

RR:

```
xv6...
Scheduling: Round Robin
cpu0: starting 0
sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58
init: starting sh
$ contrastTest
Process 0 PID 4 started
Process 1 PID 5 started
Process 2 PID 6 started
Process 3 PID 7 started
Process 4 PID 8 started
Process 5 PID 9 started
Process 6 PID 10 started
Process 7 PID 11 started
Process 8 PID 12 started
Process 9 PID 13 started
Process 10 PID 14 started
Process 11 PID 15 started
Process 12 PID 16 started
Process 13 PID 17 started
Process 14 PID 18 started
Process 15 PID 19 started
Process 16 PID 20 started
Process 17 PID 21 started
Process 18 PID 22 started
Process 19 PID 23 started
task2, pid : 9
Process: 5 Finished

ProcessID      Runnable(0/1)   task2, pid : 11
Process: 7 Finished

ProcessID      Runnable(0/1)   Ticks   ctime   etime   qtime   wtime   rtime   N_run
1              1              1        0        0        0        0        1       23
2              1              1        2        0        0        0        1       13
3              1              4       546        0        0        0        4       12
4              1              0       547        0        0        2        0       26
5              1              0       547        0        0        2        0       26
6              1              0       547        0        0        2        0       26
task2, pid : 8
Process: 4 Finished
PID: 8 | arrival_time: 547 | completion_time: 663 | first_run_time: 549 | rtime: 26
PID: 8 | Waiting: 90 | Turnaround: 116 | Response: 2
Average Waiting Time: 90
Average Turnaround Time: 116
Average Response Time: 2
Ticks   ctime   etime   qtime   wtime   rtime   N_run
1        1        0        0        0        0        1       23
2        1        2        0        0        0        1       13
```

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|---|---|---|-----------------|---|---|---|---|----|
| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 12 |
| 4 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 26 |
| 5 | 1 | 0 | task2, pid : 10 | | | | | |

Process: 6 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 4 | 546 | 0 | 0 | 1 | 4 | 12 |
| 4 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 28 |
| 5 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 28 |
| 7 | 1 | 0 | 547 | 0 | 0 | 2 | 0 | 26 |
| 8 | 1 | 26 | 547 | 0 | 0 | 2 | 26 | 26 |
| 9 | 1 | 26 | 547 | 0 | 0 | 1 | 26 | 26 |
| 10 | 1 | 25 | 550 | 0 | 0 | 0 | 25 | 25 |
| 11 | 1 | 24 | 550 | 0 | 0 | 0 | 24 | 25 |
| 12 | 1 | 2 | 555 | 0 | 0 | 2 | 2 | 23 |
| 13 | 1 | 2 | 555 | 0 | 0 | 2 | 2 | 23 |
| 14 | 1 | 3 | 555 | 0 | 0 | 2 | 3 | 23 |
| 15 | 1 | 2 | 555 | 0 | 0 | 2 | 2 | 22 |
| 547 | 0 | 0 | 0 | 26 | | | | |
| 6 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 26 |
| 7 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 26 |
| 8 | 1 | 26 | 547 | 0 | 0 | 0 | 26 | 26 |
| 9 | 1 | 25 | 547 | 0 | 0 | 0 | 25 | 26 |
| 10 | 1 | 24 | 550 | 0 | 0 | 2 | 24 | 24 |
| 11 | 1 | 24 | 550 | 0 | 0 | 1 | 24 | 24 |
| 12 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 23 |
| 13 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 23 |
| 6 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 28 |
| 7 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 28 |
| 8 | 1 | 26 | 547 | 663 | 0 | 0 | 26 | 28 |
| 9 | 1 | 27 | 547 | 0 | 0 | 0 | 27 | 28 |
| 10 | 1 | 25 | 550 | 0 | 0 | 0 | 25 | 27 |
| 11 | 1 | 26 | 550 | 0 | 0 | 1 | 26 | 26 |
| 12 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 25 |
| 13 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 25 |
| 14 | 1 | 3 | 55516 | | 1 | | 0 | 563 |
| | 0 | 2 | 0 | 22 | | | | |
| 17 | 1 | 0 | 563 | 0 | 0 | 2 | 0 | 22 |
| 18 | 1 | 0 | 563 | 0 | 0 | 2 | 0 | 22 |
| 19 | 1 | 0 | 563 | 0 | 0 | 2 | 0 | 21 |
| 20 | 1 | 0 | 572 | 0 | 0 | 2 | 0 | 21 |
| 21 | 1 | 0 | 572 | 0 | 0 | 2 | 0 | 21 |
| 22 | 1 | 0 | 572 | 0 | 0 | 2 | 0 | 21 |
| 23 | 1 | 0 | 572 | 0 | 0 | 2 | 0 | 21 |

PID: 11 | arrival_time: 550 | completion_time: 668 | first_run_time: 555 | rtime: 27

PID: 11 | Waiting: 91 | Turnaround: 118 | Response: 5

Average Waiting Time: 90

Average Turnaround Time: 117

Average Response Time: 3

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|----|---|---|-----|---|---|---|---|----|
| 14 | 1 | 3 | 555 | 0 | 0 | 0 | 3 | 23 |
|----|---|---|-----|---|---|---|---|----|

