ASSIGNMENT-3 (CS23BT063,CS23BT013)

PART-1

1)FIFO :

```
jaswika@Sona:/mnt/c/Users/jaswi/OneDrive/Desktop/lab3_os$ make run1 ALG="FIFO" FILE="process1.dat"
./part1 FIFO process1.dat
CPU0
P1,1    0       99
P2,1    100     179
P3,1    180     249
P4,1    250     259
P5,1    260     262
P6,1    263     267
P7,1    268     467
P1,2    468     557
P2,2    558     637
P3,2    638     707
P4,2    708     767
P5,2    768     770
P7,2    771     773
P1,3    774     853
P2,3    854     903
P3,3    904     943
P4,3    944     973
P5,3    974     976
P1,4    977     1046
P2,4    1047    1116
P3,4    1117    1186
P4,4    1187    1256
P1,5    1257    1316
P2,5    1317    1356
P3,5    1357    1376
P4,5    1377    1386
P1,6    1387    1396
P2,6    1397    1406
P3,6    1407    1416
P4,6    1417    1426

total run time of the simulator is 5.74e-05 seconds

average turn around time is = 1091
max turn around time is = 1423
```

2)SJF:

```
jaswika@Sona:/mnt/c/Users/jaswi/OneDrive/Desktop/lab3_os$ make run1 ALG="SJF" FILE="process1.dat"
./part1 SJF process1.dat
CPU0
P1,1    0       99
P5,1    100     102
P6,1    103     107
P5,2    108     110
P4,1    111     120
P5,3    121     123
P4,2    124     183
P3,1    184     253
P4,3    254     283
P3,2    284     353
P4,4    354     423
P3,3    424     463
P4,5    464     473
P3,4    474     543
P4,6    544     553
P3,5    554     573
P2,1    574     653
P3,6    654     663
P2,2    664     743
P1,2    744     833
P2,3    834     883
P1,3    884     963
P2,4    964     1033
P1,4    1034    1103
P2,5    1104    1143
P1,5    1144    1203
P2,6    1204    1213
P1,6    1214    1223
P7,1    1224    1423
P7,2    1426    1428

total run time of the simulator is 0.000202795 seconds

average turn around time is = 755.286
max turn around time is = 1419
```

3)Preemptive SJF:

```
max turn around time = 1477
jaswika@Sona:/mnt/c/Users/jaswi/OneDrive/Desktop/lab3_os$ make run1 ALG="PSJF" FILE="process1.dat"
./part1 PSJF process1.dat
CPU0
P1,1    0       1
P2,1    2       2
P3,1    3       3
P4,1    4       4
P5,1    5       7
P6,1    8       12
P5,2    13      15
P4,1    16      17
P5,3    18      20
P4,1    21      27
P3,1    28      29
P4,2    30      89
P3,1    90      91
P4,3    92      121
P3,1    122     186
P4,4    187     256
P3,2    257     258
P4,5    259     268
P3,2    269     270
P4,6    271     280
P3,2    281     346
P2,1    347     348
P3,3    349     388
P2,1    389     391
P3,4    392     461
P2,1    462     463
P3,5    464     483
P2,1    484     485
P3,6    486     495
P2,1    496     565
P1,1    566     567
P2,2    568     647
P1,1    648     649
P2,3    650     699
P1,1    700     702
P2,4    703     772
P1,1    773     774
P2,5    775     814
P1,1    815     816
P2,6    817     826
P1,1    827     913
P7,1    914     915
P1,2    916     1005
P7,1    1006    1007
P1,3    1008    1087
P7,1    1088    1090
P1,4    1091    1160
P7,1    1161    1162
P1,5    1163    1222
P7,1    1223    1224
P1,6    1225    1234
P7,1    1235    1423
P7,2    1426    1428

total run time of the simulator for PSJF is 0.000307883 seconds

average turn around time = 610.286
max turn around time = 1419
```

