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# CSC106 Final Project

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## Overview

Programming is a creative process that brings ideas to life through the development of software. Programs can help solve problems, enable innovations, or express personal interests. For this task, you will be developing a program of your choice. You will iteratively design, implement, and test an original program that you think up.

You will complete and submit the following:

1. Program code that you develop.
2. Responses to questions (shown below) about your program and your development process.
3. Your SCRUM document spreadsheet.
4. A presentation of your program and viewing of classmate's programs.

## Answer Document

Create an answer document called *lastname\_final*, where *lastname* is your last name. Label your answer document with "Part 1", "Part 2", "Part 3", "Part 4", "Part 5", and "Part 6" for the parts described below. You will save this file as a PDF document to turn it in.

## Partners

This project must be done with a partner. Each partner must do their own final project videos and documents, but with a single final program that you code together, and your shared SCRUM document.

**As the first line in your answer document, provide your name and the percent effort you put into the program and the programming process, and provide your partner's name and the percent effort they put into the program.** I expect the two percentages to add up to 100% and both partners to agree on the percentages. If partner percentages disagree, I will determine the partner percentages.

# Part 1: Program

Create a program that provides a benefit to the user through experiences like the user being entertained (e.g. a game), learning (e.g. an educational app), or helping with day-to-day life.

Your program must be written using the Khan Javascript + ProcessingJS programming environment. Your program and/or the description of your program must use:

- variables
- expressions formed with arithmetic and/or logical operands and operators
- conditional statements
- loops
- abstractions such as functions
- arrays

Ideally your program will contain all of these constructs, but if your program does not contain them, then you need to answer in your answer document why it does not contain them and how it might be extended to contain them. You need to demonstrate that you understand and can use each of those constructs. Note that your program may use object-orientation, but it does not have to, except for use of the Khan Button class, which is required, as described next.

**Your program must use the Khan Button object class.** You must have a button somewhere in your program that uses the Khan Button object class that is described here <https://www.khanacademy.org/computing/computer-programming/programming-games-visualizations/programming-buttons/a/a-button-object-type> (use the final class that they describe). We have used this Button class in several assignments (see the tip videos).

Your program must also:

- Have a splash screen with both partner's names and bitmojis.
- Both bitmojis must appear in the app screen too. They could just be decorative, or they could be part of what the app does (e.g. characters in your game).
- Appropriately use comments (use a lot of comments) and code styling. If you have involved code that is not commented, we will question whether you wrote it. COMMENT A LOT.
- Implement an algorithm that you can clearly describe in your answer document.
- Use abstractions to manage the complexity of your code.

To turn in your program, make a new tab for their portfolio web site, call the tab "Final Project". On that new web page:

- Write a paragraph or two describing your program and how to use it. Make it a nice, interesting looking web page that is consistent with the rest of your portfolio. Adrian and I

are doing a baseball game and we have a field that looks exactly like a baseball field which is really cool because we worked hard to make the field like that and basically there is a point system that is based off how on point you hit the baseball and if you hit it on point then it will be a homerun. our game is also called "Homerun".

- Embed on the page your program from Khan so that a visitor to your page must be able to follow written instructions on your web page and use your program right in the web page.
- Embed on your page your video from Part 2 (below) that describes executing your program (not the video of you describing the code). To embed a YouTube video, go to the YouTube page for your video and click the "Embed" button. It will provide you HTML code to paste into your web page.
- Provide in your answer document the URL of your Programming Portfolio with your final project in its own tab.
- Provide in your answer document the URL for your program on Khan.
- Save your program's code as a text file and upload it to the Sakai assignment for the final project.

## Part 2: Videos

You are required to provide two videos explaining your program.

- One is your program executing and you narrating all of the features of your program. This video must be 45seconds to 120seconds (no shorter or longer).

<https://www.loom.com/share/2cbc6ed60ac14d3ebaffa3874c902887?sid=a07d6f2e-46f8-4e94-b293-07af99c6c755>

- The second is a video where you scroll through your code and explain how it works. You must explain all parts of your code with particular emphasis on the loops, arrays, conditionals, objects, and the overall algorithm. You need to convince us that you understand the code you wrote. This video must be 3 to 10 minutes. If you are using Screencastify and you exceed the limit, then record the video in two clips and splice them together with video editing software, or if necessary just put the link to both clips in the answer document.

Make sure that the sharing permissions of your video, wherever it is hosted, are set to all the teaching staff to grade it - videos that the staff can not view, receive a zero.

Each partner must make their own videos.

Embed the video showing using your program works (not the video where you describe the code) on the web page for your project on your Programming Portfolio. Also provide in your answer document the URL's to your two videos.