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|----|----|---|-----|----|---|---|---|----|
| 15 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 22 |
| 16 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 22 |
| 17 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 22 |
| 18 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 22 |
| 19 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 21 |
| 20 | 1 | 0 | 572 | 0 | 0 | 0 | 0 | 21 |
| 21 | 1 | 0 | 572 | | 0 | 0 | 0 | 3 |
| 25 | | | | | | | | |
| 15 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 24 |
| 16 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 24 |
| 17 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 24 |
| 18 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 24 |
| 19 | 1 | 0 | 563 | 0 | 0 | 0 | 0 | 23 |
| 20 | 1 | 0 | 572 | 0 | 0 | 0 | 0 | 23 |
| 21 | 1 | 0 | 572 | 0 | 0 | 0 | 0 | 23 |
| 22 | 1 | 0 | 572 | 0 | 0 | 0 | 0 | 23 |
| 23 | 10 | 0 | 0 | 21 | | | | |
| 22 | 1 | 0 | 572 | 0 | 0 | 0 | 0 | 21 |
| 23 | 1 | 0 | 572 | 0 | 0 | 0 | 0 | 21 |

PID: 9 | arrival_time: 547 | completion_time: 671 | first_run_time: 550 | rtime: 29

PID: 9 | Waiting: 95 | Turnaround: 124 | Response: 3

Average Waiting Time: 92

Average Turnaround Time: 119

Average Response Time: 3

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|---|-----|---|---|---|---|----|
| 0 | 572 | 0 | 0 | 0 | 0 | 23 |
|---|-----|---|---|---|---|----|

PID: 10 | arrival_time: 550 | completion_time: 671 | first_run_time: 554 | rtime: 28

PID: 10 | Waiting: 93 | Turnaround: 121 | Response: 4

Average Waiting Time: 92

Average Turnaround Time: 119

Average Response Time: 3

task1, pid : 4

Process: 0 Finished

PID: 4 | arrival_time: 547 | completion_time: 748 | first_run_time: 548 | rtime: 0

PID: 4 | Waiting: 94 | Turnaround: 201 | Response: 1

Average Waiting Time: 92

Average Turnaround Time: 136

Average Response Time: 3

task3, pid : 12

Process: 8 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-----------------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 16 |
| 5 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | task3, pid : 13 |

Process: 9 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 16 |
| 5 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 134 |

6 1 0 547 0 0 0 0 134

task3, pid : 14

Process: 10 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
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|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

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|---|---|---|---|---|---|---|---|----|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
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|---|---|---|---|---|---|---|---|----|
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
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| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 16 |
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|---|---|---|-----|---|---|---|---|-----|
| 5 | 1 | 0 | 547 | 0 | 0 | 1 | 0 | 134 |
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|---|---|---|-----|---|---|---|---|---|
| 6 | 1 | 0 | 547 | 0 | 0 | 1 | 0 | 0 |
|---|---|---|-----|---|---|---|---|---|

134

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| 6 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 134 |
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|---|---|---|-----|---|---|---|---|-----|
| 7 | 1 | 0 | 547 | 0 | 0 | 0 | 0 | 134 |
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| 12 | 1 | 3 | 555 | 0 | 0 | 0 | 3 | 131 |
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| 13 | 1 | 2 | 555 | 0 | 0 | 7 | 2 | 130 |
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|----|---|---|-----|---|---|---|---|-----|
| 14 | 1 | 3 | 555 | 0 | 0 | 7 | 3 | 130 |
|----|---|---|-----|---|---|---|---|-----|

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|----|---|---|-----|---|---|---|---|-----|
| 15 | 1 | 2 | 555 | 0 | 0 | 7 | 2 | 129 |
|----|---|---|-----|---|---|---|---|-----|

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| 16 | 1 | 2 | 563 | 0 | 0 | 7 | 2 | 129 |
|----|---|---|-----|---|---|---|---|-----|

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|----|---|---|-----|---|---|---|---|-----|
| 17 | 1 | 2 | 563 | 0 | 0 | 6 | 2 | 129 |
|----|---|---|-----|---|---|---|---|-----|

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| 18 | 1 | 7 | 1 | | 0 | 547 | 0 | 0 | 0 |
|----|---|---|---|--|---|-----|---|---|---|

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| 12 | 1 | 4 | 555 | 0 | 0 | 0 | 4 | 131 |
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| 13 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 131 |
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| 14 | 1 | 3 | 555 | 0 | 0 | 8 | 3 | 130 |
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| 15 | 1 | 2 | 555 | 0 | 0 | 8 | 2 | 129 |
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|----|---|---|-----|---|---|---|---|-----|
| 16 | 1 | 2 | 563 | 0 | 0 | 8 | 2 | 129 |
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| 17 | 1 | 2 | 563 | 0 | 0 | 7 | 2 | 129 |
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| 18 | 1 | 2 | 563 | 0 | 0 | 6 | 2 | 129 |
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|----|---|---|-----|---|---|---|---|-----|
| 19 | 1 | 1 | 563 | 0 | 0 | 5 | 1 | 128 |
|----|---|---|-----|---|---|---|---|-----|

