Scheduler Write Up

170D WOBC: Module L Exam I (A)

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1 Project Summary

1.1 Description

In this exercise you will be given a sequence of corresponding job and arrival times. A job is therefore implicitly identified by this data and no other information is provided.

Design and develop a job scheduler application that schedules jobs with the primary goal of minimizing the average wait time.

Schedule a sequence of n jobs so that the queue length and average wait time are minimized.

1.2 Objective

The students are given several files: driver, scheduler.h, and scheduler_test.h. The objective is to create a scheduler.c to complete the function declarations within scheduler.h with an end-state of making the driver file functional.

2 Challenges

2.1 Understanding project intent

This project was unique because it was the first time the students were exposed to a functional program and were required to complete functions for someone else's driver code. I became overwhelmed with the amount of files and the length of the project instructions. Although the project was explained several different times, I didn't fully understand what the objectives were until the end of the second day.

2.2 Lack of progress

Every course project so far I have been able to complete within the allotted time and have extra time to refactor or complete documentation. When I am unable to understand the intent of a three day project for the first few days, I was unable to progress towards completion. It was frustrating and stressful to watch my time dwindle as I struggled to put the pieces together. Luckily our instructor was there to answer questions and guide students towards success.

2.3 Memory management

Managing memory became a huge issue for me as allocations of multiple items grew. I haven't had much experience with creating destroy functions for structures and other objects and deciphering which pointers or address symbols and where to place them. After drawing out what was happening on paper, I was able to dissect and destroy the memory properly. I learned a lot about double pointers and using them to free the memory and erase the memory location of where it was stored.

2.4 Utilizing others code and function prototypes

Although we have already completed the C portion of our course, there were some instrumental topics that I wasn't truly prepared for. This project exercised my ability to read others code and function prototypes and build usable functions around there work. I hadn't been forced to use functions as parameters for programs before and although it was challenging to get it right, it was a great learning exercise.

3 Successes

3.1 Makefile

I felt that my knowledge on Makefiles made this project easy to compile and begin to understand what I was looking at. Without an adequate Makefile and a solid foundation for receiving and organizing multiple source files, this project would have been a task in itself to compile.

3.2 Overcoming confusion

Although there were many hurdles and long nights, I was able to complete this project. My confidence wasn't there, but I knew if I had a solid understanding of the intent, I would be able to compelete the task. I would say I learned more during this three day project about C, modular code, building libraries for various structures, memory management, and more. I am grateful this project is over, but the education was invaluable.

4 Lessons Learned

4.1 Sometimes not all of the information will be provided

I understand this course and the projects within it aren't 100% friendly to the absolute beginner programmer, but it took me valuable time to really digest and understand what the intent was and how to get started. I knew the concept and what structures / logic I wanted to use, but really grasping what the driver code was asking for took me time.

4.2 Creating modular code is essential

I am still learning each day what modularity means and keeping vast project files organized and readable. After reading the rubric, I still had a lot of questions and luckily the instructor was there to clarify. I understand the projects intent, but I still needed some guidance to fully comprehend how all of the files worked together. Afterwards, having a functional program with external driver code, external libraries, and self-created libraries was really rewarding. I learned a ton about structures in C and how to logically create additional libraries to complete the objective.

4.3 Back end queue selection

When I first began this project, I attempted to use a simple array to tackle the problem. However, I quickly found out that memory and other factors would be a burden to work on. The link list we completed during instruction was extremely helpful to see how to think/create a link list library from scratch. I knew that an array was better suited for this task, but I wasn't exactly sure how to implement an array list with an external library. I ended up using the array list with an external library and it was awesome to create and understand what was truly happening. I know my code organization could use some work, but in the end, I learned way more in regards to creating libraries, creating link list/array list, and managing memory properly.than I thought I would throughout this project.

4.4 Instruction that truly helped complete this project

The book provided is a good resource for introduction into the topic, but the exercises and complexity didn't fully prepare me to be set out on my own to complete this project. Essential parts of instruction were watching the instructor build a link list from scratch and explain each section in-depth. I feel that was invaluable and gave me a greater foundation for actually programming my own structures and modular code.

4.5 Improvements for the project

For a new programmer, this project seemed a bit lengthy and complex. I am grateful for the explanation and help I received, but there were a few rough spots that could be ironed out before the next class takes this exam.

1. Explaining the core intent of the project:

- the project rubric was 12 pages in length and provided several files to work with. To me, it was extremely confusing and stressful. I put 110% into this course everyday and to have a solid understanding of the project immediately, would have helped me understand what tasks I should start with and what direction I should ultimately go.

2. Defining function prototypes more clearly.

- There were a few functions we were required to build and most of them were self explanatory. But there were a few I didn't really know what they were asking. the reset() function was essential, but the only information provided was "reset the scheduler." I didn't know what that meant until I needed to use it. I am glad the instructors do not leave the students out to dry when they hit a speed bump. A lot of this was intimidating for a new programmer and I hope the course can adjust for the new programmers coming in.