4)ROUND ROBIN(time quantum=50) :

```
jaswika@Sona:/mnt/c/Users/jaswi/OneDrive/Desktop/lab3_os$ make run1 ALG="RR" FILE="process1.dat"
./part1 RR process1.dat
CPU0
provide the time quantum value: 50
P1,1    0       49
P1,1    50      99
P2,1    102     151
P3,1    152     201
P4,1    202     211
P5,1    214     216
P6,1    219     223
P7,1    224     273
P1,2    274     323
P2,1    324     353
P3,1    356     375
P4,2    378     427
P5,2    428     430
P7,1    433     482
P1,2    483     522
P2,2    525     574
P3,2    575     624
P4,2    625     634
P5,3    637     639
P7,1    640     689
P1,3    690     739
P2,2    740     769
P3,2    772     791
P4,3    794     823
P7,1    827     876
P1,3    879     908
P2,3    912     961
P3,3    965     1004
P4,4    1008    1057
P7,2    1058    1060
P1,4    1061    1110
P2,4    1111    1160
P3,4    1161    1210
P4,4    1211    1230
P1,4    1233    1252
P2,4    1255    1274
P3,4    1277    1296
P4,5    1299    1308
P1,5    1311    1360
P2,5    1361    1400
P3,5    1403    1422
P4,6    1425    1434
P1,5    1435    1444
P2,6    1447    1456
P3,6    1457    1466
P1,6    1467    1476

total run time of the simulator for RR is 2.70087 seconds

average turn around time is = 1104.43
max turn around time is = 1477
```

PART-2(2-CPU’s)

1)FIFO:

```
jaswika@Sona:/mnt/c/Users/jaswi/OneDrive/Desktop/lab3_os$ make run2 ALG="FIFO" FILE="process1.dat"
./part2 FIFO process1.dat
CPU0 and CPU1 simulation
CPU0: P1,1      0       99
CPU1: P2,1      2       81
CPU1: P3,1      82      151
CPU0: P4,1      100     109
CPU0: P5,1      110     112
CPU0: P6,1      113     117
CPU0: P7,1      118     317
CPU1: P2,2      152     231
CPU1: P1,2      232     321
CPU0: P4,2      318     377
CPU1: P5,2      322     324
CPU1: P3,2      325     394
CPU0: P2,3      378     427
CPU1: P7,2      395     397
CPU1: P1,3      398     477
CPU0: P5,3      428     430
CPU0: P4,3      431     460
CPU0: P3,3      461     500
CPU1: P2,4      478     547
CPU0: P4,4      501     570
CPU1: P1,4      548     617
CPU0: P3,4      571     640
CPU1: P2,5      618     657
CPU0: P4,5      641     650
CPU0: P1,5      651     710
CPU1: P3,5      658     677
CPU1: P4,6      678     687
CPU1: P2,6      688     697
CPU1: P3,6      698     707
CPU0: P1,6      713     722

average turn around time is= 533.429
Maximum turn around time is= 723
total simulation time is= 9.5052e-05 seconds
```