134

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| 7 | 1 | 0 | 547 | 0 | 0 | 1 | 0 | 134 |
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| 12 | 1 | 4 | 555 | 0 | 0 | 1 | 4 | 131 |
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| 13 | 1 | 3 | 555 | 0 | 0 | 0 | 3 | 131 |
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| 14 | 1 | 3 | 555 | 0 | 0 | 0 | 3 | 131 |
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| 15 | 1 | 2 | 555 | 0 | 0 | 9 | 2 | 129 |
|----|---|---|-----|---|---|---|---|-----|

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| 16 | 1 | 2 | 563 | 0 | 0 | 9 | 2 | 129 |
|----|---|---|-----|---|---|---|---|-----|

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|----|---|---|-----|---|---|---|---|-----|
| 17 | 1 | 2 | 563 | 0 | 0 | 8 | 2 | 129 |
|----|---|---|-----|---|---|---|---|-----|

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|----|---|---|-----|---|---|---|---|-----|
| 18 | 1 | 2 | 563 | 0 | 0 | 7 | 2 | 129 |
|----|---|---|-----|---|---|---|---|-----|

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|----|---|---|-----|---|---|---|--|---|-----------------|
| 19 | 1 | 1 | 563 | 0 | 0 | 6 | | 1 | task3, pid : 15 |
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Process: 11 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

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|---|---|---|---|---|---|---|---|----|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
|---|---|---|---|---|---|---|---|----|

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| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
|---|---|---|---|---|---|---|---|----|

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| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 16 |
|---|---|---|-----|---|---|---|---|----|

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|---|---|---|-----|---|---|---|---|-----|
| 5 | 1 | 0 | 547 | 0 | 0 | 2 | 0 | 135 |
|---|---|---|-----|---|---|---|---|-----|

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|---|---|---|-----|---|---|---|---|---|--------|
| 6 | 1 | 0 | 547 | 0 | 0 | 2 | 0 | 1 | task4, |
|---|---|---|-----|---|---|---|---|---|--------|

pid : 16

Process: 12 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

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|---|---|---|---|---|---|---|---|----|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
|---|---|---|---|---|---|---|---|----|

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|---|---|---|-----|---|---|---|---|-----|
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 16 |
| 5 | 1 | 0 | 547 | 0 | 0 | 3 | 0 | 135 |
| 6 | 1 | 0 | 547 | 0 | 0 | 3 | 0 | 135 |

task4, pid : 17

Process: 13 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |

task4, pid : 18

Process: 14 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-----------------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 16 |
| 5 | 1 | 0 | 547 | 0 | 0 | 5 | 0 | 135 |
| 6 | 1 | 0 | 547 | 0 | 0 | 5 | 0 | task4, pid : 19 |

Process: 15 Finished

| ProcessID | Runnable(0/1) | Ticks | c | 2 | 563 | 0 | 0 | 5 | 2 |
|-----------|---------------|-------|-----|---|-----|---|-----|------|---|
| 129 | | | | | | | | | |
| 19 | 1 | 1 | 563 | 0 | 0 | 4 | 1 | 128 | |
| 20 | 1 | 1 | 572 | 0 | 0 | 3 | 1 | 128 | |
| 21 | 1 | 1 | 572 | 0 | 0 | 2 | 1 | 1220 | |
| 1 | 1 | 572 | 0 | 0 | 4 | 1 | 128 | | |
| 21 | 1 | 1 | 572 | 0 | 0 | 3 | 1 | 128 | |
| 22 | 1 | 1 | 572 | 0 | 0 | 2 | 1 | 128 | |
| 23 | 1 | 1 | 572 | 0 | 0 | 1 | 1 | 128 | |

PID: 13 | arrival_time: 555 | completion_time: 802 | first_run_time: 562 | rtime: 4

PID: 13 | Waiting: 115 | Turnaround: 247 | Response: 7

Average Waiting Time: 96

Average Turnaround Time: 154

Average Response Time: 3

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|-----|-----|---|-----|---|-----|---|---|------|---|
| 128 | | | | | | | | | |
| 20 | 1 | 1 | 572 | 0 | 0 | 5 | 1 | 128 | |
| 21 | 1 | 1 | 572 | 0 | 0 | 4 | 1 | 128 | |
| 22 | 1 | 1 | 572 | 0 | 0 | 3 | 1 | 1235 | |
| 7 | 1 | 0 | 547 | 0 | 0 | 2 | 0 | 135 | |
| 12 | 1 | 5 | 555 | 0 | 0 | 2 | 5 | 132 | |
| 13 | 1 | 4 | 555 | 0 | 0 | 1 | 4 | 132 | |
| 14 | 1 | 5 | 555 | 0 | 0 | 0 | 5 | 132 | |
| 15 | 1 | 2 | 555 | 0 | 0 | 0 | 2 | 131 | |
| 16 | 1 | 2 | 563 | 0 | 0 | 3 | 2 | 130 | |
| 17 | 1 | 7 | 1 | 0 | 547 | 0 | 0 | 0 | 3 |
| 0 | 135 | | | | | | | | |
| 12 | 1 | 5 | 555 | 0 | 0 | 3 | 5 | 132 | |
| 13 | 1 | 4 | 555 | 0 | 0 | 2 | 4 | 132 | |
| 14 | 1 | 5 | 555 | 0 | 0 | 1 | 5 | 132 | |
| 15 | 1 | 3 | 555 | 0 | 0 | 0 | 3 | 131 | |
| 16 | 1 | 2 | 563 | 0 | 0 | 0 | 2 | 131 | |

