Python Game Workshop

Workshop Description

The Python Game Workshop is a 9-day workshop designed to teach students the fundamentals of programming, to familiarize students with Python—a high-level programming language—and to use Python for building games in small groups. The workshop will introduce students to object-oriented programming, basic data structures, and how to process input and render output in a graphical user interface.

Instructors

Alyssa Cartwright	alyssac@mit.edu	
Jenny Lin	linjenny@mit.edu	
Lara Timbó Araujo	larat@mit.edu	(85) 98777 3210
Vinay Mayar	vmayar@mit.edu	(11) 97026 5628

Materials

Laptops and internet.

Links

Pygames
http://www.pygame.org/hifi.html
Python documentation
https://docs.python.org/2/
Python download
https://www.python.org/downloads/release/python-2711/
Pygames tutorial
http://inventwithpython.com/pygame/chapters/
Physics engine using Pygames
http://physics.gac.edu/~miller/jterm_2013/physics_engine_tutorial.html

Timeline

- Python - 3 days
    - Lesson 0: Motivation
        - Show games built in python.
    - Lesson 1:
        - What is a program
        - Input/output
        - Editing a file
        - Installing Python
        - Running a Python program
        - Printing to the console
        - Exercises:
            - Run a program
            - Print something from a file
            - Print something from the REPL

- Lesson 2: Arithmetic
  - Using code to express arithmetic
  - Integer arithmetic
  - Floating point arithmetic
  - Exercises:
    - Perform arithmetic and print it
    - Perform arithmetic in REPL
- Lesson 3: Variables
  - What is a variable?
  - Primitives
    - ints, doubles, strings, booleans
  - Assignment and operations
- Lesson 4: Conditionals
  - Booleans and logic
  - if, elif, else
- Lesson 5: Loops
  - Loops for repeated operations
  - for loops
  - while loops
- Lesson 6: Functions
  - Defining a function
  - Calling a function
  - Functions with arguments
  - Return values
  - Functions with loops and conditionals
- Lesson 7: Basic data types
  - list
  - dict
  - operations on lists and dicts
    - indexing
    - appending/adding
    - removing
    - length
  - iterating over lists and dicts

  Lesson 8: Classes
  - member methods
  - member variables
  - simple inheritance
- Optional:
  - list comprehensions
  - functional programming
    - map
    - reduce
    - filter

- Pygames - 1 hour
  - Running a game with pygames
    - Simple game to display “Hello world!”
  - Creating a window
  - Taking input from the mouse and keyboard
  - Drawing lines, objects
  - Students should understand code for making a window with an object in it.

- Physics
    - Force and motion
    - Inelastic collisions (momentum)
    - Show how to use concepts to move things according to physical laws in a pygames simulation.
- Example games - 1 day
    - Remove pieces of logic from existing implementations of simple games like Pong, Snake, etc. for students to implement.
- Students build games in pairs - 3.5 days
    - Students will choose partners.
    - Each team will submit a proposal for a game.
    - Instructors will provide feedback and possibly alter the scope of the proposal.
    - Instructors will help groups implement their projects and periodically teach additional, relevant concepts during this time.
- Demo - 1 day
    - Students will demo how their games work, why their game is cool, what interesting things they learned in the process.
    - Students will play each other's' games.
    - Students will vote on the best games.