Algorithms Hwk 3: Sample output

The Landing Queue is: 2

The Take off Queue is: 0

0 minutes have passed: Plane 1 is cleared to land

The Landing Queue is: 2

The Take off Queue is: 3

0 minutes have passed: Plane 2 is cleared to take off

The Landing Queue is: 3

The Take off Queue is: 2

5 minutes have passed: Plane 3 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 5

5 minutes have passed: Plane 4 is cleared to take off

The Landing Queue is: 3

The Take off Queue is: 7

10 minutes have passed: Plane 6 is cleared to take off

The Landing Queue is: 3

The Take off Queue is: 6

15 minutes have passed: Plane 5 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 6

25 minutes have passed: Plane 8 is cleared to take off

The Landing Queue is: 3

The Take off Queue is: 5

30 minutes have passed: Plane 7 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 4

35 minutes have passed: Plane 9 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 6

35 minutes have passed: Plane 10 is cleared to take off

The Landing Queue is: 3

The Take off Queue is: 5

40 minutes have passed: Plane 11 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 4

45 minutes have passed: Plane 13 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 7

45 minutes have passed: Plane 12 is cleared to take off

The Landing Queue is: 3

The Take off Queue is: 6

50 minutes have passed: Plane 15 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 5

55 minutes have passed: Plane 17 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 4

60 minutes have passed: Plane 19 is cleared to land

The Landing Queue is: 3

The Take off Queue is: 3

65 minutes have passed: Plane 21 is cleared to land

The Landing Queue is: 2

The Take off Queue is: 3

70 minutes have passed: Plane 23 is cleared to land

The Landing Queue is: 2

The Take off Queue is: 2

75 minutes have passed: Plane 25 is cleared to land

The Landing Queue is: 2

The Take off Queue is: 2

75 minutes have passed: Plane 14 is cleared to take off

The Landing Queue is: 1

The Take off Queue is: 2

80 minutes have passed: Plane 27 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 3

80 minutes have passed: Plane 16 is cleared to take off

The Landing Queue is: 1

The Take off Queue is: 2

85 minutes have passed: Plane 29 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 3

85 minutes have passed: Plane 18 is cleared to take off

The Landing Queue is: 1

The Take off Queue is: 2

90 minutes have passed: Plane 31 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 4

90 minutes have passed: Plane 20 is cleared to take off

The Landing Queue is: 1

The Take off Queue is: 3

95 minutes have passed: Plane 33 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 2

100 minutes have passed: Plane 35 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 2

100 minutes have passed: Plane 22 is cleared to take off

The Landing Queue is: 1

The Take off Queue is: 1

105 minutes have passed: Plane 37 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 4

105 minutes have passed: Plane 24 is cleared to take off

The Landing Queue is: 1

The Take off Queue is: 3

110 minutes have passed: Plane 39 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 5

110 minutes have passed: Plane 26 is cleared to take off

The Landing Queue is: 1

The Take off Queue is: 4

115 minutes have passed: Plane 41 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 3

120 minutes have passed: Plane 43 is cleared to land

The Landing Queue is: 1

The Take off Queue is: 4

120 minutes have passed: Plane 28 is cleared to take off

Airplanes that landed: 22

Airplanes that took off: 14

Average wait time to land: 6.0

Average wait time to take off: 28.0

Planes left in landing queue: 1

Planes left in take off queue: 3

Explanation:

For the program, the main class that engages in running the simulation is the 'simulation' class. I created my own Queue class in order to store the information. I utilized a random number generator to generate the number of planes that would be added to the takeoff and landing queue – between 0 and 3. When a plane arrives at a takeoff queue, it is given an even ID number starting from 1, while a plane arriving at a landing queue is given an odd ID number starting from 2.

In general, more planes will land than planes will take off, because planes cleared to land are given the highest priority in the queue. Thus, there will always be less planes left in the landing queue, since it takes precedence over taking off (you don't want for your plane to be stuck waiting to land while it is in the air for a long period of time!). The queue grows faster for planes taking off than for the ones that land because again, the planes that land have priority.