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|---|---|---|-----|---|---|----|---|-----|
| 17 | 1 | 3 | 563 | 0 | 0 | 9 | 3 | 130 |
| 18 | 1 | 2 | 563 | 0 | 0 | 4 | 2 | 130 |
| 19 | 1 | 2 | 563 | 0 | 0 | 8 | 2 | 129 |
| 8 | | | | | | | | |
| 22 | 1 | 1 | 572 | 0 | 0 | 1 | 1 | 128 |
| 23 | 1 | 1 | 572 | 0 | 0 | 0 | 1 | 128 |
| PID: 12 arrival_time: 555 completion_time: 805 first_run_time: 561 rtime: 6 | | | | | | | | |
| PID: 12 Waiting: 117 Turnaround: 250 Response: 6 | | | | | | | | |
| Average Waiting Time: 99 | | | | | | | | |
| Average Turnaround Time: 168 | | | | | | | | |
| Average Response Time: 4 | | | | | | | | |
| 8 | | | | | | | | |
| 23 | 1 | 1 | 572 | 0 | 0 | 2 | 1 | 128 |
| PID: 14 arrival_time: 555 completion_time: 805 first_run_time: 563 rtime: 6 | | | | | | | | |
| PID: 14 Waiting: 117 Turnaround: 250 Response: 8 | | | | | | | | |
| Average Waiting Time: 101 | | | | | | | | |
| Average Turnaround Time: 178 | | | | | | | | |
| Average Response Time: 4 | | | | | | | | |
| 20 | 1 | 2 | 572 | 0 | 0 | 7 | 2 | 129 |
| 21 | 1 | 2 | 572 | 0 | 0 | 6 | 2 | 129 |
| 22 | 1 | 2 | 572 | 0 | 0 | 5 | 2 | 129 |
| 23 | 1 | 2 | 572 | 0 | 0 | 4 | 2 | 129 |
| PID: 16 arrival_time: 563 completion_time: 806 first_run_time: 572 rtime: 4 | | | | | | | | |
| PID: 16 Waiting: 106 Turnaround: 243 Response: 9 | | | | | | | | |
| Average Waiting Time: 102 | | | | | | | | |
| Average Turnaround Time: 185 | | | | | | | | |
| Average Response Time: 5 | | | | | | | | |
| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 16 |
| 5 | 1 | 0 | 547 | 0 | 0 | 4 | 0 | 135 |
| 6 | 1 | 0 | 547 | 0 | 0 | 4 | 0 | 135 |
| 7 | 1 | 0 | 547 | 0 | 0 | 4 | 0 | 135 |
| 12 | 1 | 5 | 555 | 0 | 0 | 4 | 5 | 132 |
| 13 | 1 | 4 | 555 | 0 | 0 | 3 | 4 | 132 |
| 14 | 1 | 5 | 555 | 0 | 0 | 2 | 5 | 132 |
| 15 | 1 | 3 | 555 | 0 | 0 | 1 | 3 | 131 |
| 16 | 1 | 3 | 563 | 0 | 0 | 0 | 3 | 131 |
| 135 | | | | | | | | |
| 7 | 1 | 0 | 547 | 0 | 0 | 5 | 0 | 135 |
| 12 | 1 | 5 | 555 | 0 | 0 | 5 | 5 | 132 |
| 13 | 1 | 4 | 555 | 0 | 0 | 4 | 4 | 132 |
| 14 | 1 | 5 | 555 | 0 | 0 | 3 | 5 | 132 |
| 15 | 1 | 3 | 555 | 0 | 0 | 2 | 3 | 131 |
| 16 | 1 | 3 | 563 | 0 | 0 | 1 | 3 | 131 |
| 17 | 1 | 4 | 563 | 0 | 0 | 0 | 4 | 131 |
| 18 | 1 | 2 | 563 | 0 | 0 | 0 | 2 | 131 |
| 19 | 1 | 2 | 563 | 0 | 0 | 10 | 2 | 129 |
| 20 | 1 | 2 | 572 | 0 | 0 | 9 | 2 | 129 |
| 21 | 1 | 2 | 572 | 0 | 0 | 8 | 2 | 129 |
| 22 | 1 | 2 | 572 | 0 | 0 | 7 | 2 | 129 |
| 23 | 1 | 2 | 572 | 0 | 0 | 6 | 2 | 129 |
| PID: 18 arrival_time: 563 completion_time: 809 first_run_time: 572 rtime: 4 | | | | | | | | |
| PID: 18 Waiting: 110 Turnaround: 246 Response: 9 | | | | | | | | |

Average Waiting Time: 102

Average Turnaround Time: 191

Average Response Time: 5

| time | etime | qtime | wtime | rtime | N_run | | | | | | |
|------|-------|-------|-------|-------|-------|---|---|-----|---|-----|---|
| 1 | | 1 | | 1 | 0 | 0 | 0 | 0 | 1 | 23 | |
| 2 | | 1 | | 1 | 2 | | 3 | 563 | 0 | 0 | 8 |
| 3 | | 130 | | | | | | | | | |
| 18 | | 1 | | 2 | 563 | 0 | 0 | 3 | 2 | 130 | |
| 19 | | 1 | | 2 | 563 | 0 | 0 | 7 | 2 | 129 | |
| 20 | | 1 | | 2 | 572 | 0 | 0 | 6 | 2 | 129 | |
| 21 | | 1 | | 2 | 572 | 0 | 0 | 5 | 2 | 129 | |
| 22 | | 1 | | 2 | 572 | 0 | 0 | 4 | 2 | 129 | |
| 23 | | 1 | | 2 | 572 | 0 | 0 | 3 | 2 | 129 | |

