

Game Development

EDGE Game Development Camp

June 3, 2018

Introductions

What are games?

How video games are made.

Introductions

Welcome!

We are all glad that you are here!

A quick word from our sponsor.

- ▶ This camp is sponsored by GOOGLE. We would like to thank them for providing the resources to make this camp possible.
- ▶ If you enjoy this camp, consider coming to APSU, majoring in Computer Science, then applying for a job a Google.

Who are we?

We will introduce ourselves.

Why are we here?

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- ▶ To make video games!
- ▶ To learn how computers work.
- ▶ To see if we are interested in the study of technology and engineering in University.
- ▶ To possibly use this camp to launch a career in the technology field.

What are games?

Rules

A game should have rules.

- ▶ Rules dictate what a player is allowed to do and the order in which they are allowed to do it.
- ▶ An activity with a goal and choice but without rules is considered “puzzle”.
 - ▶ Jigsaw Puzzles
 - ▶ Rubric's Cube

Goals

A game should have one or more goals.

- ▶ Goals motivate the players to keep playing to meet an objective.
- ▶ Some games can have multiple objectives, any one of which triggers the end of the game.
- ▶ An activity without goals will cause the players to do one of two things:
 - ▶ Implicitly create their own goals to fill the void.
 - ▶ Get bored with the game and do something else.
- ▶ This can happen even when your game has a clear goal.

Choice

A game should allow a player to make choices.

- ▶ Choices allow the player to control their destiny.
- ▶ Activities with rules and goals but without choice are called “Games of Chance”.
 - ▶ Candyland
 - ▶ War
 - ▶ Snakes and Ladders
 - ▶ Slot Machines
 - ▶ Lottery

What are different types of games?

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- ▶ Sports (baseball, football, hockey, basketball, soccer, etc.)
- ▶ Dexterity (Jenga, Twister)
- ▶ Board (Monopoly, Settlers of Catan, etc.)
- ▶ Pencil-And-Paper (Dungeons and Dragons, GURPS, etc.)
- ▶ Card (Uno, Magic: The Gathering, Pokemon)
- ▶ Dice (Shut the Box, Yahtzee, Farkle, Liar's Dice, Craps)
- ▶ Video Games!

Video games

- ▶ Video games have been with us since the 1960s since computer scientists began working on interactive demonstrations for their new computers.
- ▶ The first video game was called “Spacewar!” and was developed at MIT in 1962.
- ▶ The game involves two space ships flying around a 2D space. The goal of each ship is to shoot the other.
- ▶ Spacewar was created using assembly language on the PDP-1.

Spacewar! The first video game



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How video games are made.

Assembly

- ▶ In the early days, all games were written in assembly, usually by a single person.
 - ▶ Assembly code is language which written for a particular computer architecture and probably will not work on a different machine.
 - ▶ If you wanted to play a game, you had to make sure that the code existed for your computer architecture.
 - ▶ If it didn't exist, the game would have to be rewritten from scratch or you went without.

Assembly

- ▶ Assembly has advantages: it is considered the fastest language to use when a computer is slow.
- ▶ Assembly has disadvantages: the same game might have to be written multiple times to reach a mass audience.
 - ▶ The arcade version of Pac-Man looks very different from the home Atari version of Pac-Man.
- ▶ Assembly is called a “low level language”.

Arcade Pac-Man



Atari Pac-Man



High-Level Languages

- ▶ As time went on, developers became smarter about how they wrote software, including games.
- ▶ A **compiler** allows developers to write in a **high-level language** and then translate that code into assembly language (a **low-level language**).
- ▶ The assembly language generated by a compiler is almost as fast as assembly language written by a programmer.
- ▶ This allows programmers to write a game once, then compile the code on any required machines.

Compilers and C++

- ▶ The compiler was invented by Grace Hopper.
- ▶ Most Nintendo games are written in C++.
- ▶ C++ is taught here at APSU in the CS 1010, CS 2000, and CS 2010 courses.

