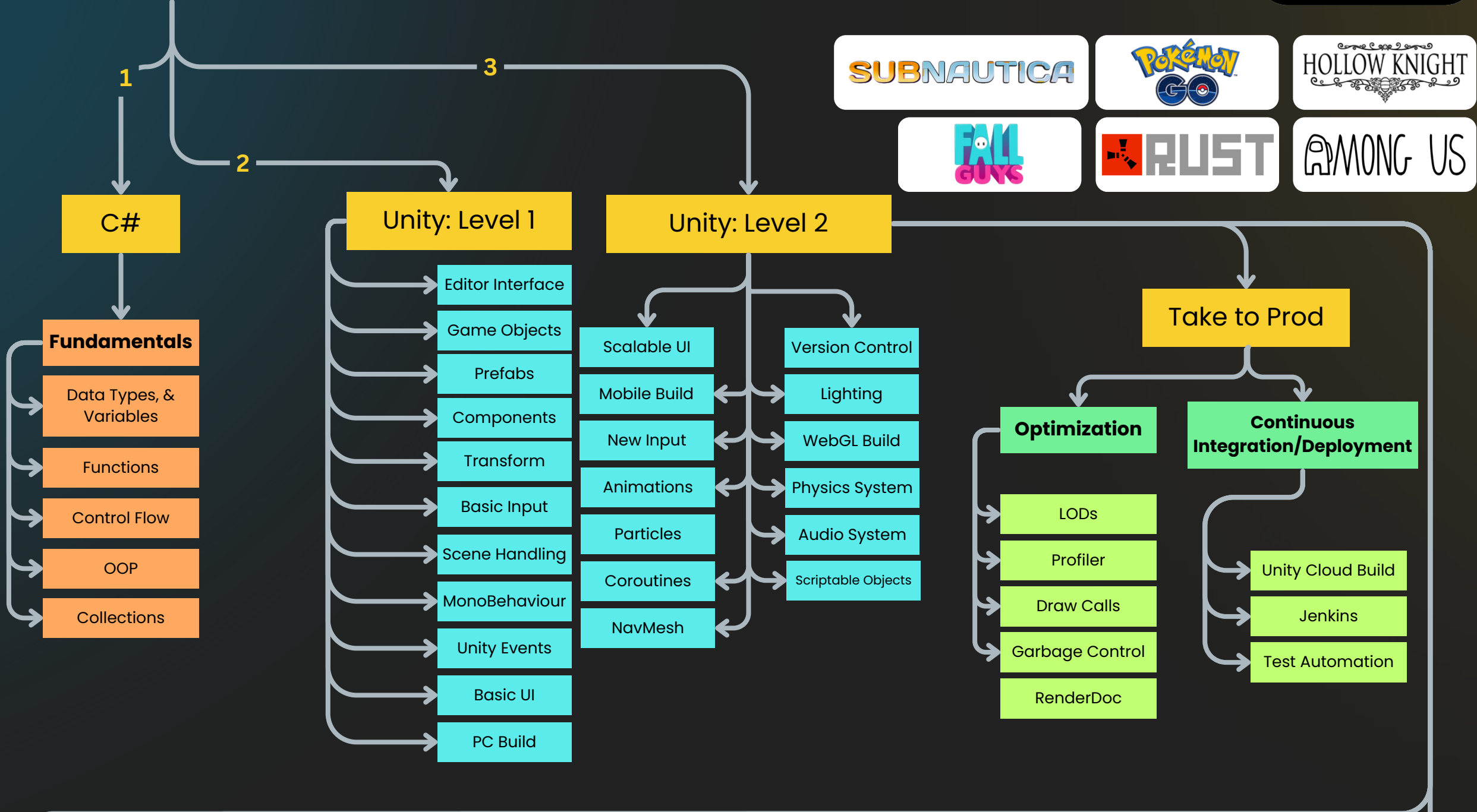
### Peer-to-Peer

# UNITY DEV ROADMAP



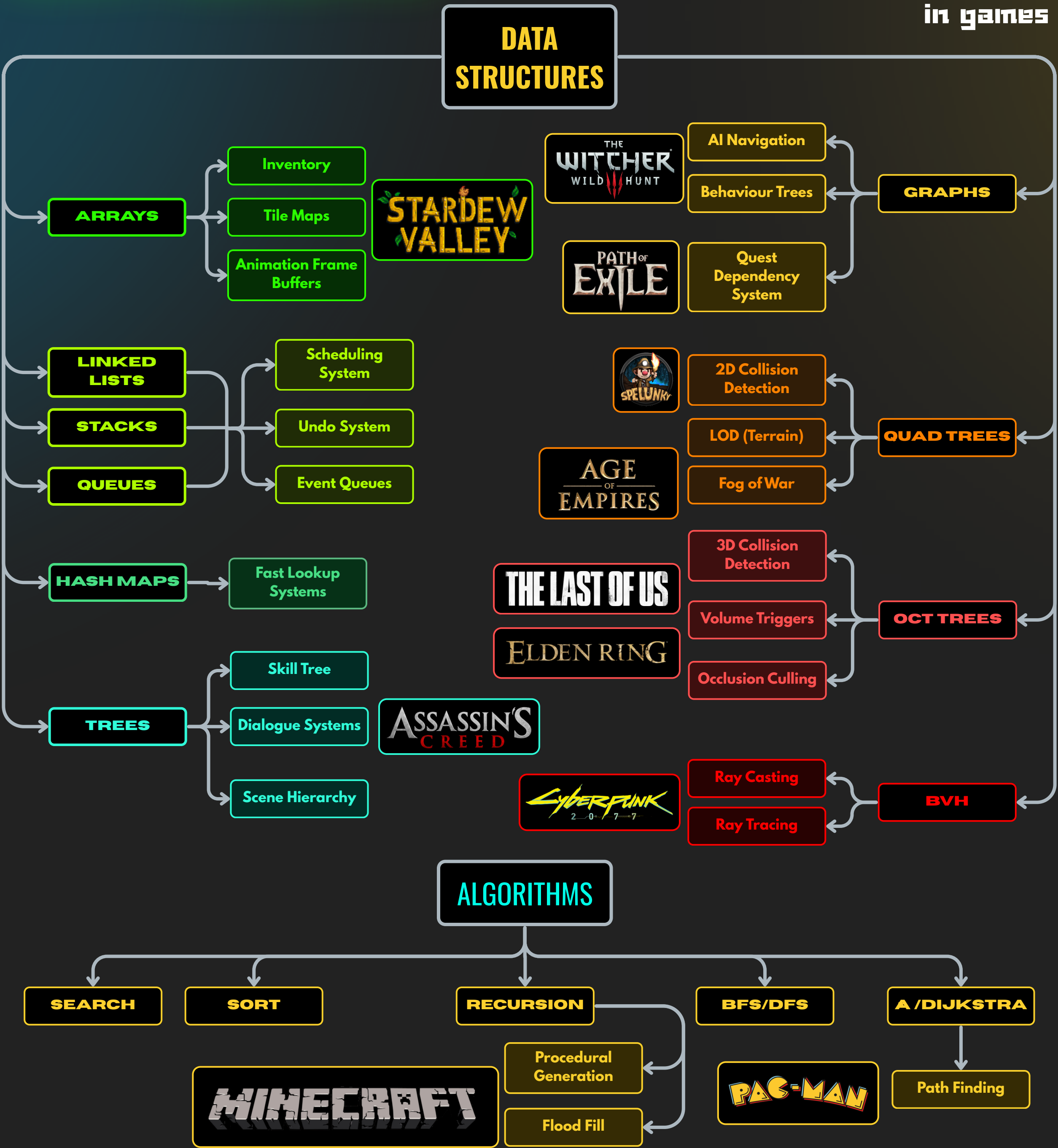
New Born Baby

## PROGRAMMING GUIDE



# DSA: ROADMAP

## DATA STRUCTURE & ALGORITHMS in games



# AAA GAME DEV LEARNING PATH

