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Assignment 2 Report

The application is comprise of three files, namely scheduler.c, ds.c and ds.h. 'scheduler.c' file is the one with main function. 'ds.h' and 'ds.c' files are the other source and header files. 'ds.h' file includes the implementation of the functions mentioned in '3. Operations on data structures' title.

The main program creates 2 queues: a first come first served (queFCFS) and a priority based (quePB) queue. queFCFS is filled with TaskA, TaskB, TaskC and TaskD which have equal priority values (1). Tasks arrive at 1, 2, 3 and 4th seconds (simulated by a loop in main) respectively. Each has a processing time of 4, 8, 3 and 4 seconds. On the other hand, the quePB is filled with TaskE, TaskF, TaskG and TaskH which arrive at 5, 6, 7 and 8th seconds and last for 3, ~6, 2 and 1 seconds respectively, allowing the priority-based queue processes to take priority.

The scheduler and Tasks are started via pthread_create() function and only the scheduler is allowed to start at main function by initializing its semaphore to 1. The tasks are made 'wait' on semaphores through the control of scheduler. Tasks also signals the scheduler when they finish the critical sections of their tasks. Each enqueue and insertion events are accompanied by a mutex so two threads cannot use the queues at the same time.

The semaphore and the task of each thread is kept by 'pcbptr' data structure. This data structure is filled in make_proc() function and pthread_create() is called inside by passing the task and semaphore of the task. This way, the scheduler can signal each task by the same label by only checking the front nodes of the queues.

The program is aimed to fulfill the requirements in the assignment, so no assumption is thought to be done.