CSE325 Queue Manager

Assignment #1

Design and Implement a Queue Manager.

Design document due: Feb 2, 3:00pm
Implementation due: Feb 2, 3:00pm

You are to work in groups of 2 or 3, with names of group members listed on the design document.

Functionality

You are to design a program that manipulates a queue data structure. The objects to be placed in the queue are abstract entities called processes. The C definition of a process (for this assignment) is defined below. You will develop a design document that will consist of at least the following information:

- The high-level design of the execution flow for these routines
- A description of the test set of inputs telling how the test all functionality
- Any design decisions you made for the specified functionality

Constraints on your design:

- Queue size will be 20 abstract entities
- You will create a testing interface that processes commands as defined in the test interface reference for this assignment
- The queue will be implemented as a doubly-linked list
- **No** system calls are allowed in your implementation of the queue manager
- System calls are allowed in the testing interface portion of this assignment

You may add extra fields to the process structure definition as needed for the linked list support. Your design does not need to be approved before you perform the implementation. If you do want it reviewed before you do implementation, make the request as soon as possible.

Operations to be implemented:

1. *Enqueue* process-number psw page-table reg0 reg1 reg2
   This operation puts the "process identified by the process-number into the queue. The values given for psw, page-table, and regs are to be assigned to these fields in the process data structure.
2. *Dequeue*
   This operation removes the process at the head of the queue. It returns the process id of that process. The data structure should be cleared.
3. *Delete* process-number

This operation removes the specified process from wherever it is located in the queue. It returns the process id of that process. The data structure should be cleared.

```
#define NUM_REGS 3
#define MAX_PROCESSES 20
struct process_control_block {
     int pid;                  /* Process ID */
     int psw;                  /* Program status word */
     int page-table;           /* Pagetable info */
     int regs[NUM_REGS];       /* Array of registers */
}
struct process_control_block process[MAX_PROCESSES];
```

Assignment Deliverables

1. Design document as defined above
2. Code implementing the design
3. Test set of commands that exercises your code
4. Captured results of your test set
5. Presentation given in lab to show your queue manager