PID: 15 | arrival_time: 555 | completion_time: 810 | first_run_time: 572 | rtime: 5

PID: 15 | Waiting: 117 | Turnaround: 255 | Response: 17

Average Waiting Time: 104

Average Turnaround Time: 197

Average Response Time: 6

| | | | | | | | | | | | |
|----|---|---|---|----|-----|---|---|----|---|-----|--|
| 0 | 0 | 0 | 1 | 13 | | | | | | | |
| 3 | | 1 | | 4 | 546 | 0 | 0 | 0 | 4 | 16 | |
| 5 | | 1 | | 0 | 547 | 0 | 0 | 6 | 0 | 135 | |
| 6 | | 1 | | 0 | 547 | 0 | 0 | 6 | 0 | 135 | |
| 7 | | 1 | | 0 | 547 | 0 | 0 | 6 | 0 | 135 | |
| 12 | | 1 | | 5 | 555 | 0 | 0 | 6 | 5 | 132 | |
| 13 | | 1 | | 4 | 555 | 0 | 0 | 5 | 4 | 132 | |
| 14 | | 1 | | 5 | 555 | 0 | 0 | 4 | 5 | 132 | |
| 15 | | 1 | | 3 | 555 | 0 | 0 | 3 | 3 | 131 | |
| 16 | | 1 | | 3 | 563 | 0 | 0 | 2 | 3 | 131 | |
| 17 | | 1 | | 4 | 563 | 0 | 0 | 1 | 4 | 131 | |
| 18 | | 1 | | 3 | 563 | 0 | 0 | 0 | 3 | 131 | |
| 19 | | 1 | | 2 | 563 | 0 | 0 | 0 | 2 | 130 | |
| 20 | | 1 | | 2 | 572 | 0 | 0 | 10 | 2 | 129 | |
| 21 | | 1 | | 2 | 572 | 0 | 0 | 9 | 2 | 129 | |
| 22 | | 1 | | 2 | 572 | 0 | 0 | 8 | 2 | 129 | |
| 23 | | 1 | | 2 | 572 | 0 | 0 | 7 | 2 | 129 | |

PID: 19 | arrival_time: 563 | completion_time: 812 | first_run_time: 578 | rtime: 5

PID: 19 | Waiting: 117 | Turnaround: 249 | Response: 15

Average Waiting Time: 105

Average Turnaround Time: 201

Average Response Time: 7

| | | | | | | | | | | | |
|----|--|---|--|---|-----|---|---|---|---|-----|--|
| 17 | | 1 | | 3 | 563 | 0 | 0 | 0 | 3 | 131 | |
| 18 | | 1 | | 2 | 563 | 0 | 0 | 5 | 2 | 130 | |
| 19 | | 1 | | 2 | 563 | 0 | 0 | 9 | 2 | 129 | |
| 20 | | 1 | | 2 | 572 | 0 | 0 | 8 | 2 | 129 | |
| 21 | | 1 | | 2 | 572 | 0 | 0 | 7 | 2 | 129 | |
| 22 | | 1 | | 2 | 572 | 0 | 0 | 6 | 2 | 129 | |
| 23 | | 1 | | 2 | 572 | 0 | 0 | 5 | 2 | 129 | |

PID: 17 | arrival_time: 563 | completion_time: 814 | first_run_time: 572 | rtime: 8

PID: 17 | Waiting: 116 | Turnaround: 251 | Response: 9

Average Waiting Time: 106

Average Turnaround Time: 205

Average Response Time: 7

task1, pid : 5

Process: 1 Finished

PID: 5 | arrival_time: 547 | completion_time: 948 | first_run_time: 548 | rtime: 0

PID: 5 | Waiting: 125 | Turnaround: 401 | Response: 1

Average Waiting Time: 107

Average Turnaround Time: 219

Average Response Time: 6

task1, pid : 6

Process: 2 Finished

PID: 6 | arrival_time: 547 | completion_time: 1148 | first_run_time: 548 | rtime: 0

PID: 6 | Waiting: 130 | Turnaround: 601 | Response: 1

Average Waiting Time: 108

Average Turnaround Time: 244

Average Response Time: 6

task1, pid : 7

Process: 3 Finished

PID: 7 | arrival_time: 547 | completion_time: 1348 | first_run_time: 548 | rtime: 0

PID: 7 | Waiting: 136 | Turnaround: 801 | Response: 1

Average Waiting Time: 110

Average Turnaround Time: 279

Average Response Time: 6

task5, pid : 20

Process: 16 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 4 | 546 | 0 | 0 | 0 | 4 | 25 |
| 20 | 1 | 17 | 572 | 0 | 0 | 0 | 17 | 1537 |
| 21 | 1 | 19 | 572 | 0 | 0 | 0 | 19 | 1536 |
| 22 | 1 | 21 | 572 | 0 | 0 | 0 | 21 | 1533 |
| 23 | 1 | 17 | 572 | 0 | 0 | 0 | 17 | 1530 |