<https://www.loom.com/share/3840b902b91c457bb6d1940d9dbc5b6d?sid=2ead03a5-b238-468b-8125-20e637343c13>

## Part 3: Questions

Submit answers to the following questions in your answer document. Label each answer in your answer document with the question number. Your answers to all questions combined must not exceed 1000 words and should be at least 500 words.

1. What is the purpose of your program? The purpose of our program is to make a cool game that will have the kids at our presentation astonished.
2. Describe the incremental and iterative development SCRUM process that you used to develop your program focusing on two distinct points in that process. Describe the difficulties that you encountered and how they were resolved. Also describe the opportunities for features that you discovered and how they were incorporated into your process and program. (Approximately 200 words) For the first day that we worked on our scrum document we had little to no clue what we wanted to for the scrum document but we did know that we wanted to do a baseball game so that was the good part but we still tried to figure out what we should put on the scrum document. At first we had "As a user I can play the game against another player as in PB1 or against a CPU as X with the CPU playing strict defense and random placement otherwise", that was all the way back in October 21 almost 2 months ago, little did we know that was not how our game was going to be but we thought it was going to be like that. As the days went on we started to develop our scrum document and we were more sure what we wanted to do. In our game there isn't defense like what we said at first, it is more like if you hit the baseball on point then you get a certain amount of points for hitting the ball, we are excited for the professor the TA'S and the highschool kids to view our project.
3. Describe your use of each of these constructs. If you do not use a construct, explain why and also speculate on how you could use it in an extension of your program. Label each answer with 4A, 4B, etc.

1. Variables We used a lot of variables, for the score/point system, for our characters, for our splash screen, to draw the baseball, and to draw the baseball bat.
2. expressions formed with arithmetic and/or logical operands and operators we used this for if the user is still playing and we have it true or false.
3. conditional statements We have an else if statement under our draw function for the size of the baseball.
4. Loops. we didn't use any loops because we felt that the variables were good enough especially to have the point system.
5. abstractions such as functions I wouldn't necessarily say these are abstractions such as functions but we have our texts to put my name and Adrian's name. we have texts to put "Home run!!!" for the introduction screen, and texts for the instructions screen.
6. structured data such as arrays
4. Describe an algorithm that you implemented in your code. We didn't use any algorithms because similar to what I said before we felt that the variables would be good enough for what we needed.
5. Describe use of abstraction that you implemented in your code. We have a return function for a moused clicked.

Each partner must do their own answer document. You may not each turn in the same answers - you must answer yourself.

## Part 4: SCRUM Document

The SCRUM document spreadsheet that you have developed must be completed and must have:

- The final backlog consists of ordered user stories and task lists for each user story, with the user stories organized into sprints.
- A complete set of notes from your SCRUM meetings including annotation of all:
  - PBI (user story) additions
  - PBI (user story) re-prioritizations
  - Sprint content changes
  - Sprint date changes
  - Task updates

Provide in your answer document the share link to your Google Sheet that is your SCRUM document. Partners should turn in the same SCRUM document since it is a document you shared to develop your project. Also paste into your answer document the cells from your SCRUM document spreadsheet so that they are right there in the answer document.

<https://docs.google.com/spreadsheets/d/1nVgZv31B-1B1k5d1jne-1jllBErPdOlxp1I5t0gmFZI/edit?pli=1#gid=0>

## **Part 5: GitHub**

You and your partner are to use a GitHub repo to store your code as you develop it - pick one partner's repo to be the one that holds your shared code and give the other partner privileges to commit to it. You should have at least two different commits of your code on two different days. Each partner must have at least two commits on different days (total of at least four commits for your team).

Make your repo public by going to the Settings for the Repo and to the Manage Access tab and setting "Who has access" to "public".

Put the name of your repo and the public link to it in your answer document for Part 5.

## **Part 6 Presenting Your Program**

You and your partner must present your final exam project in-person at the 2023 Summit to be held Wednesday December 20 8am-11am at URI's Memorial Union. This is during URI's Final Exam period for the lab portion of this class, so it must be free in your schedule. You will be given a table to display your app in a Science Fair like arrangement. We have about 500 high school students coming to URI for the event to learn about Computer Science. High school students will come by your table, and you will demonstrate your app and answer questions. You will also have time to wander around the Summit and see other displays and activities. We will be providing free lunch for presenters too!

In your answer document, include a picture of you and your partner at your table at the Summit.

In your answer document, include a picture and one paragraph description of the app presented for at least 5 of your classmates (five separate pictures and descriptions).

## **What To Hand In**

By Midnight Wednesday December 20 turn in the PDF of your answer document.