

Project 3 - Games!

Checkpoint Deadline: End of tutor hours Friday 12/1

Project Deadline: 10pm Friday 12/8

There will be no late submissions for 60% credit, be sure to submit early.

Overview

In this project, you will write your own game or game simulator. Please pick a game that is interesting to you or create one of your own! As with the previous projects, the goal is for this activity to showcase your creativity and be valuable to you personally. It's a success to us if you play the game yourself or share them with your family and friends.

As with previous projects, you'll have a checkpoint due on Friday 12/1 where you will talk through your plans with a tutor who will help you scope the project well. For the project deadline, you'll submit your code, a diagram of the functions you wrote for the project, and a video explaining the project.

Your Tasks

Game Design and Project Vision

The first step is figuring out what you want to create. Do you want to recreate a favorite car game from road trips with family? Do you enjoy word games on your smartphone and want to create a fun variant yourself? Do you play a board game a lot and want to write a simulator to know how likely you are to win a conflict in the game if there are a certain number of units on each side?

One major caveat, we're sticking with just regular Python without using the common library called PyGame¹ and we'll also skip creating a nice Graphical User Interface². So, your game will need to be able to display its state in text in some way.

¹ Pygame is great to learn and we encourage you to look into it after this class. But it's also beyond the scope of what we're teaching in this class.

² You can create a Graphical User Interface if you want, but you won't get any credit for doing so. Feel free to add it after you have your project done though!

Project Requirements/Expectations

Although having fun is the primary goal here, we do have some expectations for you in terms of your learning goals for the class:

- The project should require at least **4 functions** to complete (see Problem Decomposition)
- Your game should have its state represented in some form and it should be clear in your video how you are representing the state of the game (i.e., the game board is a 2D list of characters)
- Your project should either 1) be a playable game by 1 or more players or 2) be able to simulate the execution of many runs of a single game. If you pick the simulation, you'll need to show detailed output from the game for a single simulation to show that it is working properly.
- It cannot be a game we programmed in class (Tic-Tac-Toe or Any Number) or in the book.
- You cannot use the PyGames library.
- The grader should be able to play the game or reproduce the simulation results shown in your video.

Problem Decomposition

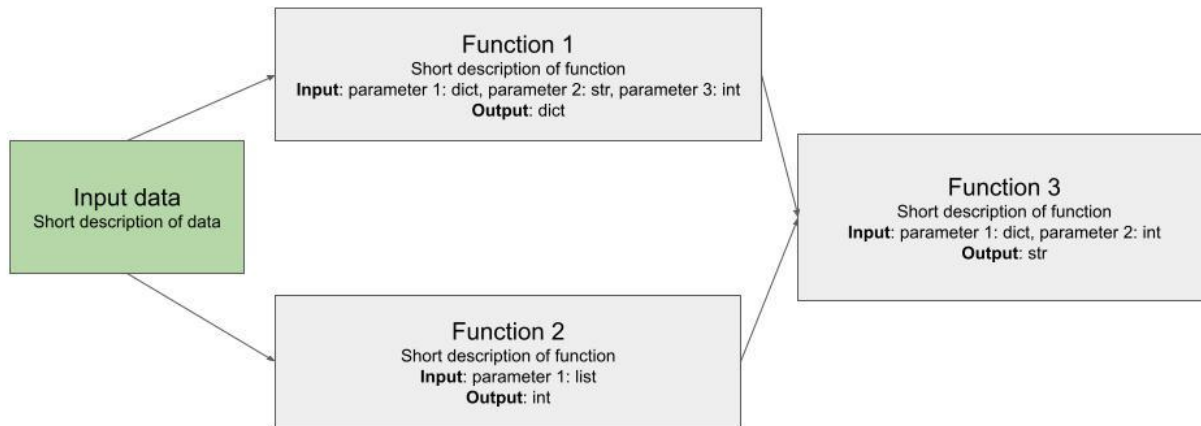
Just like Project 1 and 2, we expect you to break apart your problem into functions just like the games we program in class. You should likely break down the game into game setup and playing the game. After that, you might need a function to help you update the state of the game based on a user input, or another function to make sure the user input is correct. As with before, try to make the functions you write as versatile as possible (i.e., not just useful for your project this quarter). You'll ultimately need to break up the overall problem into small enough tasks that Copilot can help you write the code for those steps. Once you've completed the problem decomposition, we'll expect you to create a figure like Figure 7.3 in the textbook. Please expand that figure to show the full function signatures and a brief description of each function.

Below you can find an example of what your problem decomposition may look like.

