Game Engines

Game Engines

- The term arose in the mid-1990's associated to first-person shooters (FPS) games such as Doom, by id Software.

- Enable faster creation of different games sharing the same engine, both by companies and modders.

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Game Engines

- Commonly refers to a set of inter-operating sub-systems that perform tasks commonly required for games, e.g.:
  - graphics rendering,
  - collision detection,
  - input handling,
  - etc.

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Some Common Game Engines

Unreal Engine

- AAA Graphics
- C++ and Blueprints
- Blueprint Visual Programming
    - Easily integrate designers in the development
- Release:
    - Pay a 5% royalty on that amount after the first $3,000 per game per calendar quarter
- May be overwhelming at beginning

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Some Common Game Engines

Unity

- Great adoption by the indie community
- Great community support + tutorials and assets
- C#, JS (discontinued)
- Can be used for any game genre easily
- Unity Personal is free (limitations apply) and valid while making less than $100k per year.

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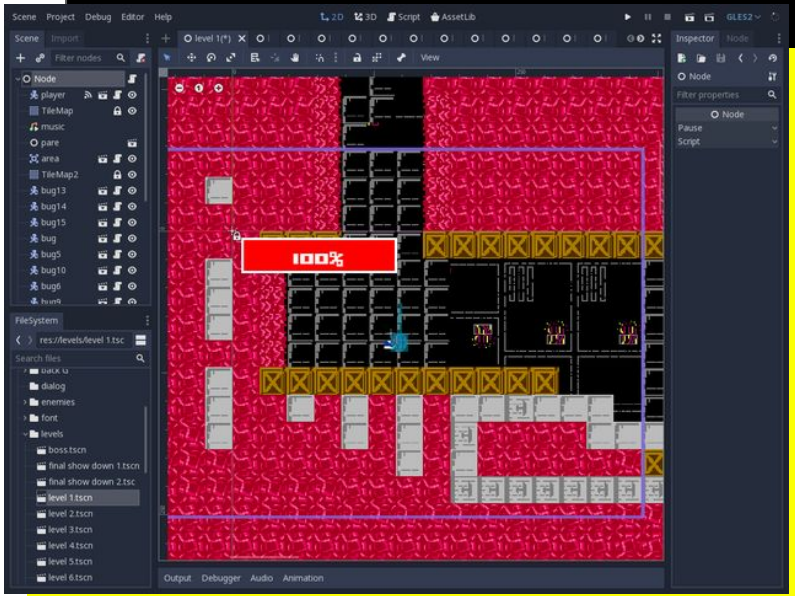
Some Common Game Engines

- Open source (MIT license)
  - What you develop is yours
- 2D and 3D games
- C#, C++, GDScript (...)
- Huge set of common tools
- Big and growing community
  - over 34k subscribers on reddit
  - Steam community

Godot



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https://es.m.wikipedia.org/wiki/Archivo:Godot_3.1_screenshot.png
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Some Common Game Engines

Cry Engine

- Free to use
  - until 5k USD, 5% royalties after
- A powerful and visually stunning engine
  - XBOne, PS4, Win, VR (rift)
  - there's a bit of a learning curve
  - C++
- Plenty of free learning resources
  - Tutorials, forums, and documentation
- CryEngine marketplace
  - free assets and packages

Some Common Game Engines

LibGDX

- Free and open source
- Java game dev platform
- A single API for cross-platform support
  - Win, ios, Android, macos, linux, etc…
- Great for beginners and 2D games
- Good community support

Retrieved from:
https://www.gamedevelopment.blog/full-libgdx-game-tutorial-particle-effects/

Some Common Game Engines

- Corona
- GameMaker
- GameSalad
- RPG Maker
- ...

