Lesson 5.XX — Programming Project (PictureLab Alternative)

Overview

This lesson is intended to be a smaller scale alternative (2-3 hours) to PictureLab from the original AP computer science course. Starting from 2014-2015 the College Board announced that 20 hours of hands-on lab time may replace the original required labs (MagPie, PictureLab, Elevens). In this lesson document, we recommend some open-ended alternatives.

Objectives — *Students will be able to…*

- **Conduct user-centred research** to identify specific functions for a specialized application
- **Plan and create** a calculator that perform specialized operations for an end-user
- **Test, evaluate, and share** the end product

Assessments — *Students will…*

- **Apply** 2-dimentional arrays, traversal, binary representations of data (images, characters)
- **Submit** a complete, functional program

Pacing Suggestion

- The duration of this project is at the discretion of the teacher. We recommend 2 hours for class time design and implementation, and 1-2 hours for out of class time to connect with end-user.
- Project involves

> Students will follow applied design process to implement the idea. You should talk to your teacher often to ensure that your progress is in-line with expectations. ### Documentation and Style - As with all projects, your program must be well-written, well-documented, and readable. Writing code with good style is always good idea. This will help you debug, pick up where you left off each day, and keep track of progress.

STEP 1 - UNDERSTANDING CONTEXT

Conduct user-centred research to find design opportunities and barriers. Select an end-user for whom you will design and create this program (this can be a friend, classmate, relative, etc). Create interview questions that will allow you to understand the end-user's interests and likes/dislikes.

Here are some possible applications that could potentially use "if" statements and "String" methods: **Picture Manipulation**

* One of the Activiies in the orginal Picture Lab (estimated 1-2 hour time) * Create an image manipuation for a special purpose

Other Canvas-based Applications, involving ARRAYS, Binary representations of data * Etch-a-Sketch https://en.wikipedia.org/wiki/Etch_A_Sketch * Battleship https://en.wikipedia.org/wiki/Battleship_(game) * Othello or Tic-Tac-Toe with a twist * Maze creation for a nanobug to run through * Hex dump Translator * Flip Book Creator (create series of images where only a few pictures differ) https://en.wikipedia.org/wiki/Flip_book * Snowflakes, or Flower drawing program * Interactive story scene — - After you have some initial ideas, interview some potential end-user to clarify your project specifications. — ### Emphasize with students... ### Big Ideas - personal design interests require the evalution and refinement of skills

The possibilities are endless.

We live in a world that operates on the written or spoken word. The computer and internet has forced us to digitize the words we use into zero's and one's for transmission purposes. But at a higher level, most people are working with "strings" (a collection of character symbols, making up a word). Sometimes words are easily understood and recognized, sometimes it is not.

Our human brains naturally make decisions and choices. With so many options, and paths, we can ask the computer to help us explore these choices. This is great when it comes to routine, repetitive, or time consuming tasks. Poets, writers, travellers, wanderers, cryptographers, kings and queens have loved playing with words (strings, characters), and creating games (logic, secret messages) since the earliest of times to entertain, inspire, and protect the land.

Let your creative juices flow!

CHECKPOINT 2

SUBMIT THE CURRENT VERSION OF YOUR PROGAM TO YOUR TEACHER, AS WELL AS YOUR TEST PLAN AND FEEDBACK FROM THE END-USER

STEP 4 – SHARING, TESTING AND FINAL ITERATION

Gather feedback from users over time to critically evaluate your design and make changes to product design or processes Identify new design issues.

Share your work with other classmates, friends or family. Record any feedback, suggestions and comments and use this information to make the final iteration of your program.

CHECKPOINT 3

SUBMIT THE FINAL VERSION OF YOUR PROGAM TO YOUR TEACHER, AS WELL AS YOUR FEEDBACK FROM CLASSMATES, FRIENDS OR FAMILY.

Grading Scheme/Rubric	
Implementation	
Project is appropriately complex and creative	4 points
Program is well-documented and shows good style	10 points
Final product meets all requirements and goals laid out in checkpoint specifications	8 points
Program uses programming concepts effectively, including all required elements with an appropriate level of complexity	4 points
Object Oriented Programming concepts are effectively applied with an appropriate level of complexity	6 points