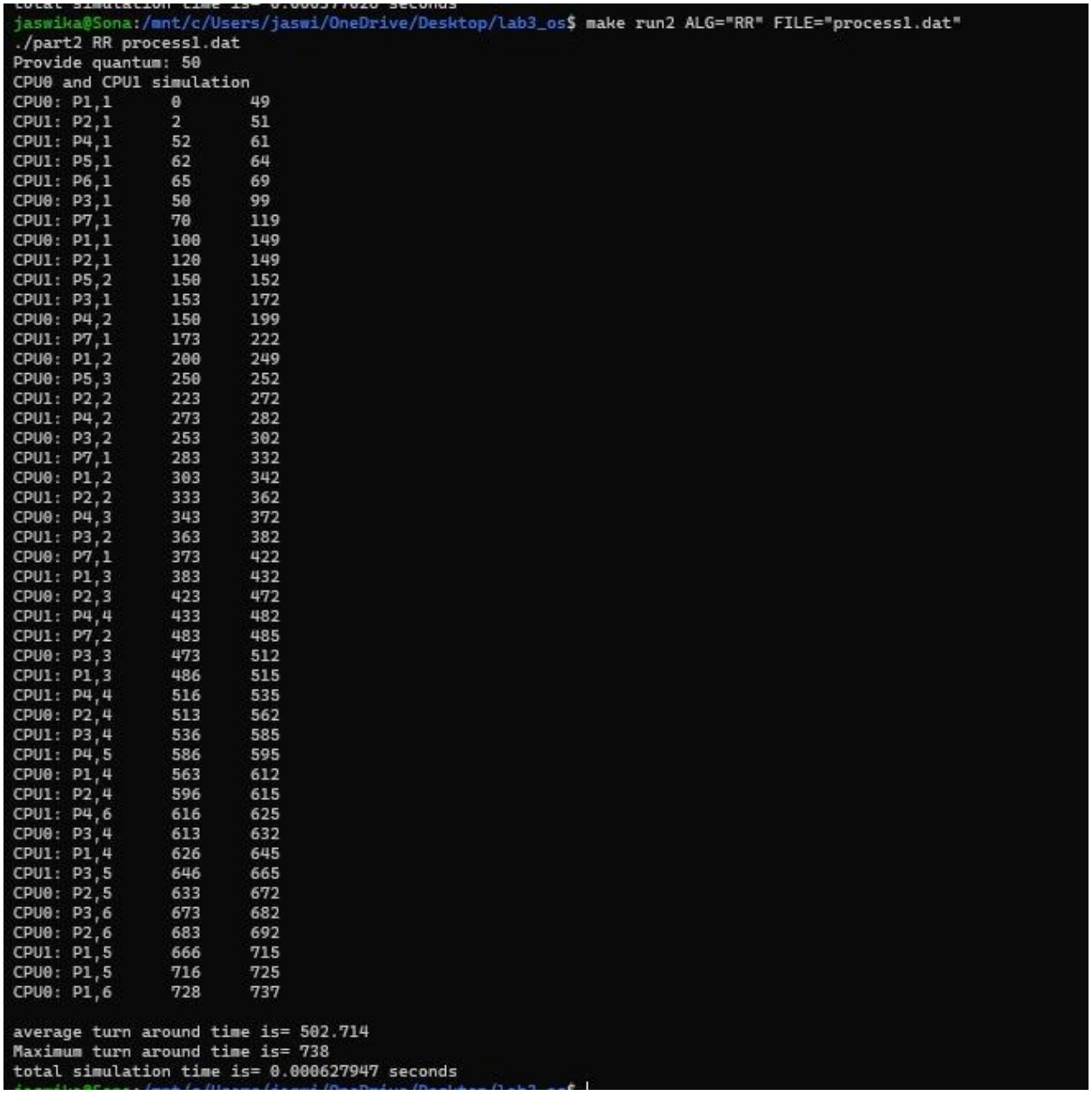
2)SJF:

```
jaswika@Sona:/mnt/c/Users/jaswi/OneDrive/Desktop/lab3_os$ make run2 ALG="SJF" FILE="process1.dat"
./part2 SJF process1.dat
CPU0 and CPU1 simulation
CPU0: P1,1      0       99
CPU1: P2,1      2       81
CPU1: P5,1      82      84
CPU1: P6,1      85      89
CPU1: P5,2      90      92
CPU1: P4,1      93      102
CPU0: P5,3      100     102
CPU0: P3,1      103     172
CPU1: P2,2      103     182
CPU0: P4,2      173     232
CPU1: P3,2      183     252
CPU0: P2,3      233     282
CPU1: P4,3      253     282
CPU0: P3,3      283     322
CPU1: P1,2      283     372
CPU0: P2,4      323     392
CPU1: P4,4      373     442
CPU0: P3,4      393     462
CPU1: P2,5      443     482
CPU0: P4,5      463     472
CPU0: P3,5      473     492
CPU1: P4,6      483     492
CPU0: P2,6      493     502
CPU1: P1,3      493     572
CPU0: P3,6      503     512
CPU0: P7,1      513     712
CPU1: P1,4      576     645
CPU1: P1,5      648     707
CPU1: P1,6      710     719
CPU0: P7,2      715     717

average turn around time is= 444.286
Maximum turn around time is= 720
total simulation time is= 9.9111e-05 seconds
```