Others

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Common Game Engine Architecture

- Typically has:
  - a runtime component
    - the engine itself
  - a tool suite
    - for preparing data for the runtime to use

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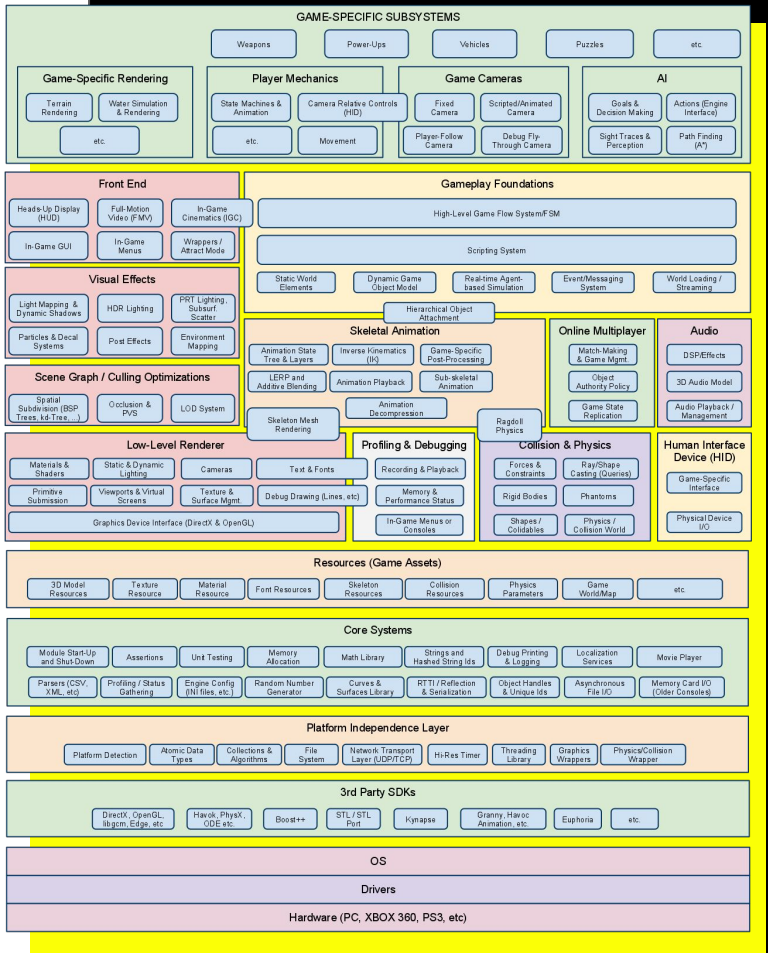
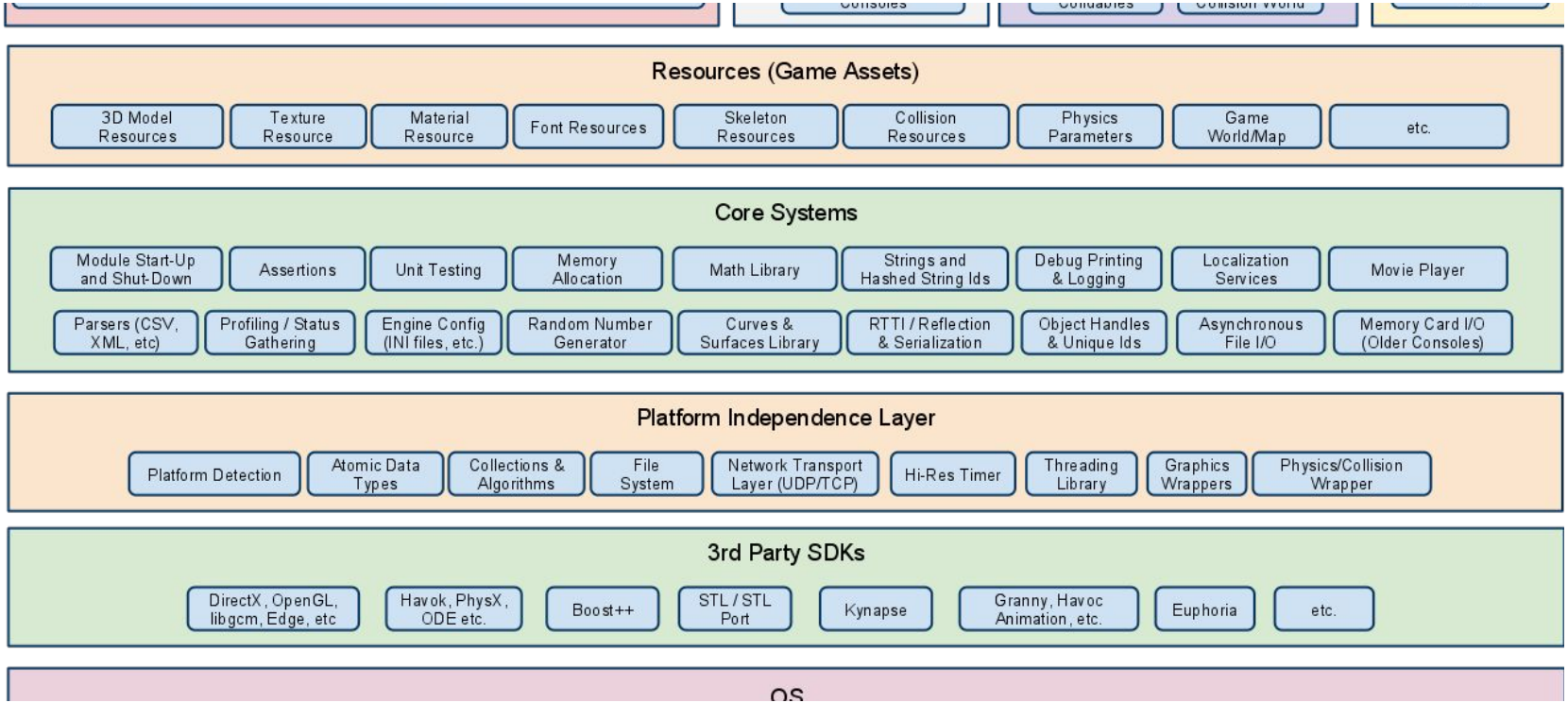
- The engine includes many different layers
  - For some games, only some are needed
  - Additional layers may need to be added/implemented.

