**Simulation Project - 1st Assignment**

**Submitted By:** Rahul Sethi

**Unity ID:** rsethi3

*Events*

1. Departure of a packet from the server
2. Departure of a packet from the infinite server queue
3. Departure of a packet from the client queue.

*Actions*

1. Departure of a packet from the server

a The packet joins the infinite server queue. Decide how long it would stay in the infinite server queue.

b. Calculate when the next packet will depart from the server. For this you will have to determine whether the server has to change the transmission speed based on a flag set by the client.

2. Departure of a packet from the infinite server queue

a. The packet joins the client queue, and if its server is busy, then no further action is required.

b. If its server is idle, then the packet goes into service. Determine when the service will be completed.

c. Check the occupancy level of the client queue (includes the packet that has just arrived) and accordingly set the flag to up (increase speed) or down (decrease speed).

3. Departure of a packet from the client queue

a. The packet departs from the system. If no packet is waiting, then the server become idle. No further action is taken.

b. Otherwise, the next packet in line goes into service. Determine when the service will be completed.

*Clocks*

* CL-p: departure of a packet from the server
* CL-isq: departure of a packet from the infinite server queue
* CL-cq: departure of a packet from the client queue

*Delays – (*2,2,4,3,2,2,5,4,3,2,6,5,4,3,2,5,4,3,2,4,3,2,2,2)