3)PSJF:

```
jaswika@Sona:/mnt/c/Users/jaswi/OneDrive/Desktop/lab3_os$ make run2 ALG="PSJF" FILE="process1.dat"
./part2 PSJF process1.dat
CPU0 and CPU1 simulation
CPU0: P5,1      5       7
CPU1: P6,1      6       10
CPU0: P5,2      10      12
CPU0: P5,3      15      17
CPU1: P4,1      15      24
CPU0: P4,2      27      86
CPU1: P3,1      27      96
CPU0: P4,3      89      118
CPU1: P3,2      99      168
CPU0: P4,4      122     191
CPU0: P4,5      194     203
CPU0: P4,6      206     215
CPU1: P3,3      206     245
CPU0: P2,1      216     295
CPU1: P3,4      249     318
CPU0: P3,5      321     340
CPU0: P3,6      343     352
CPU1: P2,2      343     422
CPU0: P1,1      353     452
CPU1: P2,3      425     474
CPU0: P1,2      455     544
CPU1: P2,4      478     547
CPU0: P2,5      550     589
CPU0: P2,6      592     601
CPU1: P1,3      592     671
CPU0: P1,4      675     744
CPU0: P1,5      747     806
CPU0: P1,6      809     818
CPU1: P7,1      809     1008
CPU0: P7,2      1011    1013

average turn around time is= 429
Maximum turn around time is= 1004
total simulation time is= 0.00134268 seconds
```

4)RR(with time quantum=50):



Comparison of avg tat for all the algorithms for FILE: process1.dat

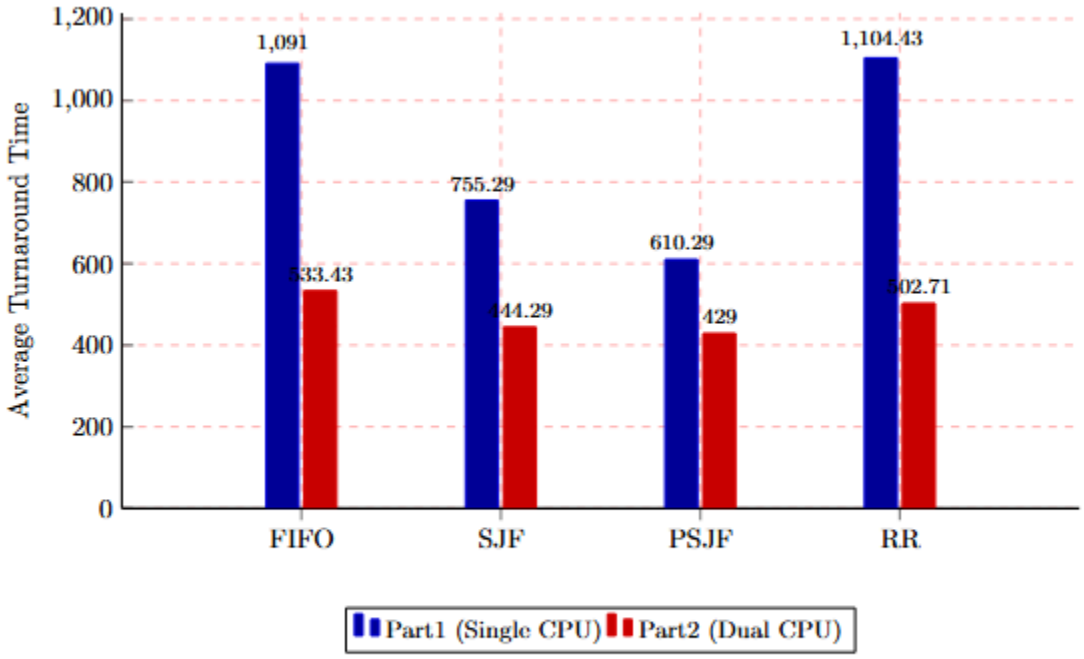


Figure 1: Average turnaround time comparison for different algorithms.

For RR,quantum=50

Dual CPU system consistently reduces both average and maximum turnaround times compared to single CPU.

Round Robin (RR) scheduling benefits the most from dual CPU, with a dramatic reduction in turnaround times.

PSJF scheduling is efficient in average turnaround time but may have some tasks with higher maximum turnaround in dual CPU.

FIFO scheduling is the least efficient among the algorithms tested.

