



Video Games Introduction

CS 415: Game Development

Professor Eric Shaffer

A Few Quick Words About CS 415

The course lectures will discuss:

- How the features of Unreal work
 - Graphics
 - Physics
 - AI
 - Animation
 - Generating game art
- Also, we'll discuss some elements of game design
- There are lots of great tutorials about how to develop with Unreal Engine
 - e.g. how to use blueprint, how to add AI to the game, etc.
- We will link to useful ones, but not cover that in depth in lecture

Today...let's discuss game design a bit....



Video Game Design

design verb

 Save Word

de-sign | \ di-'zīn \ 

designed; designing; designs

Definition of *design* (Entry 1 of 2)

transitive verb

1 : to create, fashion, execute, or construct according to plan : DEVISE, CONTRIVE

// *design* a system for tracking inventory

2 a : to conceive and plan out in the mind

// *he designed* the perfect crime

b : to have as a purpose : INTEND

// *she designed* to excel in her studies

c : to devise for a specific function or end

// a book *designed* primarily as a college textbook

// a suitcase *designed* to hold a laptop computer

3 *archaic* : to indicate with a distinctive mark, sign, or name

4 a : to make a drawing, pattern, or sketch of

// ... a curious woman whose dresses always looked as if they had been

designed in a rage ...

— Oscar Wilde

b : to draw the plans for

// *design* a building

// *designing* a new bike

The most common and time-honored approach to design is to copy something that someone else made...

So let's look at what kinds of video games people make...

What is a Genre?

Game genres

adventure games; action games; action-adventure games; platform games; fighting games; first-person shooter games; real-time strategy games; turn-based strategy games; role playing games; massively multiplayer online games; stealth games; survival horror games; simulation games; racing games; sports games; rhythm games; puzzle games; board games; educational games; serious games.

Games are often classified into genres, which purport to define games in terms of having a common style or set of characteristics, e.g. as defined in terms of perspective, gameplay, interaction, objective, etc.

However, the classification of games is not always consistent and can be somewhat arbitrary.

Game Platforms: Definitions from Wikipedia

A **computer game** is a computer-controlled game.

A **video game** is a computer game where a video display such as a monitor is the primary feedback device.

In common usage:

- **Computer game** or a **PC game** is played on a PC
- **Console game** is played on a device specifically designed for gaming
- **Mobile game** is played on a mobile device such as a phone or tablet
- ...and there's xR games that require a head-mounted display or other specialized display device



