

# Be a Computer Scientist

Game Programming

# 1 PROGRAMMING VIDEO GAMES

## 1.1 *Big Budget Games*

- Typically use a complicated game engine
- Examples include Unreal Engine (Epic Games), Frostbite (EA), Anvil (Ubisoft)
- I'll be showing a little about Unreal Engine
- Made by many programmers, graphic designers, 3d modelers

## 1.2 *Our Game!*

# SPACE RACER

### 1.3 *Our Schedule for the Week*

1. Learn basic programming
2. Explore 3D modeling
3. Learn about how the different parts of games fit together
4. Learn basic AI
5. Hold a competition!

## 2 BASIC PROGRAMMING

## 2.1 *What is programming?*

1. A computer follows instructions one by one
2. A *program* is an instruction set
3. A program might take in *input* from a user
4. A program often returns *output* the user can see

## 2.2 *Machine Code*

- The computer reads *machine code*
- Machine code is hard to write and hard to read
- Sometimes we use it for performance
- For the most part, we run away from it because the "easy" version of it looks like...



```
org
    xor ax, ax
    mov ds, ax
    mov si, msg
boot_loop: lodsb
    or al, al
    jz go_flag
    mov ah, 0x0E
    int 0x10
    jmp boot_loop
go_flag:
    jmp go_flag
msg    db "hello world", 13, 10, 0
    times 510-($-$$) db 0
    db 0x55
    db 0xAA
```

## 2.3 *Higher Level Languages*

- A higher level language lets you write code that gets converted to something the machine understands
- The language may also check for errors for you
  - Errors at *compile time*
  - Errors at *runtime*
- Easier to understand, the one we'll be using looks like...

```
public class HelloWorld {  
  
    public static void main(String[] args) {  
        // Prints "Hello, World"  
        // to the terminal window.  
        System.out.println("Hello, World");  
    }  
  
}
```

## 2.4 *Java*

- High level programming language
- Good choice if working on simple *cross platform* programs
- Is *object oriented*
- Can work from the *command line*, but we're going to use an *integrated developer environment*


## 2.5 *Making a scratch project*

1. Open Eclipse (circular icon left side of screen)
2. Select "New Project..."
3. Make New Java Project
4. Then we're going to make a new class

New Java Class

Java Class

Create a new Java class.



Source folder:

Scratch/src

Browse...

Package:

demo

Browse...

☐ Enclosing type:

Browse...

Name:

Scratch

Modifiers:

☒ public ☐ package ☐ private ☐ protected  
☐ abstract ☐ final ☐ static

Superclass:

java.lang.Object

Browse...

Interfaces:

Add...


Remove

Which method stubs would you like to create?

☒ public static void main(String[] args)  
☐ Constructors from superclass  
☒ Inherited abstract methods

Do you want to add comments? (Configure templates and default value [here](#))

☐ Generate comments



Finish

Cancel

## 2.6 *Variables and Assignment*

```
int five; // tells the computer to make space  
          // for a number we called number
```

```
five = 5; // now the value of the "five" is 0
```

```
five = 6; // now it's 6....
```

```
five = 5; // let's change it back to 5
```

## 2.7 *Types of Variables*

```
int aNumber = 54920;  
double aDecimalNumber = 43902.3290;  
String aSentence = "Hello world!";  
char ACharacter = 'c';
```



## 2.8 *Programming Together*

- We're going to all program together now
- Programming examples will be provided for the lab section