IMPORTANT: This image is only a **suggestion** and your problem decomposition can have a different number of functions that interact with each other differently (or not at all).

Problem Summary

1. What problem or question(s) are you trying to solve?
2. What is your input data? What does it look like? (e.g. data types, format, etc.)
3. What is the output you are trying to create?



Coding and Testing your Solution

In conjunction with the task of problem decomposition, you'll be authoring the functions (optionally with help from Copilot) to complete the tasks. Be sure to have a plan on how you'll test each function, likely by creating fake sample games to help you understand if it is working or not. One nice thing about games is testing them (by playing them) can be fun³.

Checkpoint - Due at end of tutor hours on Friday 12/1 (5%)

Your meeting with the tutor will last roughly 5-10 minutes. This is an opportunity for you to get feedback on your plans for the project and for us to make sure you are on track to complete the project on time. The checkpoint is worth 5% of your project grade. No additional 1% bonus will be available for this project. A calendar with all the tutor hours can be found on the Course Calendar [here](#).

What to have done before your meeting with the tutor:

³ True story, Professor Porter had a colleague who worked as a game tester for a First Person Shooter game company in the late 90s. His job for a summer was to play just a couple levels over and over again trying to get the graphics to break by running into walls, trying to get stuck, etc. This was reportedly even less fun than you might think.

Before meeting with the tutor, have the following done:

1. Have your game (or game simulation) picked or designed
2. Have the way you will represent the state of the game designed

If you are missing any one of these **two** things when meeting with a tutor, you will **NOT** be checked off and will have to resubmit an Autograder ticket to meet with the tutor again.

What to expect from your meeting with the tutor:

You will request your meeting with the tutor either online or in-person using [Autograder](#) based on the Tutor Lab Hours posted on the [Class Calendar](#). (Professor and TA Office Hours will not be used for checkpoints and will be reserved for other questions you may have about the class. In your meeting, the tutor will ask you about your game and will help you properly scope the project. For example, making a playable game of Othello is within reach at this point in the class, making the game Settlers of Catan is not. If you have both items above done, you'll receive full credit and the tutor will check you off as completing your checkpoint. The tutor will also offer you feedback about the difficulty of the task and you can ask them for advice on how to approach the project.

Note that tutor hours are limited. **Waiting until late Thursday or Friday to ask for your checkpoint risks not getting your checkpoint completed in time.** There are no late checkpoints, so not completing your checkpoint by the end of the last tutor hours on Friday will result in a 0 for your checkpoint. We are happy to still discuss your project with you, etc., after the checkpoint deadline but no credit will be given.

Project Submission - due 10pm Friday 12/8

You will be turning in 3 parts to Canvas for your project submission: your code, the diagram of your function hierarchy, and a link to a video of you explaining your project. See details below:

Code submission (20%)

You will upload all the code and your dataset to Canvas for grading. **The tutor grading your submission needs to be able to download your code and run it and have the code work as expected.** The tutor will need to be able to either play the game when they run it or, if it's a simulation, be able to see a detailed walkthrough of the simulation during execution as well as overall statistics about the simulation.

Problem Decomposition (20%)

You will upload an image summarizing your problem decomposition to Canvas. Specifically, how did you take your large problem and break it into functions that helped to solve the larger problems. Your image should be an expanded version of the example in Figure 7.3. Each function should have its inputs and outputs included and a brief description of the function.

Explanation Video (55%)

You will upload a link to a video of you explaining the project on Canvas. Your video should include the following:

Video quality/Details:

- Record the video with both your face and your presentation/code.
- Please either give us a link to the video in a **google drive folder** (that is public to anyone with the link) or to a private **Youtube** video.

The 5 minute video should contain:

- (1 min) You describing briefly how your game and how you are representing the state of the game in code.
- (1 min) You talking through why you decomposed the problem into the functions you did.
- (3 min) A detailed walkthrough of one of your functions where you explain how it works.

We will only grade the first 5 minutes of your video, so if you post a video longer than 5 minutes, we will only grade the content in the first 5 minutes.

Submitting Files

You will be submitting 3 things for the project

1. Python code for your game
2. A PNG, PDF, or JPEG image of your project decomposition
3. A text file that contains the link to your video

All of these files can be compressed into a **zip folder** which you can upload to **Canvas**.

Academic Integrity

You can ask for help from the instructional staff and Copilot. You should not discuss your project with other students in the class. We expect the code you write to be your own (the code can be aided by Copilot). Use of any code online is forbidden (as is using the project of a classmate) and turning in that code will result in your work being submitted for an Academic Integrity Violation.

Please see the class Academic Integrity Agreement for more details.