Airport Simulator

You will be programming an airport simulator. The airport has one runway, and a plane can either be taking off or landing on it at any given minute.

Your simulator should run similar to the WaitLine simulator from the lecture notes and the book. Each time your loop iterates represents another moment in time. In each moment of time, you need to:

Decide if a plane should join the take-off queue
Decide if a plane should join the landing priority queue
Planes should show randomly, on average of about one every 6 units of time. Any plane joining the landing priority queue should have a random amount of remaining fuel assigned to it. This should range from 5 to 15 time-units of fuel left. Each unit of time, the amount of fuel left should decrement. If a plane's fuel reaches 0, it crashes. The planes should sort in the priority queue by placing those with the least amount of fuel at the front.

Each plane takes 2 units of time to land and 3 units of time to take off. While a plane is landing or taking off, the runway is in use, and no other plane is allowed on the runway. When the runway is done being used, the landing priority queue is checked. If it contains any planes, the next one is selected to land. If there are no planes in the landing queue, the next plane in line to take off may do so. When a plane is selected to take off, no other planes should be allowed to take off or land until that plane is done.

Record interesting statistics from your simulation.

What is the average time spent waiting for take off?
What is the longest time spent waiting for take off?
What is the average time spent waiting to land?
What is the longest time spent waiting to land?
Did any planes crash?
How many planes total took off and landed during the simulation?
If you do not like the results you are getting (i.e. planes crashed, no planes were able to take off, etc) feel free to tweak your numbers until the results are more realistic.

You will need to program your own priority queue. While using a heap is the most efficient way to program a priority queue, we have not covered that structure (you will in CS241). If you know how a heap works and would like to use it in your implementation you may, but for this project you can simply use a linked list in your priority queue.