The choice of platform will impact the kind of game you design

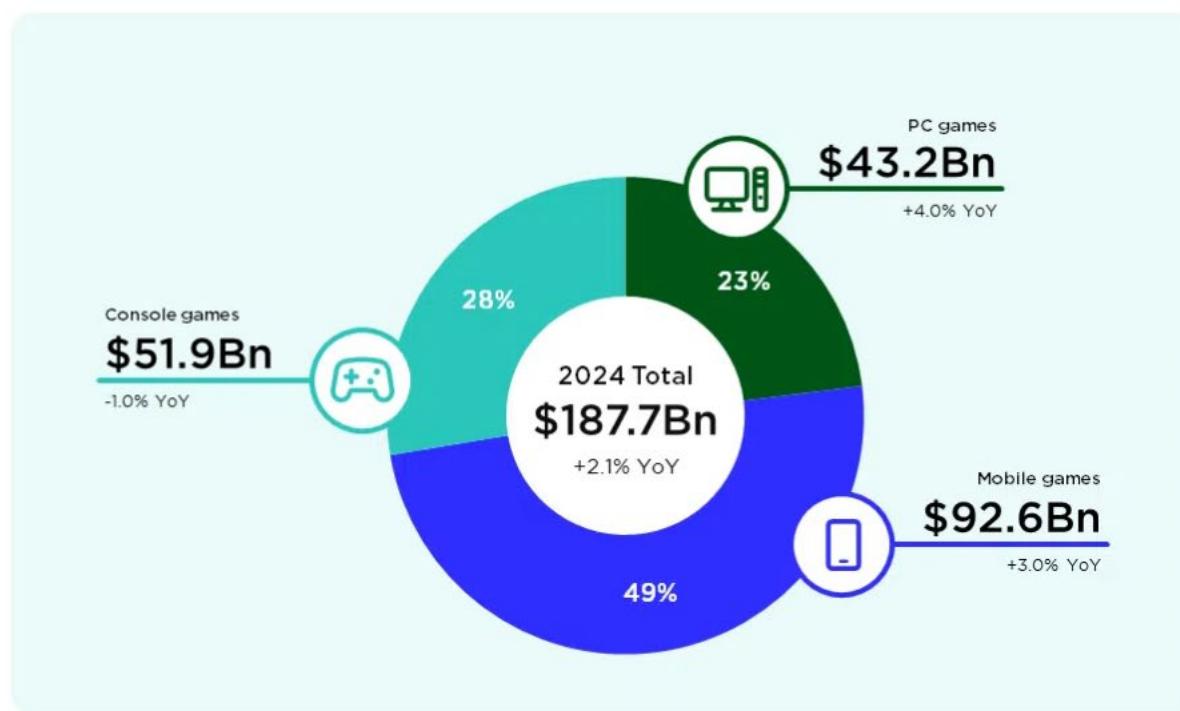


PC Versus Console Versus Mobile

Global revenue in game industry was \$188 billion in 2024

Global games market revenues in 2024

Per segment with year-on-year growth rates



In 2024, the global box office revenue amounted to approximately **30 billion U.S. dollars**, out of which more than half – 15.4 billion dollars – came from the international market (without China). Despite being on the rise in comparison to 2022, box office revenues have yet to fully recover to pre-pandemic levels.

\$95.1Bn
PC and Console game revenues will account for slightly more than half (51%) of the global market in 2024.



Our revenues encompass consumer spending on games: physical and digital full-game copies, in-game spending, and subscription services like Xbox Game Pass. Mobile revenues exclude advertising. Our estimates exclude taxes, second-hand trade or secondary markets, advertising revenues earned in and around games, console and peripheral hardware, B2B services, and the online gambling and betting industry.

Source: Newzoo, Games Market Reports and Forecasts, July 2024 | newzoo.com/globalgamesreport

Genre: Adventure

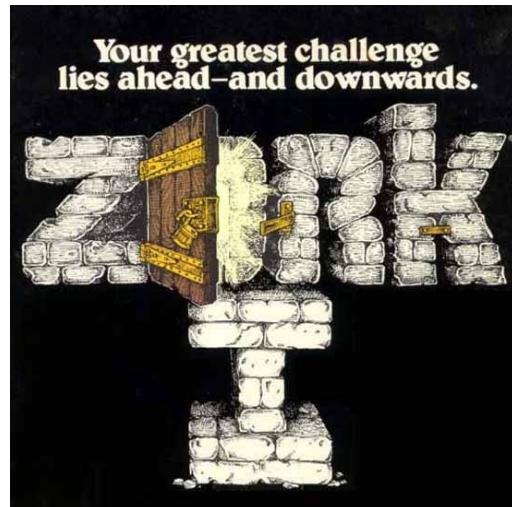
- The player is the protagonist of a story and in order to progress must solve puzzles.
- The puzzles can often involve manipulating and interacting with in-game objects, characters, etc.
- Text-based adventures and graphical

– **Colossal Cave (1976)**

– **Zork (1977)**

– **PlanetFall (1983)**

– **Myst (1993)**

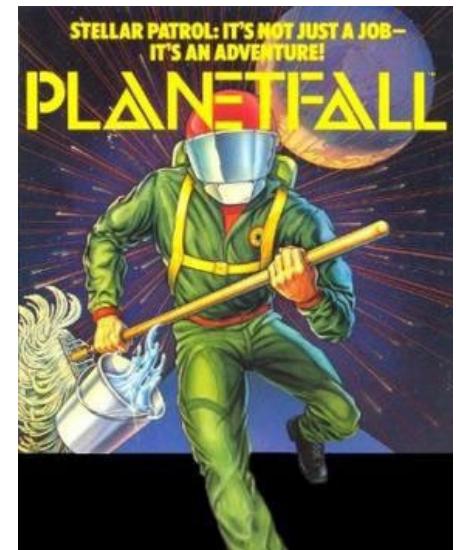


```
West of House
You are standing in an open field west of a
white house, with a boarded front door.
There is a small mailbox here.

>Open Mailbox
Opening the small mailbox reveals a leaflet.

>Take Leaflet
Taken.

>Read Leaflet
"WELCOME TO ZORK!"
```



"Early on in the game, the player finds what at first appears to be the only remaining inhabitant of the island: Floyd, a childish yet endearing robot. He is both a constant source of comic relief (e.g. "Oh, boy! Are we going to try something dangerous?" when the player saves the game in his presence)..."