Comparison of max tat for all the algorithms for FILE: process1.dat

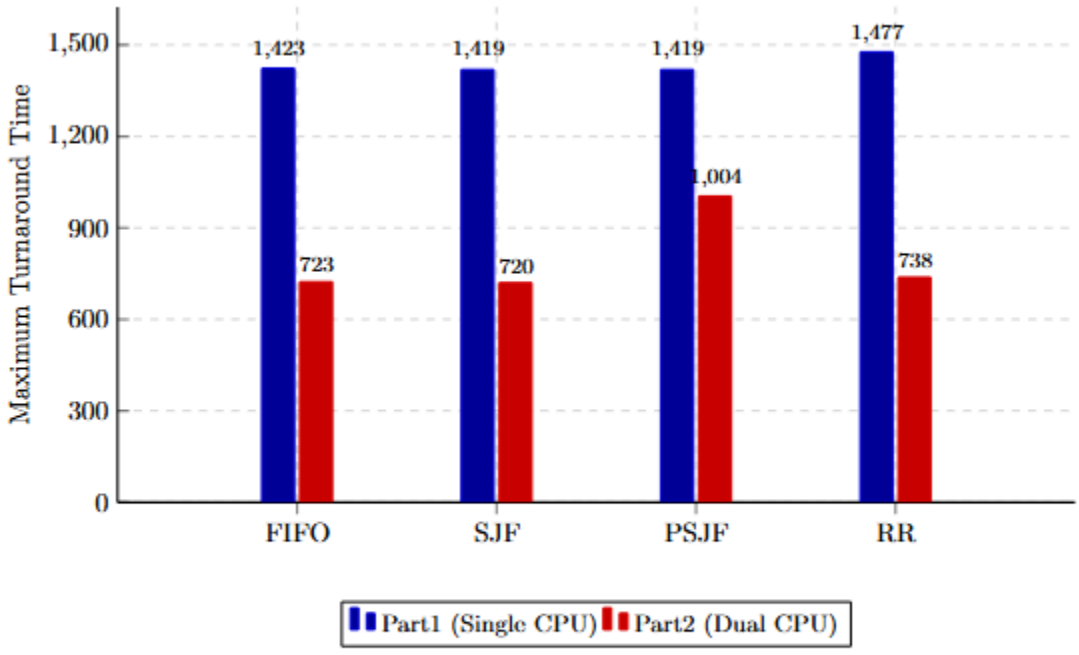


Figure 2: Maximum turnaround time comparison between algorithms.

For RR,quantum=50.

