Assignment 8 - Part A Solution

1. Gantt Charts

1.1 SRTF (Shortest Remaining Time First)

SRTF Gantt Chart:

```
0   1   2         9     15     23     33        49
| P1| P2|   P3     | P5  |  P2  |   P1  |     P4     |
```

1.2 Round Robin (RR), Quantum = 2

RR Gantt Chart:

```
0   2   4   6   8  10  12  14  16  18  20  22  24  26  28  30  32  34  35  37  39  40  42  43  49
| P1| P2| P3| P4| P1| P5| P2| P3| P4| P1| P5| P2| P3| P4| P1| P5| P2| P3| P4| P1| P2| P4| P1|
P4    |
```

2. Turnaround Times (TAT)

Process	AT	BT	CT (SRTF)	TAT (SRTF)
P1	0	11	33	33
P2	1	9	23	22
P3	2	7	9	7
P4	2	16	49	47
P5	3	6	15	12

Process	AT	BT	CT (RR)	TAT (RR)
P1	0	11	43	43
P2	1	9	40	39
P3	2	7	35	33
P4	2	16	49	47
P5	3	6	32	29

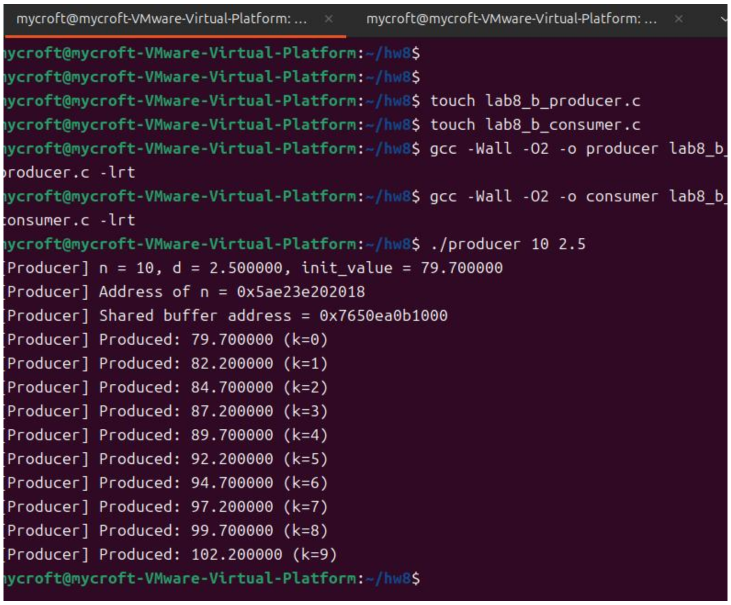
3. Waiting Times (WT)

Process	BT	TAT (SRTF)	WT (SRTF)
P1	11	33	22
P2	9	22	13
P3	7	7	0
P4	16	47	31
P5	6	12	6

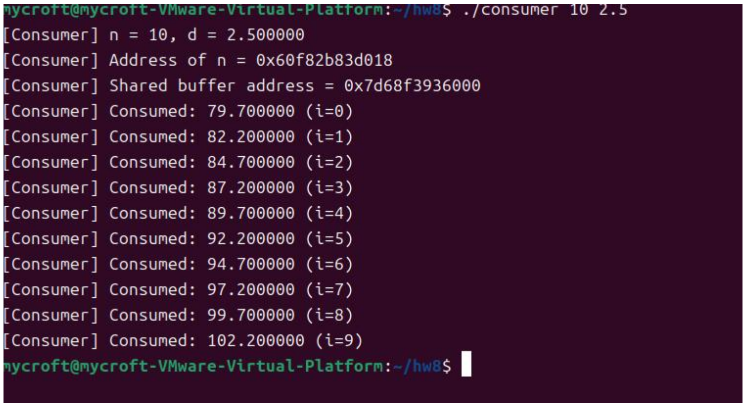
Process	BT	TAT (RR)	WT (RR)
P1	11	43	32
P2	9	39	30
P3	7	33	26
P4	16	47	31
P5	6	29	23

Part B Solution

In this assignment, I re-implemented the Lab 5A producer - consumer system using two independent programs that communicate through a POSIX shared-memory object created with shm_open and mmap. Both programs receive the same parameters n and d, with n stored as a global initialized variable, and the producer generates an arithmetic sequence based on my name initials and writes each value into a shared circular buffer of size five. The consumer continuously reads and prints values from the buffer as soon as they become available. Both programs also print the virtual address of n and the shared buffer to support the analysis in Part C. The system works correctly, with the consumer receiving all values in the correct order.


mycroft@mycroft-VMware-Virtual-Platform: ...
mycroft@mycroft-VMware-Virtual-Platform: ...

```
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$ touch lab8_b_producer.c
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$ touch lab8_b_consumer.c
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$ gcc -Wall -O2 -o producer lab8_b_
roducer.c -lrt
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$ gcc -Wall -O2 -o consumer lab8_b_
onsumer.c -lrt
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$ ./producer 10 2.5
[Producer] n = 10, d = 2.500000, init_value = 79.700000
[Producer] Address of n = 0x5ae23e202018
[Producer] Shared buffer address = 0x7650ea0b1000
[Producer] Produced: 79.700000 (k=0)
[Producer] Produced: 82.200000 (k=1)
[Producer] Produced: 84.700000 (k=2)
[Producer] Produced: 87.200000 (k=3)
[Producer] Produced: 89.700000 (k=4)
[Producer] Produced: 92.200000 (k=5)
[Producer] Produced: 94.700000 (k=6)
[Producer] Produced: 97.200000 (k=7)
[Producer] Produced: 99.700000 (k=8)
[Producer] Produced: 102.200000 (k=9)
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$
```



```
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$ ./consumer 10 2.5
[Consumer] n = 10, d = 2.500000
[Consumer] Address of n = 0x60f82b83d018
[Consumer] Shared buffer address = 0x7d68f3936000
[Consumer] Consumed: 79.700000 (i=0)
[Consumer] Consumed: 82.200000 (i=1)
[Consumer] Consumed: 84.700000 (i=2)
[Consumer] Consumed: 87.200000 (i=3)
[Consumer] Consumed: 89.700000 (i=4)
[Consumer] Consumed: 92.200000 (i=5)
[Consumer] Consumed: 94.700000 (i=6)
[Consumer] Consumed: 97.200000 (i=7)
[Consumer] Consumed: 99.700000 (i=8)
[Consumer] Consumed: 102.200000 (i=9)
ycroft@mycroft-VMware-Virtual-Platform:~/hw8$
```