Genre: Action Games

Action games are typified by fast-paced events and movement.

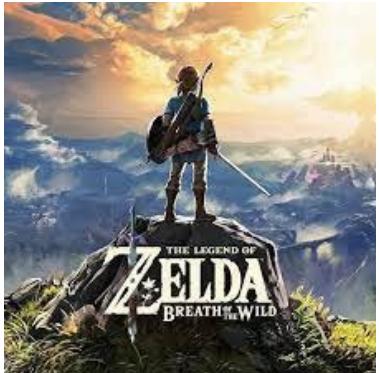
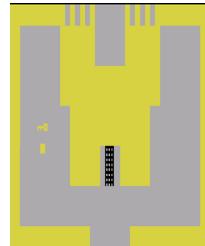
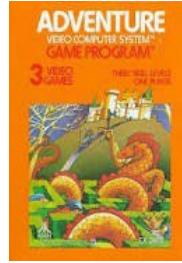
Games such as **Pong (1972)** and **Space Invaders (1978)** initially defined the genre.

Many other kinds of games, and many of the currently most popular games fall into sub-genres of Action Games



Genre: Action-adventure Games

- Action-adventure games involve both exploration and puzzle solving alongside fast-paced action sequences.
- **Adventure (1980)** on Atari 2600 can be considered as initially defining this genre.
- Other examples include:
 - **Last of Us (2013)**
 - **Breath of the Wild (2017)**



Genre: Platform Games (platformers)

- Requires the protagonist to run and jump between surfaces
 - typically avoiding game objects and thwarting gravity.
- Traditional platform games were side-on 2D in perspective and (very popular on earlier gaming platforms)
- The genre has declined in popularity in recent years, although some titles have successfully redefined the genre to include 3D environments
 - **Pitfall!**
 - **Super Mario Bros**
 - **Sonic the Hedgehog**
 - **Super Mario 64**



Genre: Fighting Games

- Player typically fights other players or the computer in some form of one-on-one combat.
- Notable classics include:
 - **Double Dragon**
 - **Mortal Kombat**
 - **Street Fighter**
 - **Tekken**
 - **Super Smash Bros**
 - **Brawlhalla**



1984



2012

Genre: First-person Shooter (FPS)

- Player is “behind the eyes” of the game character in a first-person perspective. Many FPS games also support third-person views.
- Most FPSs are fast-paced and typically require actions to be performed reflexively.
- Notable examples include:
 - **Wolfenstein**
 - **DOOM**
 - **Half-Life**
 - **Far Cry**
 - **F.E.A.R.**
 - **Call of Duty**
 - **Valorant**
 - **Apex Legends**
 - **Superhot**



Genre : Turn-Based Strategy Games

- Turn-based games share similar aims to real-time strategy games although players take turns in much the same was as with many traditional board games.
- Notable examples include:
 - **Civilization**
 - **Jagged Alliance**
 - **Total War** (hybrid games that include elements of both turn-based and real-time games)



Genre: Real-Time Strategy (RTS)

- RTS games typically defined a number of goals around:
 - resource collection
 - base and unit construction
 - engagement in combat with opponents who also share similar goals
- Emphasis is often placed upon managing logistics, resources and production.
- Notable examples include:
 - **Dune 2**
 - **Command and Conquer**
 - **Warcraft**
 - **Age of Empires**



Genre: Role Playing Games (RPGs)

- Games based on pen and pencil games like Dungeons and Dragons.
- Provides the player with character development, problem resolution
- Notable examples include:
 - **Final Fantasy**
 - **Baldur's Gate**
 - **Wasteland**
 - **Neverwinter Nights**
 - **Elder Scrolls Oblivion**