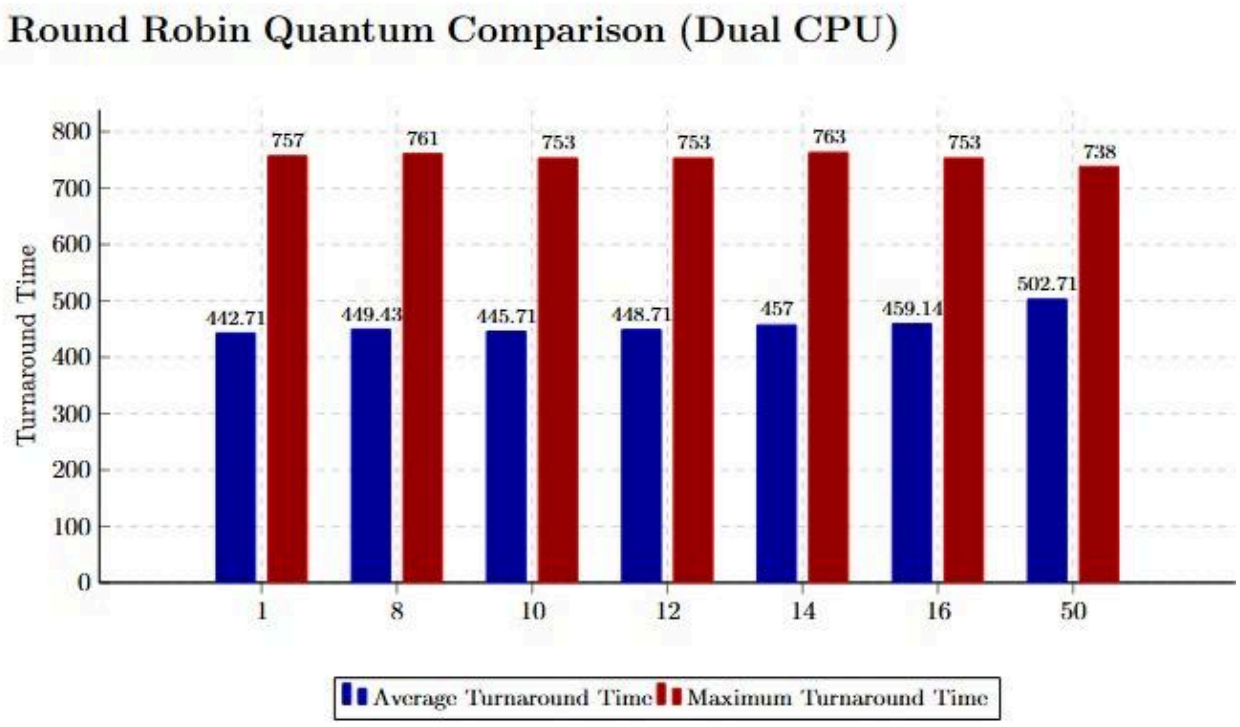


Figure 1: Comparison of Average and Maximum Turnaround Times for Round Robin Scheduling with Different Quantum Sizes (Dual CPU).

SUMMARY:

->Dual CPU reduces turnaround times (both average and maximum) for all algorithms.
->Round Robin (RR) benefits the most in dual CPU → huge drop in turnaround times.
->PSJF gives the best average turnaround time, but its max turnaround can be higher than FIFO/SJF.
->FIFO is consistently the least efficient scheduling method.
->SJF and FIFO show similar maximum turnaround times, with SJF slightly better

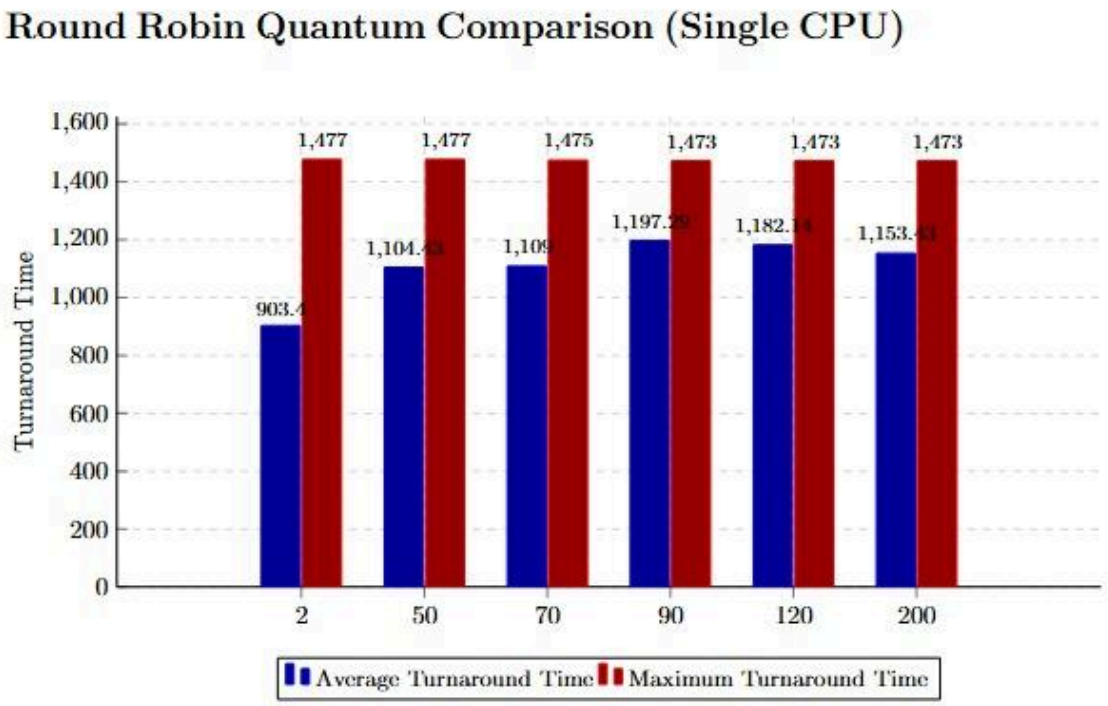


Figure 1: Comparison of Average and Maximum Turnaround Times for Round Robin Scheduling with Various Quantum Sizes (Single CPU).

SUMMARY:

->Average turnaround time tends to increase as quantum size increases from very small values, reaches a peak, and then stabilizes or slightly decreases for very large quantum sizes.

->Maximum turnaround time remains almost constant across quantum sizes, showing that worst-case scenarios are less influenced by the quantum size in this range.