*Threshold Value* = 2

*Hand simulation*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Actions** | | **Server** | | **Infinite server q.** | **Client queue** | | |
| **MCL** | **Event no** | **Trans.**  **speeed** | **CLp** | **CL-isq for each**  **waiting packet (delay)** | **CL-cq** | **Νο queue** | **Flag** |
| 0 |  | H | 1 |  | - | 0 |  |
| 1 | 1 | H | 2 | 3(2) | - | 0 |  |
| 2 | 1 | H | 3 | 3(2),4(2) | - | 0 |  |
| 3 | 1 | H | 4 | 3(2),4(2),7(4) | - | 0 |  |
| 3 | 2 | H | 4 | 4(2),7(4) | 4 | 1 | Up |
| 4 | 1 | H | 5 | 4(2),7(4),7(3) | 4 | 1 |  |
| 4 | 2 | H | 5 | 7(4),7(3) | 4 | 2 | Up |
| 4 | 3 | H | 5 | 7(4),7(3) | 5 | 1 |  |
| 5 | 1 | H | 6 | 7(4),7(3),7(2) | 5 | 1 |  |
| 5 | 3 | H | 6 | 7(4),7(3),7(2) | - | 0 |  |
| 6 | 1 | H | 7 | 7(4),7(3),7(2),8(2) | - | 0 |  |
| 7 | 1 | H | 8 | 7(4),7(3),7(2),8(2),12(5) | - | 0 |  |
| 7 | 2 | H | 8 | 8(2),12(5) | 8 | 3 | Down |
| 8 | 1 | L | 10 | 8(2),12(5),12(4) | 8 | 3 |  |
| 8 | 2 | L | 10 | 12(5),12(4) | 8 | 4 | Down |
| 8 | 3 | L | 10 | 12(5),12(4) | 9 | 3 |  |
| 9 | 3 | L | 10 | 12(5),12(4) | 10 | 2 |  |
| 10 | 1 | L | 12 | 12(5),12(4),13(3) | 10 | 2 |  |
| 10 | 3 | L | 12 | 12(5),12(4),13(3) | 11 | 1 |  |
| 11 | 3 | L | 12 | 12(5),12(4),13(3) | - | 0 |  |
| 12 | 1 | L | 14 | 12(5),12(4),13(3),14(2) | - | 0 |  |
| 12 | 2 | L | 14 | 13(3),14(2) | 13 | 2 | Up |
| 13 | 2 | L | 14 | 14(2) | 13 | 3 | Down |
| 13 | 3 | L | 14 | 14(2) | 14 | 2 |  |
| 14 | 1 | L | 16 | 14(2),20(6) | 14 | 2 |  |
| 14 | 2 | L | 16 | 20(6) | 14 | 3 | Down |
| 14 | 3 | L | 16 | 20(6) | 15 | 2 |  |
| 15 | 3 | L | 16 | 20(6) | 16 | 1 |  |
| 16 | 1 | L | 18 | 20(6),21(5) | 16 | 1 |  |
| 16 | 3 | L | 18 | 20(6),21(5) | - | 0 |  |
| 17 | 0 | L | 18 | 20(6),21(5) | - | 0 |  |
| 18 | 1 | L | 20 | 20(6),21(5),22(4) | - | 0 |  |
| 19 | 0 | L | 20 | 20(6),21(5),22(4) | - | 0 |  |
| 20 | 1 | L | 22 | 20(6),21(5),22(4),23(3) | - | 0 |  |
| 20 | 2 | L | 22 | 21(5),22(4),23(3) | 21 | 1 | Up |
| 21 | 2 | L | 22 | 22(4),23(3) | 21 | 2 | Up |
| 21 | 3 | L | 22 | 22(4),23(3) | 22 | 1 |  |
| 22 | 1 | H | 23 | 22(4),23(3),24(2) | 22 | 1 |  |
| 22 | 2 | H | 23 | 23(3),24(2) | 22 | 2 | Up |
| 22 | 3 | H | 23 | 23(3),24(2) | 23 | 1 |  |
| 23 | 1 | H | 24 | 23(3),24(2),28(5) | 23 | 1 |  |
| 23 | 2 | H | 24 | 24(2),28(5) | 23 | 2 | Up |
| 23 | 3 | H | 24 | 24(2),28(5) | 24 | 1 |  |
| 24 | 1 | H | 25 | 24(2),28(5),28(4) | 24 | 1 |  |
| 24 | 2 | H | 25 | 28(5),28(4) | 24 | 2 | Up |
| 24 | 3 | H | 25 | 28(5),28(4) | 25 | 1 |  |
| 25 | 1 | H | 26 | 28(5),28(4),28(3) | 25 | 1 |  |
| 25 | 3 | H | 26 | 28(5),28(4),28(3) | - | 0 |  |
| 26 | 1 | H | 27 | 28(5),28(4),28(3),28(2) | - | 0 |  |
| 27 | 1 | H | 28 | 28(5),28(4),28(3),28(2),31(4) | - | 0 |  |
| 28 | 1 | H | 29 | 28(5),28(4),28(3),28(2),31(4),31(3) | - | 0 |  |
| 28 | 2 | H | 29 | 31(4),31(3) | 29 | 4 | Down |
| 29 | 1 | L | 31 | 31(4),31(3),31(2) | 29 | 4 |  |
| 29 | 3 | L | 31 | 31(4),31(3),31(2) | 30 | 3 |  |
| 30 | 3 | L | 31 | 31(4),31(3),31(2) | 31 | 2 |  |
| 31 | 1 | L | 33 | 31(4),31(3),31(2),33(2) | 31 | 2 |  |
| 31 | 2 | L | 33 | 33(2) | 31 | 5 | Down |
| 31 | 3 | L | 33 | 33(2) | 32 | 4 |  |
| 32 | 3 | L | 33 | 33(2) | 33 | 3 |  |
| 33 | 1 | L | - | 33(2),35(2) | 33 | 3 |  |
| 33 | 2 | L | - | 35(2) | 33 | 4 | Down |
| 33 | 3 | L | - | 35(2) | 34 | 3 |  |
| 34 | 3 | L | - | 35(2) | 35 | 2 |  |
| 35 | 2 | L | - | - | 35 | 3 | Down |
| 35 | 3 | L | - | - | 36 | 2 |  |
| 36 | 3 | L | - | - | 37 | 1 |  |
| 37 | 3 | L | - | - | - | 0 |  |