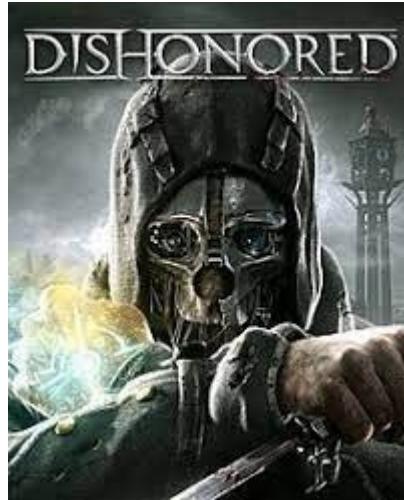
Genre: Massively Multiplayer Online Role-playing Games (MMORPGs)

- Typically a RPG set in a persistent virtual world populated by thousands of other players.
 - Evolved from text-based MUDs in mid-to-late 1990s.
- The first highly popular MMORPG was **Ultima Online**
- **EverQuest** produced real-world economic effects (goldmining)
- **World of Warcraft** holds the honor of being the current most popular



Genre: Stealth Games

- Defined by a focus on evasion and precision play.
- Notable examples include:
 - **Metal Gear**
 - **Thief**
 - **Dishonored**



Genres: Sports and Simulation Games

- Simulate physical activities such as flying an aircraft (**Microsoft Flight Simulator**)
 - Or playing football, etc..
- Other forms of simulation game aim to provide simulations of forms of management
 - football management games, city management (**SimCity**), railroading, etc.
- Or **The Sims** series where the player manages the lives of computer characters.



Genre: Racing Games

- Place the player behind the wheel
 - competing in a race against other drivers or time.
- Notable examples include
 - **Mario Kart**
 - **GTR**



Actually...maybe sports...



Genre: Puzzle Games

- Require the player to solve puzzles or problems
 - can involve the exercise of logic, memory, pattern matching, reaction time, etc.
- Notable examples include:
 - **Tetris**
 - **Minesweeper**
 - **Boulder Dash**
 - **Candy Crush**



Genre: Board or Card Games

Computerised versions of board, word, and card games and include games such as chess, go, scrabble, etc.



Genre: Educational games

- Educational games are designed to teach new skills which can span from pre-school onwards.
- Notable examples of this genre include:
 - **Carmen Sandiego series**
 - **Mavis Beacon Teaching Typing**



Genre: Sandbox Games

A **sandbox game** is a [video game](#) with a gameplay element that provides the player a great degree of [creativity](#) to interact with, usually without any predetermined goal, or alternatively with a goal that the player sets for themselves. Sandbox games are often associated with an [open world concept which gives the player freedom of movement and progression in the game's](#) world. The term "sandbox" derives from the nature of a [sandbox](#) that lets children create nearly anything they want within it. -Wikipedia



People also ask :

What type of game is Minecraft considered?

"sandbox" adventure game

Minecraft is a multi-platform "sandbox" adventure game (like a virtual 3D lego-like building game) which means that players are given a hollow virtual world with which they can build things.

Open World

- Elden Ring
- No Man's Sky



In video games, an open world is a game mechanic of using a virtual world that the player can explore and approach objectives freely, as opposed to a world with more linear and structured gameplay.^{[1][2]} While games have used open-world designs since the 1980s, the implementation in Grand Theft Auto III (2001) set a standard for the concept which has been used since. -Wikipedia

And also Breath of the Wild...etc.

Levels



In [video games](#), a **level** (also referred to as a **map**, **stage**, or **round** in some older games) is any space available to the player during the course of completion of an objective. Video game levels generally have progressively-increasing difficulty to appeal to players with different skill levels. Each level may present new concepts and challenges to keep a player's interest high. – Wikipedia

Humble Suggestions

For the final project:

1. Implement a level-based game
 1. Professional studios have trouble with open world
 2. Allows better division of labor on the project
2. Unreal Engine is particularly good for first person action games
3. Don't make your own art assets...
 1. Or if you do...only make simple ones
 2. Art takes time... a lot of time
 3. Lots of free pro stuff available

If you really want to do mobile or VR or not use UE...you can but be prepared