LEVEL 1 - PYTHON

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

INTRODUCTION TO PYTHON
VARIABLE CREATION AND CONVENTIONS
DATA TYPES (STRING, INT, FLOAT, BOOLEAN)
PRINT STATEMENTS
TAKING USER INPUT
IF AND ELSE STATEMENTS

SAMPLE PROJECTS

- DOG AGE CALCULATOR (ASK USER FOR THEIR AGE, CONVERT TO DOG YEARS)
- MAD LIBS (TAKE PARTS OF SPEECH FROM USER AND MAKE STORY)
- COOL SCORE (ASK USER QUESTIONS AND THEN CALCULATE A COOLNESS SCORE BASED ON ANSWERS)
- GUESSING GAME 1 (GENERATE A RANDOM NUMBER BETWEEN 1 AND 10 GIVE USER 3 GUESSES TO WIN)
- SASSY CALCULATOR (MAKE A CALCULATOR PROGRAM THAT GIVES THE USER SOME ATTITUDE)

LEVEL 2 - PYTHON

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

BOOLEAN LOGIC WITH AND/OR OPERATORS
WHILE LOOPS AND FOR LOOPS
STRING CREATION
STRING SLICING AND INDEXING
SEARCHING STRINGS WITH LOOPS

SAMPLE PROJECTS

- PIG LATIN (ASK THE USER FOR A SENTENCE AND TRANSLATE IT TO PIG LATIN BY FOLLOWING ITS RULES.)
- HANGMAN (SELECT A RANDOM WORD FROM LIST, ASK USER TO GUESS LETTERS UNTIL THEY GUESS THE WORD OR RUN OUT OF LIVES)
- WORDLE (SELECT A RANDOM WORD FROM LIST, ASK USER TO GUESS FIVE LETTER WORDS AND THEN LET THE USER KNOW WHAT LETTERS ARE IN THE RIGHT PLACE OR WRONG PLACE BUT IN THE WORD. THEY HAVE 6 GUESSES TO GET IT RIGHT)

CODE
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LEVEL 3 - PYTHON

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

CREATING FUNCTIONS WITH OR WITHOUT INPUTS
USING FUNCTIONS TO MAKE CODE MORE READABLE AND REUSABLE
CREATING LISTS WITH OR WITHOUT ITEMS
BUILT IN FUNCTIONS FOR LISTS (APPEND, REMOVE, ECT)
USING FOR LOOPS TO SEARCH LISTS

SAMPLE PROJECTS

- SNAKE AND LADDERS (USERS WILL ROLL A DICE AND VIRTUALLY PLAY THE BOARD GAME SNAKES AND LADDERS. THE GAME BOARD WILL BE ORGANIZED USING A LIST)
- TIC-TAC-TOE (USER WILL BE ASKED TO PLAY AGAINST A NAIVE COMPUTER IN A CLASSIC GAME OF TIC-TAC-TOE)
- PET REGISTRY (USER WILL TAKE INFORMATION GIVEN BY USER ABOUT A PET AND ITS OWNER AND STORE IT INTO LISTS FOR ORGANIZATION. IT WILL THEN ALLOW THE USER TO SEARCH THE DATA AND ASK FOR SPECIFIC PETS)

LEVEL 4 - PYTHON

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

CREATING DICTIONARIES
BUILTIN FUNCTIONS FOR DICTIONARIES
DICTIONARIES WITH NESTED LISTS
TURTLE LIBRARY INTRODUCTION
MAKING TURTLES AND BUILT-IN COMMANDS

SAMPLE PROJECTS

- DESIGN TURTLES AND HAVE THEM RACE WITH EACH OTHER
- DESIGN A GRAPHIC POSTER WITH TEXT AND DIFFERENT COLORS THAT ARE ORGANIZED WITH A DICTIONARY
- DESIGN A MODERN ART WITH VARIOUS FUNCTIONS USING THE TURTLE LIBRARY TO MAKE SHAPES OF DIFFERENT COLORS AND SIZES.
- DESIGN A HOUSE THAT THE USER WILL EXPLORE VIA TEXT. ROOMS AND DOORS WILL BE ORGANIZED IN THE CODE USING A DICTIONARY.

