**Schedule of Events**

Part 1: January Challenges

16th to 19th - Week 1

22nd to 26th - Week 2

29th to 2nd - Week 3

Part 2: February Projects

12th to 16th - Week 4

19th to 23rd - Week 5

26th to 28th - Week 6

Week 1: A Field Trip

Day 1: Taking Roll

* Basic tasks - a template program which contains several small tasks to get programmer familiar with variables, operations, print statements, loops

Day 1: Sugar High

* Simple Hello World program - accepts a numerical input and checks to see if quantity is enough to purchase gumball.

Day 2: Catch of the Day

* Basic Intro to Functions - program utilizes a function to compute total price of fish of varying prices from text file

Day 3: Gear Shift Gaff

* Basic Intro to Objects - program utilizes the gear shift object which stores its gear position as an attribute and is pushed to different gears through methods.

Day 4: Prime your Engines!

* Prime number solver - program will parse a list of keys and values to return the answer to a riddle. First challenge problem; requires some independent research! Also a great day to catch up for laggards

(Optional) Day 4: Catch up Day

* Day utilized to catch everyone up to speed or revise their previous projects to be better - provides some latitude in case the problems are more intensive than previously anticipated.

Week 2: In the Medical Corps

Day 5: The Suds

* Mastering User Input - program will prompt the user to tell symptoms and match with given diagnoses based on a datasheet of diseases provided to the programmer.

Day 6: Pill Popping Palooza

* Critical Thinking with Data Structures - Multiple prescriptions have been mixed up and a pharmacist needs a program to tell her how many prescriptions are correct given a sample.

Day 7: Prescription Panic!

* Open-ended text processing - A list of “AI-generated digital scans” of prescription pads must be fixed in order to determine how many of each medicine is needed given several typos.

Day 8: Total Eclipse™ (of the Heart!)

* Refresher and File Handling - program will read in multiple stethoscope readouts and determine whether the patient who produced the readout has arrhythmia or not.

Week 3: Language-ception

Day 10: Plurality Pandering:

* Advanced Conditionals - Given a list of strings, students will return a list where any multiple in the original list is replaced by a singular plural form of the string. Puzzle output will be the result of a very long and obnoxious string.

Day 11: Sam would be proud…

* Introduction to first true puzzle - Given a message in Morse Code, the student is asked to translate the given message into plaintext and return the result as the answer to the puzzle.

Day 12: Moby Click

* Intro to Counter - Given the entire text of Moby Dick, students will be asked to find which word appears exactly “x” times, given that the word is at a unique frequency in the book. This familiarizes students to an often used and very important library in python - Counter

Day 13: Basically Hackers

* Advanced String Manipulation - This challenge will require students to develop a custom “encryption” algorithm based around a set of arbitrary rules set forth in the puzzle input which all have to do with silly string manipulation. The puzzle output is the “encrypted” input

Day 14: Markov’s Gun

* Creative Challenge - This challenge will have the students create a Markov chain which constructs a random poem. The most profound poem produced by the student’s program will be considered for acceptance. Depending on level of involvement and enthusiasm - top three may be accepted as valid solutions. A vote may be involved.

Week 4: Project 1 - Go Fish

In this medium-term project, the students would be given daily requirements for their program in the form of specific, granular deliverables. Students will be given a rudimentary Software Requirement Specification and a Software Design Description based loosely on the IEEE standards for the associated documents. This will best mirror what industry standards currently are and will impart a level of agile software development skills in the aspiring coder. The project itself is not technically difficult and will not require extensive outside research, but will build up a foundation of meeting specific, previously set milestones and features at an incremental level. Template programs are abundant online as well and each day's features will be available as a sample solution the following day to keep from anyone being left behind.

Week 5: Web Crawler

Similarly to the first week’s development, this week’s project will roll out week-by-week requirements and features presented in the pseudo-IEEE format. Unlike the previous week, some amount of independent research is required by the student in order to fulfill the requirements given. For example, several libraries will be needed in order to interface with the web or generally connect to the internet. Resources and links will be provided throughout the project.

Week 6: AI/ML

While some students may be originally intimidated by the concept of Artificial Intelligence and Machine Learning in general, what they may not realize at this point is that they have already demonstrated competency at every level necessary to interact with this at a surface level and in a way which greatly boosts their resume to potential employers looking for well-rounded professionals. This project will consist of a very simple plant categorization convolutional neural network (CNN). No SRS or SDD will be provided, only the specific prompt of what the program should be capable of, the input data and several extensive resources to guide the student to creating a rudimentary trained network which classifies flowers. From here the student will be a competent amateur python programmer!

Idea Corner for Leeb:

Spa Day

Wrapping Paper

Day 4: Zoo-wee-mama!

Basic Intro to Algorithms - program utilizes the Dijkstra algorithm to find the shortest possible path to the exit

Gear Shift snaps off leaving smooth sphere!

Hot Dog Cart

<https://www.google.com/amp/s/www.geeksforgeeks.org/dijkstras-shortest-path-algorithm-greedy-algo-7/amp/>