PID: 20 | arrival_time: 572 | completion_time: 2258 | first_run_time: 578 | rtime: 18

PID: 20 | Waiting: 149 | Turnaround: 1686 | Response: 6

Average Waiting Time: 112

Average Turnaround Time: 362

Average Response Time: 6

task5, pid : 21

Process: 17 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 546 | 0 | 0 | 0 | 5 | 27 |
| 21 | 1 | 19 | 572 | 0 | 0 | 0 | 19 | 1735 |
| 22 | 1 | 21 | 572 | 0 | 0 | 0 | 21 | 1731 |
| 23 | 1 | 18 | 572 | 0 | 0 | 0 | 18 | 1728 |

PID: 21 | arrival_time: 572 | completion_time: 2465 | first_run_time: 578 | rtime: 22

PID: 21 | Waiting: 156 | Turnaround: 1893 | Response: 6

Average Waiting Time: 115

Average Turnaround Time: 447

Average Response Time: 6

22

Process: 18 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 546 | 0 | 0 | 0 | 5 | 28 |
| 22 | 1 | 25 | 572 | 0 | 0 | 0 | 25 | 1736 |
| 23 | 1 | 22 | 572 | 0 | 0 | 0 | 22 | 1732 |

PID: 22 | arrival_time: 572 | completion_time: 2469 | first_run_time: 578 | rtime: 27

PID: 22 | Waiting: 160 | Turnaround: 1897 | Response: 6

Average Waiting Time: 117

Average Turnaround Time: 523

Average Response Time: 6

task5, pid : 23

Process: 19 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 23 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 546 | 0 | 0 | 0 | 5 | 29 |
| 23 | 1 | 22 | 572 | 0 | 0 | 0 | 22 | 1933 |

PID: 23 | arrival_time: 572 | completion_time: 2669 | first_run_time: 578 | rtime: 23

PID: 23 | Waiting: 164 | Turnaround: 2097 | Response: 6

Average Waiting Time: 119

Average Turnaround Time: 602

Average Response Time: 6

FCFS:

xv6...

Scheduling: First Come First Serve

cpu0: starting 0

sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58

init: starting sh

\$ contrastTest

Process 0 PID 4 started

Process 1 PID 5 started

Process 2 PID 6 started

Process 3 PID 7 started

Process 4 PID 8 started

Process 5 PID 9 started

Process 6 PID 10 started

Process 7 PID 11 started

Process 8 PID 12 started

Process 9 PID 13 started

```

Process 10 PID 14 started
Process 11 PID 15 started
Process 12 PID 16 started
Process 13 PID 17 started
Process 14 PID 18 started
Process 15 PID 19 started
Process 16 PID 20 started
Process 17 PID 21 started
Process 18 PID 22 started
Process 19 PID 23 started
task2, pid : 8
Process: 4 Finished
PID: 8 | arrival_time: 664 | completion_time: 691 | first_run_time: 0 | rtime: 24
PID: 8 | Waiting: 3 | Turnaround: 27 | Response: 0
Average Waiting Time: 3
Average Turnaround Time: 27
Average Response Time: 0
task2, pid : 9
Process: 5 Finished

```

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 9 |
| 4 | 1 | 0 | 663 | 0 | 0 | 24 | 0 | 2 |
| 5 | 1 | 0 | 664 | 0 | 0 | 24 | 0 | 2 |
| 6 | 1 | 0 | 664 | 0 | 0 | 24 | 0 | 2 |
| 7 | 1 | 0 | 664 | 0 | 0 | 24 | 0 | 2 |
| 9 | 1 | 0 | 664 | 0 | 0 | 0 | 25 | 1 |
| 10 | 1 | 0 | 664 | 0 | 0 | 53 | 0 | 0 |
| 11 | 1 | 0 | 665 | 0 | 0 | 52 | 0 | 0 |
| 12 | 1 | 0 | 665 | 0 | 0 | 52 | 0 | 0 |
| 13 | 1 | 0 | 665 | 0 | 0 | 52 | 0 | 0 |
| 14 | 1 | 0 | 665 | 0 | 0 | 52 | 0 | 0 |
| 15 | 1 | 0 | 665 | 0 | 0 | 52 | 0 | 0 |
| 16 | 1 | 0 | 665 | 0 | 0 | 51 | 0 | 0 |
| 17 | 1 | 0 | 666 | 0 | 0 | 51 | 0 | 0 |
| 18 | 1 | 0 | 666 | 0 | 0 | 51 | 0 | 0 |
| 19 | 1 | 0 | 666 | 0 | 0 | 51 | 0 | 0 |
| 20 | 1 | 0 | 666 | 0 | 0 | 51 | 0 | 0 |
| 21 | 1 | 0 | 666 | 0 | 0 | 50 | 0 | 0 |
| 22 | 1 | 0 | 667 | 0 | 0 | 50 | 0 | 0 |
| 23 | 1 | 0 | 667 | 0 | 0 | 50 | 0 | 0 |

```

PID: 9 | arrival_time: 664 | completion_time: 721 | first_run_time: 0 | rtime: 29
PID: 9 | Waiting: 28 | Turnaround: 57 | Response: 0
Average Waiting Time: 15
Average Turnaround Time: 42
Average Response Time: 0
task2, pid : 10
Process: 6 Finished

