Homework 6
Due April 16, 9:30am
50 points
CS 2235
Data Structures and Algorithms
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1. One of the main applications of priority queues is in operating systems—for scheduling jobs on a CPU or HPC. In this assignment you are to build a program that schedules simulated CPU jobs.
   a. Your program should run in a loop, each iteration of which corresponds to a time slice for the CPU.
   b. Each job is assigned a priority, which is an integer between 1 (highest priority) and 20 (lowest priority), inclusive. From among all jobs waiting to be processed in a time slice, the CPU must work on a job with highest priority.
   c. Each job also has a name which is simply "Job_" + an integer beginning at 1 and increasing by 1 with each new job added to the queue.
   d. In this simulation, each job will also come with a length value, which is an integer between 1 and 100, inclusive, indicating the number of time slices that are needed to process this job. For simplicity, you may assume jobs cannot be interrupted—once it is scheduled on the CPU, a job runs for a number of time slices equal to its length.
   e. Your simulator must output the name of the job running on the CPU in each time slice.
2. Begin your simulation with ten randomly simulated CPU jobs. Randomly assign a priority and a length value, and add them to your priority queue.
   a. Every 100 time slices, add another randomly simulated CPU job to the priority queue.

3. The simulation ends when the CPU has run all the jobs in the priority queue.

Demonstrate that your program works. Submit your source code and output screenshots. Utilize good object-oriented programming and efficient algorithms.

HINT I suggest creating a class "CPU_job" which has instance variables "name", "priority", and "length", and necessary methods. Then instantiate a java.util.PriorityQueue of these CPU_job s.