Game Engine Layers

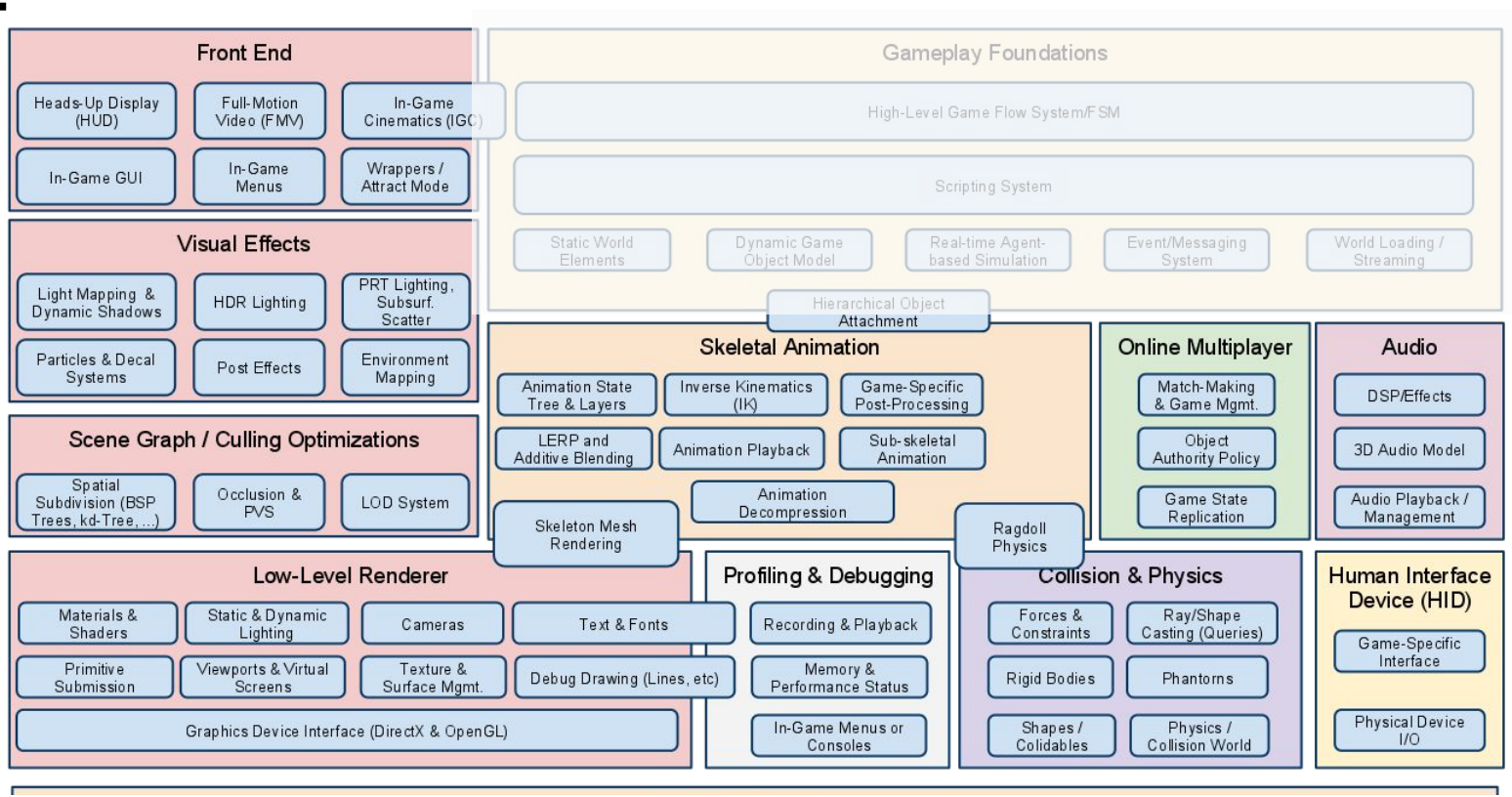
- Many layers
- Grouped in sub-systems
- Depending on the engine, some layers may not be present



