Term Project - CS313E

CS313 E - Elements of Data Analytics
(10 points)

1 Description

The goal of this project assignment is to develop a software project using Python programming, algorithms, and data structures that you have learned in this course. The topic of the project is free and can be any topic from your major study field. For example, you can work on a simple data processing project, access data from any source and process it, develop an application that controls some mockup sensors, a web scraping project, or the calculation of linear algebra operations or differential equations or anything you can think of from your field. However, you cannot directly use a project from your major or other courses you are taking currently, but can adapt it to this course to use data structures.

The project idea should be original and not copied from any online websites or resources. The project should be new and implemented by the group you have partnered with throughout this semester. Each group can have no more than 2 people. Make an Ed discussion post if you would like to find a partner at this point or you are welcome to work alone if you would like to continue with the same.

2 Define a Project (2 Points)

Define the project idea and create a project model design. You can use any methods to model your software model, packages, classes, and communication and interactions between them.

Describe your project, software model, and its implementation in text form.

You should describe the following items:

1. What is your project idea about?
2. If you use any datasets, describe the dataset and provide how one can access and download it.
3. Describe your design for main packages, classes, methods, functions, and iterations between them.
4. Describe any libraries that you use.
5. Describe the data structures you use.
6. Design some Test cases that can test the correctness of your software.
7. What is your current expectations of your software? For example, do you expect that it works well? What are the expected weaknesses?

3 Implementation (3 Points)

- You need to implement your project in Python. You are allowed to use any Python libraries, or without using any libraries. If you are using libraries, you need to describe them.
- You can implement your project in Python using any IDE or use Jupyter Notebooks and provide your documentation.
- Your code should be completed and compilable without any errors. The teaching team should be able to read your documentation and run your project.
- Run your implementation on your laptop and generate the results if it generates any results when it runs.
- Provide interpretations of your results.
- What can you do to improve your results? Apply your ideas to improve your results.
- Provide any references that you have used.

Requirements:

- You should use at least 2-3 data structures that we have learned in our class. Examples of these data structures are: lists, dictionaries, queues, stacks, heaps, binary search trees, and trees.
- You should use at least one of the algorithm types that we have learned.

4 Create a Recorded Presentation Video of Your Project (5 Points)

- Create a document or presentation (you can create a presentation using your Jupyter notebook, or create a PowerPoint presentation, or other formats) to describe your project and results.
- Describe your code.
- Describe the results of your project in a professional academic manner.
- Describe the model and implementation of your project in a way that anyone in this field can read, enjoy, and understand.
- Run your software and describe it.

Record your presentation in the form of a video recording (minimum 8 minutes, maximum 15 minutes). Present your talk on your laptop computer and record it using a desktop recording software.

You should use your webcam so that we can identify who is presenting.

You have the following three options to create a presentation video:

- **Method 1:** You can use the Panopto Desktop Recorder. You can find this software and documentation here: `https://www.panopto.com/`.
- **Method 2:** You can record your presentation using the Zoom client application. Start your Zoom client, start a Zoom meeting (you will be the only participant), click on share your desktop, turn on your camera, and record your presentation. End the Zoom session and you will get an MP4 video file of your presentation. Upload the file to the Canvas system.

- **Method 3:** Alternatively, you can use any desktop recording software to generate an MP4 file and upload it to Canvas, or upload it to some other cloud storage (like Google Drive or Dropbox) and share with us the URL link of your presentation (submit the link in Canvas).

Note 1: Your video presentation should be between 8 minutes to maximum 15 minutes long (Min 8 mi, Max 15 min)

Note 2: You should turn on your Web Camera so that we can see your face during the presentation, and be able to identify the presenter.

Note 3: Grading will be based on quality of your presentation, implementation and correct description of algorithms or concepts in your report.

4.1 Turnins

- Submit your Python code
- Submit your documentation (It can be part of your README.md file if you are sharing your Github or a separate file like pdf)
- Submit your Video Presentation. Upload your video file to Canvas Panopto Video Gallery.

4.2 Grading Criteria

Your term project will be graded based on the following rubrics:

1. Correct compilation and execution of your code.
2. Correct application of Algorithms and Data Structures.
3. General Correctness of software design approach.
4. Correctness of your implementation and output results.
5. Correctness of your interpretations of the results.
6. Documentation and correct referencing to any references including online references.