PSWC Assignment

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Section: E

SRN: PES1UG19CS018

Project: #1

You need to simulate the working of an airport.

Let us consider a small but busy airport with only one runway. In each unit of time (minute, hour), one plane can land or one plane can take off, but not both. Planes arrive ready to land or ready to take off at random times, so at any given unit of time, the runway may be idle or a plane may be landing or taking off and there may be several planes waiting either to land or take off. We therefore need two queues, called landing and takeoff, to hold these planes. It is better to keep a plane waiting on the ground than in the air, so a small airport allows a plane to take off only if there are no planes waiting to land. Hence, after receiving requests from new planes to land or take off, our simulation will first service the head of the queue of planes waiting to land, and only if the landing queue is empty, will it allow a plane to take off. The simulation should run through many units of time.

Output screenshots.

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abhiram@Abhiram:/mnt/c/Users/user/Desktop/Abhiram PES1UG19CS018$ ./a.out
One plane can land or depart in each unit of time.
Up to 5 planes can be waiting to land or take off at any time
How many units of time will the simulation run? 30
Expected number of arrivals per unit time: 0.47
Expected number of departures per unit time: 0.47

    Plane 1 is ready to takeoff
1: Plane 1 took off; In takeoff queue 0 units

2: Runway is idle

3: Runway is idle

    Plane 2 is ready to takeoff
    Plane 3 is ready to takeoff
4: Plane 2 took off; In takeoff queue 1 units

    Plane 4 is ready to takeoff
5: Plane 3 took off; In takeoff queue 1 units

    Plane 5 is ready to takeoff
    Plane 6 is ready to takeoff
6: Plane 4 took off; In takeoff queue 2 units

    Plane 7 is ready to land
7: Plane 7 landed; In landing queue 0 units

    Plane 8 is ready to land
    Plane 9 is ready to land
    Plane 10 is ready to takeoff
8: Plane 8 landed; In landing queue 1 units

    Plane 11 is ready to land
    Plane 12 is ready to takeoff
    Plane 13 is ready to takeoff
9: Plane 9 landed; In landing queue 1 units
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    Plane 14 is ready to land
    Plane 15 is ready to takeoff
    Plane 15 is told to wait
10: Plane 11 landed; In landing queue 1 units

    Plane 16 is ready to land
    Plane 17 is ready to takeoff
    Plane 17 is told to wait
11: Plane 14 landed; In landing queue 1 units

    Plane 18 is ready to land
12: Plane 16 landed; In landing queue 1 units

    Plane 19 is ready to takeoff
    Plane 19 is told to wait
13: Plane 18 landed; In landing queue 0 units

    Plane 20 is ready to takeoff
    Plane 20 is told to wait
    Plane 21 is ready to takeoff
    Plane 21 is told to wait
14: Plane 5 took off; In takeoff queue 4 units

    Plane 22 is ready to land
    Plane 23 is ready to takeoff
15: Plane 22 landed; In landing queue 0 units

16: Plane 6 took off; In takeoff queue 4 units

17: Plane 10 took off; In takeoff queue 3 units

    Plane 24 is ready to takeoff
18: Plane 12 took off; In takeoff queue 3 units

19: Plane 13 took off; In takeoff queue 2 units

    Plane 25 is ready to land
    Plane 26 is ready to land
20: Plane 25 landed; In landing queue 1 units
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    Plane 27 is ready to land
    Plane 28 is ready to land
    Plane 29 is ready to takeoff
    Plane 30 is ready to takeoff
21: Plane 26 landed; In landing queue 2 units

    Plane 31 is ready to land
    Plane 32 is ready to land
22: Plane 27 landed; In landing queue 3 units

    Plane 33 is ready to takeoff
23: Plane 28 landed; In landing queue 2 units

    Plane 34 is ready to land
    Plane 35 is ready to takeoff
    Plane 35 is told to wait
24: Plane 31 landed; In landing queue 2 units

    Plane 36 is ready to takeoff
    Plane 36 is told to wait
25: Plane 32 landed; In landing queue 1 units
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    Plane 37 is ready to land
26: Plane 34 landed; In landing queue 1 units

27: Plane 37 landed; In landing queue 0 units

28: Plane 23 took off; In takeoff queue 4 units

    Plane 38 is ready to takeoff
29: Plane 24 took off; In takeoff queue 4 units

30: Plane 29 took off; In takeoff queue 3 units

        Simulation has concluded after 30 units.
        Total number of planes processed: 38
            Number of planes landed: 16
            Number of planes taken off: 12
            Number of planes refused use: 7
            Number left ready to land: 0
            Number left ready to take off: 3
            Percentage of time runway idle: 6.67
            Average wait time to land: 1.06
            Average wait time to takeoff: 6.75
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