```

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

| | | | | | | | | |
|----|---|---|-----|---|---|----|----|----|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 10 |
| 4 | 1 | 0 | 663 | 0 | 0 | 26 | 0 | 3 |
| 5 | 1 | 0 | 664 | 0 | 0 | 26 | 0 | 3 |
| 6 | 1 | 0 | 664 | 0 | 0 | 26 | 0 | 3 |
| 7 | 1 | 0 | 664 | 0 | 0 | 26 | 0 | 3 |
| 10 | 1 | 0 | 664 | 0 | 0 | 0 | 27 | 1 |
| 11 | 1 | 0 | 665 | 0 | 0 | 83 | 0 | 0 |
| 12 | 1 | 0 | 665 | 0 | 0 | 83 | 0 | 0 |
| 13 | 1 | 0 | 665 | 0 | 0 | 83 | 0 | 0 |
| 14 | 1 | 0 | 665 | 0 | 0 | 83 | 0 | 0 |
| 15 | 1 | 0 | 665 | 0 | 0 | 83 | 0 | 0 |
| 16 | 1 | 0 | 665 | 0 | 0 | 82 | 0 | 0 |
| 17 | 1 | 0 | 666 | 0 | 0 | 82 | 0 | 0 |
| 18 | 1 | 0 | 666 | 0 | 0 | 82 | 0 | 0 |
| 19 | 1 | 0 | 666 | 0 | 0 | 82 | 0 | 0 |
| 20 | 1 | 0 | 666 | 0 | 0 | 82 | 0 | 0 |
| 21 | 1 | 0 | 666 | 0 | 0 | 81 | 0 | 0 |
| 22 | 1 | 0 | 667 | 0 | 0 | 81 | 0 | 0 |
| 23 | 1 | 0 | 667 | 0 | 0 | 81 | 0 | 0 |

PID: 10 | arrival_time: 664 | completion_time: 751 | first_run_time: 0 | rtime: 30

PID: 10 | Waiting: 57 | Turnaround: 87 | Response: 0

Average Waiting Time: 29

Average Turnaround Time: 57

Average Response Time: 0

task2, pid : 11

Process: 7 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 11 |
| 4 | 1 | 0 | 663 | 0 | 0 | 23 | 0 | 4 |
| 5 | 1 | 0 | 664 | 0 | 0 | 23 | 0 | 4 |
| 6 | 1 | 0 | 664 | 0 | 0 | 23 | 0 | 4 |
| 7 | 1 | 0 | 664 | 0 | 0 | 23 | 0 | 4 |
| 11 | 1 | 0 | 665 | 0 | 0 | 0 | 24 | 1 |
| 12 | 1 | 0 | 665 | 0 | 0 | 111 | 0 | 0 |
| 13 | 1 | 0 | 665 | 0 | 0 | 111 | 0 | 0 |
| 14 | 1 | 0 | 665 | 0 | 0 | 111 | 0 | 0 |
| 15 | 1 | 0 | 665 | 0 | 0 | 111 | 0 | 0 |
| 16 | 1 | 0 | 665 | 0 | 0 | 110 | 0 | 0 |
| 17 | 1 | 0 | 666 | 0 | 0 | 110 | 0 | 0 |
| 18 | 1 | 0 | 666 | 0 | 0 | 110 | 0 | 0 |
| 19 | 1 | 0 | 666 | 0 | 0 | 110 | 0 | 0 |
| 20 | 1 | 0 | 666 | 0 | 0 | 110 | 0 | 0 |
| 21 | 1 | 0 | 666 | 0 | 0 | 109 | 0 | 0 |
| 22 | 1 | 0 | 667 | 0 | 0 | 109 | 0 | 0 |
| 23 | 1 | 0 | 667 | 0 | 0 | 109 | 0 | 0 |

PID: 11 | arrival_time: 665 | completion_time: 779 | first_run_time: 0 | rtime: 27

PID: 11 | Waiting: 87 | Turnaround: 114 | Response: 0

Average Waiting Time: 43

Average Turnaround Time: 71

Average Response Time: 0

task1, pid : 4

Process: 0 Finished

PID: 4 | arrival_time: 663 | completion_time: 867 | first_run_time: 667 | rtime: 0

PID: 4 | Waiting: 118 | Turnaround: 204 | Response: 4

Average Waiting Time: 58

Average Turnaround Time: 97

Average Response Time: 0

task3, pid : 12

Process: 8 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 13 |
| 5 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 202 |
| 6 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 202 |
| 7 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 202 |
| 12 | 1 | 3 | 665 | 0 | 0 | 0 | 3 | 197 |
| 13 | 1 | 2 | 665 | 0 | 0 | 0 | 2 | 195 |
| 14 | 1 | 3 | 665 | 0 | 0 | 0 | 3 | 194 |
| 15 | 1 | 2 | 665 | 0 | 0 | 0 | 2 | 193 |
| 16 | 1 | 0 | 665 | 0 | 0 | 0 | 0 | 193 |
| 17 | 1 | 0 | 666 | 0 | 0 | 0 | 0 | 193 |
| 18 | 1 | 0 | 666 | 0 | 0 | 0 | 0 | 193 |
| 19 | 1 | 0 | 666 | 0 | 0 | 0 | 0 | 193 |
| 20 | 1 | 0 | 666 | 0 | 0 | 0 | 0 | 193 |
| 21 | 1 | 0 | 666 | 0 | 0 | 0 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 0 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 0 | 0 | 193 |

