USC Viterbi
School of Engineering

ITP-382 "Mobile Game Programming"
Units: 4
Fall 2023
Mon&Wed 10:00-11:50 am

Location: KAP 267

Instructor: Matt Whiting

Office: RRB 221
Office Hours:
 TBD See Piazza for latest
Contact Info:
 Email: whitingm@usc.edu
 Skype: crashlotus
 Discord: Matt Whiting#2805

IT Help: Viterbi IT

Hours of Service:
Monday – Friday, 8:30 a.m. – 5:00 p.m.
Contact Info:
DRB 205
(213) 740-0517
engrhelp@usc.edu

Last updated: 4/15/2023

Course Description

Cell phones and tablets are everywhere today. Everyone has at least one, and they usually carry one around at all times. Everyone plays mobile games – even people who don't consider themselves video game players.
With just a few extra skills, any programmer can learn to build and distribute unique and creative mobile games.

Catalogue Description

Application of techniques used to develop games for mobile devices. Sprites, mobile input, mobile graphics and monetization.

Learning Objectives

This course provides students with an in-depth introduction to technologies and techniques used to create successful cross-platform mobile games.
At semester's end, students will have:
1. Developed a solid foundation in software engineering for mobile games
2. Gained an understanding of Unity & programming in C#
3. Demonstrated an understanding of the unique design requirements of supporting mobile devices
4. Deployed a game onto multiple different iOS and Android devices
5. Distributed a game via App Store Connect and Google Play
6. Applied these concepts creatively to develop their own unique game and deploy it to mobile devices

Prerequisite(s): CSCI-104 or ITP-365
Co-Requisite(s): n/a
Concurrent Enrollment: n/a
Recommended Preparation: prior experience with Unity

Course Notes

Each week is centered around a specific mobile game project. We will kick off each week with a lecture on Monday where we discuss the new topics for the week. Then on Wednesday, the in-class period will be devoted to building that week's project. These projects are individual week-long mobile games programs, and they are due before class begins on the following Wednesday one week later.

In this way, students get hands-on practice with the concepts while also getting an overview of several influential mobile games and the design lessons they have to teach us.

The in-class lectures are supplemented by pre-recorded videos to augment the lecture material and fill in the gaps for students with varied previous experience.

We will use a variety of online services in the classroom. Assignments and lecture notes can be found on Blackboard. The Weekly Projects are in Github Classroom. Outside the class, questions and discussion can be found on Piazza.

Technological Proficiency and Hardware/Software Required

We will be programming in C#, so previous experience with either C# or C++ is required. Students with significant previous experience with C# in Unity can waive the C++ prerequisite.

Required Readings and Supplementary Materials

Introduction to Game Design, Prototyping, and Development: From Concept to Playable Game with Unity and C#. 2nd Ed. Jeremy Gibson Bond. ISBN-10: 0134659864.
Recommended:
Game Programming in C++. Madhav, Sanjay. ISBN-10: 0134597206.

Description and Assessment of Assignments, Grading Breakdown

Assignment	% of grade
Weekly Projects	**30**
Weekly In-Class	**10**
Weekly Report Summary	**10**
Individual Project	**10**
Midterm Exam	**20**
Final Exam	**20**
TOTAL	**100**

Weekly Projects
Each week is focused on an individual mobile game project. We will use the in-class time on Wednesday to work on these projects with the help of the instructor and TA(s). Each Weekly Project is due before the beginning of the class period on the following Wednesday.

Each Weekly Project begins with base requirements that all students must fulfill. After that, the assignment is divided into three Tracks: Programming, Design, and Art. After fulfilling the base requirements, each student may choose a track and perform the tasks called for on that track.

Weekly In-Class
Lecture time is devoted to working on these Weekly Projects each Wednesday. As such, it is expected that students attend the session and dedicate themselves to working on the appropriate assignments during that time. If a student is unable to attend during that time, they will be expected to spend a similar amount of time (approximately 1 hour and 50 minutes) at some point during that day working on the assignment.

To receive credit for the in-class work, students must commit their work to Github Classroom and copy a link to that commit into the appropriate assignment on Blackboard/Gradescope.

Weekly Report Summary
Along with completing the functional game each week, the weekly assignment concludes by filling out a short form where the students reflect on what they learned and accomplished with the project.

Individual Project

The series of weekly game projects culminates with a unique, individually designed and created game project. The project will be formally presented to the class during the last in-class session.

Final Exam
Finally, there will be an exam in the form of a programming task that must be completed in the classroom during the final exam period. The final exam will be found on Github Classroom.

Assignment Submission Policy
Weekly In-Class checkoffs are submitted on Gradescope.
Weekly Projects, the Individual Project, and the Final Exam are submitted to Github Classroom.
Finally, the Weekly Report Summaries are Google Forms.