Grace Hopper, inventor of the compiler



High-Level Interpreted Languages

- ▶ Computers in the 90s became faster.
- ▶ The language **Java** is a high-level compiled language that is translated into its own special code called **bytecode**.
- ▶ To run a Java program, you need a program that translates **bytecode** to **assembly** on the fly.
 - ▶ This program is called a Virtual Machine.
- ▶ Any program written in Java will work on any computer with the Java Virtual Machine.
- ▶ This is slower than direct-to-assembly languages, but computers were faster and that's okay.

Java

- ▶ The most famous game written in Java is **Minecraft** in 2011.
- ▶ Java is considered the current most popular language in the world.
- ▶ Java is taught at APSU in the CS 1015 course.

James Gosling, inventor of Java (1996)



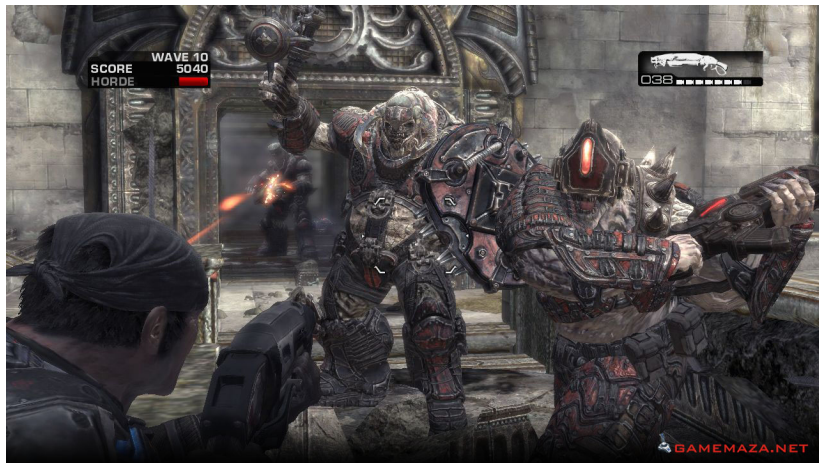
Markus “Notch” Perrson, creator of Minecraft (2011)



Microsoft wants to game.

- ▶ In 2006, Epic Games released Gears of War for the XBox 360.
- ▶ This game is noteworthy because it represented a change in video gaming away from C++.
- ▶ This game used the Microsoft language called C#, which is similar to Java in both language structure and internal design.
- ▶ Like Java, it's a compiled language that uses an interpreter to convert on-the-fly into assembly.
- ▶ C# is taught at APSU in the CS 3005 course.

Gears of War (2006)



Game Engines

- ▶ Most games are no longer created “from scratch”.
- ▶ Games are created in a game engine.
 - ▶ Phase 1: Developers will create or purchase a game engine that will give them the features that are desired in a game.
 - ▶ Phase 2: Developers will then create the game within that engine.
- ▶ There are many game engines and most are specialized for a particular type of game (such as FPS, RPG, or RTS).
- ▶ This will still feel like making a game from scratch.

Unity

- ▶ The **Unity** game engine is a free-for-personal use game engine that is used to create games on platforms such as XBox, Nintendo DS, Android, and WebGL.
- ▶ Unity has a built-in physics simulation engine allows users to create real-time physics games, such as as pinball.
- ▶ Unity has a built-in framework for creating both 2D and 3D games with the click of a button.
- ▶ The primary language of Unity is C#.
- ▶ Unity is free for commercial use up to \$100,000.
- ▶ Games made with Unity: Kentucky Route Zero, Pokemon GO, Angry Birds Epic, and Fallout Shelter.



Unity

- ▶ We are learning Unity and the C# language.

Hard Truth about Game Development

- ▶ Game development is a slow process while also rewarding.
- ▶ Don't let the frustration get to you.
- ▶ There is a lot to learn. Don't be afraid to ask questions.
- ▶ Game development is equal parts programming, math, and art.
- ▶ It's fun to play games.
- ▶ It's even more fun to watch someone play a game that you made.

Camp Rules

- ▶ We will make mistakes.
- ▶ I will make mistakes.
- ▶ We will learn about computers and programming.
- ▶ We will make games that provide enjoyment while playing.
- ▶ We will be constructive with our feedback.
- ▶ We will be respectful to each other.

Question to you.

- ▶ What kind of games would you like to make this week?
- ▶ We will be lucky to create one game per day.