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# CSci 4455

## Computer Game Design and Programming

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Fall 2016 Sep 2 - Dec 9, 2016  
Class: Fridays 6:10pm – 8:40pm  
Tompkins Hall 4<sup>th</sup> floor



THE GEORGE  
WASHINGTON  
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WASHINGTON, DC

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This syllabus is subject to enhancement  
without notice.

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### Overview

Principles, techniques, and design of computer games. Graphic game engines, modeling, motion, AI and interaction; sound design and synthesis; real-time software and hardware issues. May be taken for graduate credit.

### Goals

To create a complete, playable game through a compressed, simulated game development cycle.

### Evaluation

- 1) The final grade will be based on how much you have learned during this course, not how much you knew when you started.
- 2) In-class, in-person contribution and interaction sets this class apart from online courses. The creative aspect of game design will be driven from this interaction.
- 3) The grading scheme below is one of the tools for accurate, fair assessment of how much you have learned in the class. There is a 10% late submission fee per day.
  - 35% class contribution/collaboration (If you have not contributed to class discussions, you should not expect a grade above C)
  - 35% assignments/quizzes
  - 30% final project (Festival of Animation and publication in App Store)  
The date for Festival of Animation is TBA.

### Prerequisites

Logical mind. Non-Computer Science majors are encouraged to enroll. Some of our best games were created by non-majors.

### Textbooks

This class does not require textbooks.

## Final Project Requirements

- A complete game must be created per person. No team project. Individual Project
- Due Date: 4:00pm November 6, 2015 App Store ready

### Compatibility

- Do not use keyboard functions. Touch Only.
- Multi-touch compatible. If I can only press one button at a time, your project will not be accepted.
- iOS/App Store compatible w/unique name in App Store
  - DO NOT use keyboard\_ functions
  - <https://developer.apple.com/appstore/resources/approval/guidelines.html>

### Screens (or room) and Levels:

- Every room must be either 1136x640 or 640x1136 in size
- Title Screen
  - Menu Item: Play
  - Menu Item: Credit
  - To visually convey what your game is all about
  - must **NOT** have a menu item that exits the game
- Game-Over Screen
- Level Select Screen
- Ten different levels must be created
  - Level 1 to 6 must be fool-proof easy
    - Each tutorial level must introduce only one new feature at a time.
  - Level 7-10 must be progressively more difficult little by little.
- Game creator (student) must be not rely on written instruction or readme screen/file.

### Visual Elements

- Any touchable object must be larger than 64x64 pixels. 128x128 is recommended.
- Fonts must be bigger than 30 points
- No pixelation. No scaling. One exception is momentary pixelation while zooming animation for a fraction of a second.

### Source code naming requirements:

- Must be written in Game Maker Studio
- Only gml module can be used. e.g. must not use DLL or JavaScript modules
- Rooms must start with rm\_
- Sprites must start with spr\_

- Objects must start with obj\_
- All assets must be properly, meaningfully named. If names such as sprinte14, sound2 are found, the project will not be accepted.
- Proper orientation must be set. e.g. portrait, landscape

Assets (graphics, sound effects, background music, sprites, code, etc.)

- All assets must be original, created by you.
- All assets that are not created by you must be properly licensed and credited.
  - Licensed (with a written permission from the owner) This include CC, GPL, etc.
  - Credited in Credit Screen, which must state each asset in the following format:
    - Asset Name: Source (Licensor)
  - Failure to do so will result in F as the final grade. will be reported according to GWU and CS department's policy on plagiarism.

### Sound Effects and Background Music

- Every action must accompany sound effects as an aural feedback.
- Background music in mp3 format

### Project Submission

- Submit on the website <http://www.gwgamedev.com>
- Email submission will not be accepted.

Preparing Directory Structure (the trailing slash incidate directory):

- YourFullName-YourGameName/
  - icons/
    - .png format of 1024x1024 pixel in size
    - Your own creation. No scaled image
    - Do not use text.
  - YourGameName.gmx/
    - screenshot/
      - title.png
      - gameplay1.png, gameplay2.png,...
      - same resolution as your game
      - Remove window borders and title bars
    - assets/
      - source audio, graphics files
    - description.txt: 20-100 words.
  - Submit a single .zip file that contains the above directory strcture
    - Name it: YourFullName-YourGameName.zip

- User Experience: DO NOT include or rely on an instruction/email/readme/help. If I have to read the instruction to play your game, 0 points will be given.

## Class Summary

### Unit 1: Genre Programming

Shooter

Introduction to Game Programming

Platformer

Physics Implementation

Puzzle

Algorithm Design

### Unit 2: Mobile Considerations

Multi-Touch

Gestures

Tilt

Testing Mobile Application

### Unit 3: Level Design

Tutorial Levels

Progressively More Difficult Levels

CAR (Challenge-Action-Reward) Cycle

### Unit 4: User Experience Design

Consistent User Interface

Device Limitation e.g. Touchable Size

Level Chooser

Pause Function

### Unit 5: Modular Programming

Abstraction

Module

### Unit 6: Creative Design

Inspiration

Gameplay Design

Abstraction and Gamification

Graphics

Audio

Animation