Additional Policies
Late assignments (with the exception of the Individual Project and Final Exam) will be accepted with a 20% penalty plus 10% for each additional 24 past the original due date.

Course Schedule: A Weekly Breakdown

	Topics	Assignment	Read it Before Class
Week 1 8/21	Course Introduction, Building to Device, Mouse 0 as Touch	In-Class 01: github	Gibson: Chapter 17, Appendix C
Week 1 8/23	Begin: Blackjack		Gibson: Preface, Chapters 18-24
Week 2 8/28	Accelerometer, XML Resource Data, Sprite Animation		Supplementary [1]
Week 2 8/30	Begin: Heads Up!	Due 10am: Blackjack	Gibson: Chapters 24-26, Appendix A
Week 3 9/4	No Class Labor Day		
Week 3 9/6	Begin: Missile Command	Due 10am: Heads Up!	Gibson: Appendix B ("Math Concepts" and "Interpolation")
Week 4 9/11	Collision Detection, Audio, Infinite Scrolling, Procedural Levels		
Week 4 9/13	Begin: Flappy Bird	Due 10am: Missile Command	Gibson: Appendix B ("C# and Unity Coding Concepts")
Week 5 9/18	Swipe Input, UI		
Week 5 9/20	Begin: Candy Crush	Due 10am: Flappy Bird	Gibson: Chapter 1
Week 6 9/25	3D and 3D Animation, Screen-to-World Transform		
Week 6 9/27	Begin: Hogwarts	Due 10am: Candy Crush	Gibson: Chapter 2
Week 7 10/3	Midterm Review		
Week 7 10/4	Midterm Exam		Gibson: Chapter 7
Week 8 10/9	Object Pools, Custom Shaders		
Week 8 10/11	Begin: Subway Surfer	Due 10am: Hogwarts	Gibson: Chapter 8

Commented [MW1]: Landscape vs Portrait

Commented [MW2]: Need to add topics:
Basics of Unity Transform, GameObject, Prefab
Basic UI and Sprite vs Image
Git and .gitignore
Coroutine

Commented [MW3]: Talk about landscape vs portrait

Week 9 **10/16**	Save/Load, Streaming Assets, Android Asset Packs		
Week 9 **10/18**	Begin: Clash of Clans 1	Due 10am: Subway Surfer	Gibson: Chapter 9
Week 10 **10/23**	Virtual Joysticks, Animation Blend Trees, Sprite Atlas		Supplementary [2]
Week 10 **10/25**	Begin: Fortnite	Due 10am: Clash of Clans 1	Gibson: Chapter 10
Week 11 **10/30**	AI & Navigation		Supplementary [3]
Week 11 **11/1**	Begin: Clash of Clans 2	Due 10am: Fortnite	Gibson: Chapters 11 & 12
Week 12 **11/6**	Final Project Setup, In-App Purchases		Supplementary [4]
Week 12 **11/8**	Begin: Individual Project	Due 10am: Clash of Clans 2	Gibson: Chapter 13
Week 13 **11/13**	Language Support, In-Game Ads		Supplementary [5]
Week 13 **11/15**	Work on Individual Project		Gibson: Chapter 14
Week 14 **11/20**	Analytics		
Week 14 **11/22**	No Class Thanksgiving Break		
Week 15 **11/27**			
Week 15 **11/29**	Individual Project Presentations	Due 10am: Individual Project	
Final Exam	In the Classroom Monday Dec 11 8-10am		

Commented [MW4]: Move sprite atlas elsewhere.
Need more coverage of coordinates - particularly the polar thing.
Pre-recorded video on polar coords.
Pre-recorded video on using gizmos to debug collisions

Supplemental Reading:

[1] *147 Mobile Gaming Statistics for 2022 That Will Blow Your Mind*
Andrea Knezovic, March 24,2022
https://www.blog.udonis.co/mobile-marketing/mobile-games/mobile-gaming-statistics

[2] *Cost Per Thousand (CPM)*
Will Kenton, March 28, 2022
https://www.investopedia.com/terms/c/cpm.asp

[3] *Demystifying Cost Per Install: Understanding the CPI of Your Mobile Game*

Annabel Youens, 2021
https://get.theappreciationengine.com/2021/01/25/demystifying-cpi/

[4] *How Much Do Games Make From Ads*
Vanessa Shaw, May 29, 2021
https://nextgenhero.io/what-do-games-make-from-ads/

[5] *The Average Revenue for an iPhone Game*
David Weedmark
https://smallbusiness.chron.com/iphone-advertising-strategy-13596.html

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298
equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
ombuds.usc.edu
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.