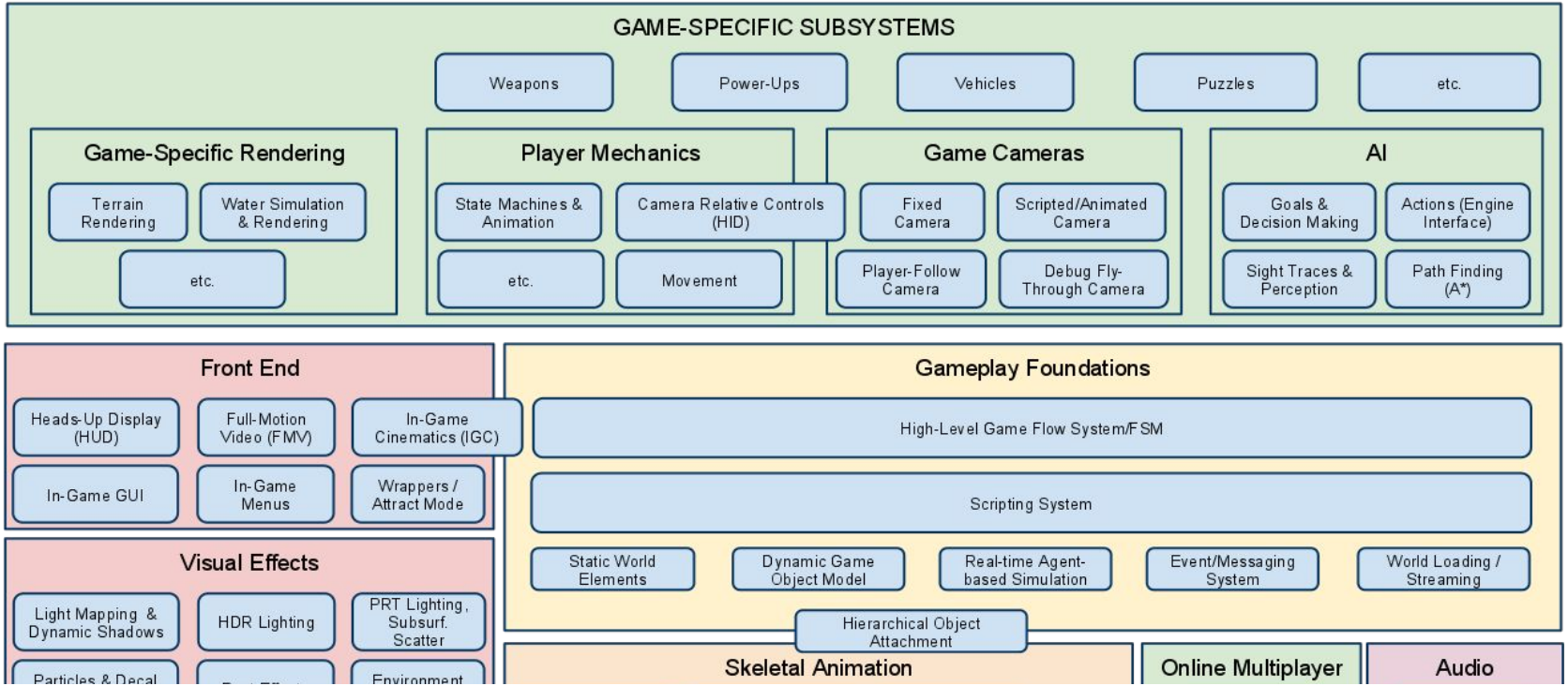
Game Engine Layers



Game Engine Layers



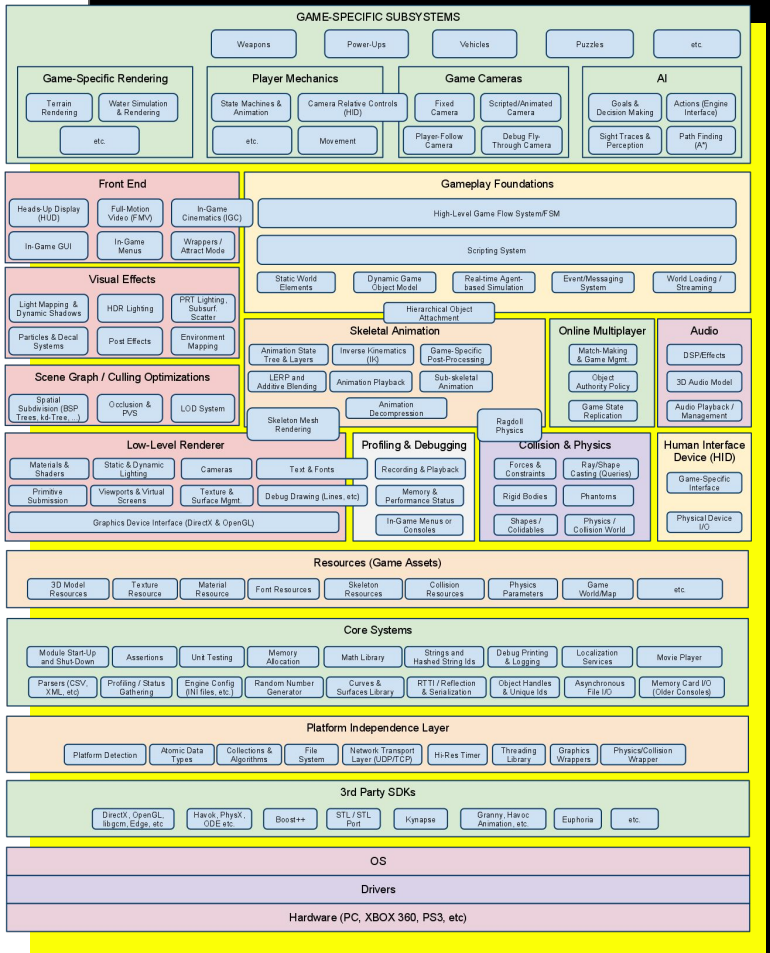
Game Engine Layers



Game Engine Layers

1. Game-specific subsystems
2. Gameplay foundations
3. Front end
4. Visual Effects
5. Scene graph/culling optimizations
6. Low-level rendering
7. Skeletal animation, collision and physics
8. Audio
9. Interfaces
10. Online multiplayer
11. Profiling and debugging
12. Resource handling
13. Core Systems
14. Platform independence Layer

- (Other libs)
- (OS, drivers, hardware)



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Tools Suite

- **A series of tools are employed for content creation**
  - Well-known tools from the design world, such as Photoshop, Maya, 3DS Max, Soundforge, etc.
  - The output formats of these tools usually require conversion
  - In some cases specific tools have to be developed (e.g. the game world's description)

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Tools Suite

- **The asset creation, testing and conditioning pipeline should be as well-defined and early as possible**, to allow as much independence as possible between
  - asset creators
  - game designers
  - game engine developers.

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