LEVEL 5 - PYTHON

DURATION - 5 WEEKS (1 TO 2 HRS/WK)

INTRODUCTION TO THE TKINTER LIBRARY

PROGRAMING BUTTONS AND ON-CLICK FUNCTIONS

USER INTERFACE COMMANDS USING TKINTER

SAMPLE PROJECTS

- CREATE A VISUAL PROGRAM THAT WILL ALLOW A USER TO TYPE IN A CURRENCY AMOUNT AND CONVERT IT TO ANOTHER CURRENCY TYPE.
- DESIGN A VISUAL PROGRAM THAT ALLOWS USERS TO CLICK BUTTONS TO PERFORM BASIC MATHEMATICAL CALCULATIONS.
- DESIGN A VISUAL PROGRAM THAT ALLOWS USERS TO MAKE TODO LISTS.
- DESIGN A CLASSIC SNAKE GAME USING TKINTER. USERS WILL BE ABLE TO USER ARROW KEYS TO EAT FOOD AND GROW UNTIL THEY COLLIDE WITH ITSELF OR A WALL.

LEVEL 6 - PYTHON

DURATION - 6 WEEKS (1 TO 2 HRS/WK)

INTRODUCTION TO OBJECT ORIENTED PROGRAMMING

CREATING CLASSES, SYNTAX AND CONVENTIONS

USING CONSTRUCTORS WITH AND WITHOUT INPUTS

CREATING INSTANCES

OBJECTS AND LISTS

OVERRIDING AND OVERLOADING

SAMPLE PROJECTS

- POKEMON REGISTRY (USERS WILL INPUT INFORMATION NEEDED TO CREATE A POKEMON. THIS INFORMATION WILL BE ORGANIZED BY CREATING AN OBJECT AND THEN PLACING THE OBJECT INTO A LIST. USERS WILL ALSO BE ABLE TO VIEW ALL POKEMON AND SELECT SPECIFIC POKEMON)
- BLACKJACK GAME (CREATES A DECK OF CARDS USING OBJECTS, USERS WILL BE ABLE TO PLAY BLACKJACK AGAINST THE COMPUTER)

LEVEL 7 - PYTHON
DURATION - 6 WEEKS (1 TO 2 HRS/WK)

RECURSION
INTRODUCTION TO PYGAL
INTRODUCTION TO FILE READING
FILE WRITING
INTRODUCTION TO PANDAS

SAMPLE PROJECTS

- CARBON DIOXIDE ANALYSIS (DATA FROM THE LAST 10 YEARS WILL BE PLOTTED ON A LINE GRAPH USING PYGAL. DATA WILL BE READ FROM A FILE)
- FIBONACCI RECURSION PROBLEM (A FUNCTION WILL ALLOW THE USER TO CALCULATE THE NTH FIBONACCI NUMBER USING RECURSION)
- BOOK RATING ANALYSIS (USING PANDAS AND A LARGE DATA SET, AN ANALYSIS OF BOOK RATINGS WILL BE PERFORMED USING THE PANDAS LIBRARY)

LEVEL 8 - PYTHON
DURATION - 6 WEEKS (1 TO 2 HRS/WK)

INTRODUCTION TO GAME ENGINES
START CODE AND LOOP CODE
CREATING GAME OBJECTS
COLLISION DETECTION
ERROR CHECKING
GRAPHICS AND ANIMATIONS

SAMPLE PROJECTS

- SPACE SHOOTER (CREATE A GAME WHERE ENEMIES WILL SPAWN FROM THE TOP OF THE SCREEN AND THE USER WILL BE ABLE TO MOVE WITH ARROW KEYS AND SHOOT MISSILES AT ENEMIES)
- ADVENTURE GAME (CREATE A GAME WHERE A USER WILL BE ABLE TO EXPLORE FROM ROOM TO ROOM BY MOVING TO THE EDGES OF THE SCREEN. USERS WILL ENCOUNTER ENEMIES AND ITEMS TO INTERACT WITH)
- CUSTOM GAME (STUDENTS WILL CREATE THEIR OWN CUSTOM GAME USING THE GAME ENGINE. GAMES MUST HAVE AN OBJECTIVE)

CODE WITH US

TECHNOLOGY REQUIREMENTS

DESKTOP, LAPTOP OR CHROMEBOOK WITH MICROPHONE AND SPEAKER (CAMERA IS OPTIONAL)

MOUSE FOR EFFICIENT BROWSING

UPDATED WEB BROWSER (EXAMPLE; CHROME, FIREFOX, OR SAFARI)

HIGH-SPEED INTERNET CONNECTION

A PROJECTOR OR SMARTBOARD IN THE CLASSROOM

HEADPHONES ARE RECOMMENDED FOR THE STUDENTS TO EFFECTIVELY COMMUNICATE WITH TEACHERS IN ONLINE CLASSROOMS.

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*THE CLASSES ARE LECTURE STYLE, COMPLETION TIME MAY VARY BASED ON LEARNING PACE AND PRIOR KNOWLEDGE.

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