Major Project Assignment

Parts 1-5

Part 1 – Description and Basic Functional Prototype:

A. Create a GitHub repository and description page for your software. Address the who, what, where, when, how, and why for the software:
   - Who are the users of the software?
   - What is the purpose of the software?
   - Where and when will the software be used?
   - How does the software work?
   - Why would anyone want to use the software over existing processes?

B. Create UML class diagrams to describe the relationship between the classes in your software. Save these UML diagrams as PNG images and post the UML class diagrams, with appropriate captions, in your GitHub description page.

C. Create a basic functional prototype for the software. The prototype must:
   - Read/write data from/to a file
   - Use a graphical user interface (e.g., JavaFX, unless given permission by the instructor otherwise)
   - Include an array or ArrayList data structure
   - Include an efficient sorting algorithm (e.g., quicksort / mergesort / heapsort) with comments describing the efficiency,
   - Use generics and classes with an inheritance structure of your own creation to match your UML.
   - Upload this version of the software to your GitHub account via IntelliJ using the information given in Blackboard.
   - Participate in any posted Blackboard activities related to this part of the Major Assignment.

Submit a zip file with all materials created for the first part of the assignment using the link provided in Blackboard. This submission will be used as record/backup of the materials you have submitted for grading.

Part 2 – Linear Data Structures:

Update your software to:

- Contain at least one stack, queue, or deque structure from the API
- Use a link list, set, or map structure of your own creation
- Commit all necessary updates to your GitHub repository and update your description page.
- Participate in any posted Blackboard activities related to this part of the Major Assignment.

Submit a zip file with all materials for the second part of the assignment using the link provided in Blackboard. This submission will be used as record/backup of the materials you have submitted for grading.

Part 3 – Trees, Graphs, and Hashing:

Update your software to:

- Contain an efficient binary search tree, 2-4 tree, or B-Tree implementation for searching through your data,
- Include a hash table structure of your own creation or implement a weighted graph, either directed or undirected
- Commit all necessary updates to your GitHub repository and update your description page.
- Participate in any posted Blackboard activities related to this part of the Major Assignment.

Submit a zip file with all materials for the third part of the assignment using the link provided in Blackboard. This submission will be used as record/backup of the materials you have submitted for grading.

Part 4 – System Level Improvements:

- implement at least one of the following improvements: concurrent processing/multi-threading, database access, or network communication sockets, and
- make one other improvements of your choosing.
- Commit all necessary updates to your GitHub repository and update your description page.
- Participate in any posted Blackboard activities related to this part of the Major Assignment.

Submit a zip file with all materials for the fourth part of the assignment using the link provided in Blackboard. This submission will be used as record/backup of the materials you have submitted for grading.

Part 5 – Video or PowerPoint Demonstration:

This part of the project does not require any coding, but rather required you to create a video demonstration of the features of your software and how you have used GitHub to help with your software development. You may use PowerPoint to develop a slide shows presentation. PowerPoints should be less than 12 slides and videos should be less than six minutes long and be uploaded to YouTube.

PowerPoint is included in the software provided for free by the college or you can download a screen capturing software application like CamStudio (free) or Filmora (free trial) to capture your demonstration of your project. Be sure to demonstrate the improvements you made to the project.

Part 5 Assignment Submission:

- Upload your video to a publicly available video sharing platform (e.g., YouTube, Vimeo, …) share it. Obtain a hyperlink to the video.
- Post the video hyperlink to your YouTube video in your GitHub description and any related Blackboard activities and discussion forums.

Submit a zip file with all materials for the final part of the assignment including any presentation materials (e.g., PPTs) using the link provided in Blackboard and provide the URL link to your video presentation. This submission will be used as record/backup of the materials you have submitted for grading.

NOTE: Be sure to attach your zip file containing all source code for your application using the correct file name (i.e., your file name must be MajorProjectAssignment5_Lastname_Firstname.zip – where you replace Lastname and Firstname with your actual name).