PID: 12 | arrival_time: 665 | completion_time: 984 | first_run_time: 782 | rtime: 5

PID: 12 | Waiting: 118 | Turnaround: 319 | Response: 117

Average Waiting Time: 68

Average Turnaround Time: 134

Average Response Time: 20

task3, pid : 13

Process: 9 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 14 |
| 5 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 203 |
| 6 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 203 |
| 7 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 203 |
| 13 | 1 | 2 | 665 | 0 | 0 | 0 | 2 | 196 |
| 14 | 1 | 3 | 665 | 0 | 0 | 3 | 3 | 194 |
| 15 | 1 | 2 | 665 | 0 | 0 | 3 | 2 | 193 |
| 16 | 1 | 0 | 665 | 0 | 0 | 3 | 0 | 193 |
| 17 | 1 | 0 | 666 | 0 | 0 | 3 | 0 | 193 |

| | | | | | | | | |
|----|---|---|-----|---|---|---|---|-----|
| 18 | 1 | 0 | 666 | 0 | 0 | 3 | 0 | 193 |
| 19 | 1 | 0 | 666 | 0 | 0 | 3 | 0 | 193 |
| 20 | 1 | 0 | 666 | 0 | 0 | 3 | 0 | 193 |
| 21 | 1 | 0 | 666 | 0 | 0 | 3 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 3 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 3 | 0 | 193 |

PID: 13 | arrival_time: 665 | completion_time: 987 | first_run_time: 784 | rtime: 4

PID: 13 | Waiting: 123 | Turnaround: 322 | Response: 119

Average Waiting Time: 76

Average Turnaround Time: 161

Average Response Time: 34

task3, pid : 14

Process: 10 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 15 |
| 5 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 204 |
| 6 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 204 |
| 7 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 204 |
| 14 | 1 | 3 | 665 | 0 | 0 | 0 | 3 | 195 |
| 15 | 1 | 2 | 665 | 0 | 0 | 6 | 2 | 193 |
| 16 | 1 | 0 | 665 | 0 | 0 | 6 | 0 | 193 |
| 17 | 1 | 0 | 666 | 0 | 0 | 6 | 0 | 193 |
| 18 | 1 | 0 | 666 | 0 | 0 | 6 | 0 | 193 |
| 19 | 1 | 0 | 666 | 0 | 0 | 6 | 0 | 193 |
| 20 | 1 | 0 | 666 | 0 | 0 | 6 | 0 | 193 |
| 21 | 1 | 0 | 666 | 0 | 0 | 6 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 6 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 6 | 0 | 193 |

PID: 14 | arrival_time: 665 | completion_time: 990 | first_run_time: 787 | rtime: 5

PID: 14 | Waiting: 126 | Turnaround: 325 | Response: 122

Average Waiting Time: 82

Average Turnaround Time: 181

Average Response Time: 45

task3, pid : 15

Process: 11 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 16 |
| 5 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 205 |
| 6 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 205 |
| 7 | 1 | 0 | 664 | 0 | 0 | 0 | 0 | 205 |
| 15 | 1 | 2 | 665 | 0 | 0 | 0 | 2 | 194 |
| 16 | 1 | 0 | 665 | 0 | 0 | 9 | 0 | 193 |
| 17 | 1 | 0 | 666 | 0 | 0 | 9 | 0 | 193 |
| 18 | 1 | 0 | 666 | 0 | 0 | 9 | 0 | 193 |
| 19 | 1 | 0 | 666 | 0 | 0 | 9 | 0 | 193 |
| 20 | 1 | 0 | 666 | 0 | 0 | 9 | 0 | 193 |

| | | | | | | | | |
|----|---|---|-----|---|---|---|---|-----|
| 21 | 1 | 0 | 666 | 0 | 0 | 9 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 9 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 9 | 0 | 193 |

PID: 15 | arrival_time: 665 | completion_time: 993 | first_run_time: 789 | rtime: 4

PID: 15 | Waiting: 131 | Turnaround: 328 | Response: 124

Average Waiting Time: 87

Average Turnaround Time: 198

Average Response Time: 54

task4, pid : 16

Process: 12 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 17 |
| 5 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 206 |
| 6 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 206 |
| 7 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 206 |
| 16 | 1 | 0 | 665 | 0 | 0 | 0 | 3 | 194 |
| 17 | 1 | 0 | 666 | 0 | 0 | 14 | 0 | 193 |
| 18 | 1 | 0 | 666 | 0 | 0 | 14 | 0 | 193 |
| 19 | 1 | 0 | 666 | 0 | 0 | 14 | 0 | 193 |
| 20 | 1 | 0 | 666 | 0 | 0 | 14 | 0 | 193 |
| 21 | 1 | 0 | 666 | 0 | 0 | 14 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 14 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 14 | 0 | 193 |

PID: 16 | arrival_time: 665 | completion_time: 998 | first_run_time: 789 | rtime: 5

PID: 16 | Waiting: 135 | Turnaround: 333 | Response: 124

Average Waiting Time: 92

Average Turnaround Time: 211

Average Response Time: 61

task4, pid : 17

Process: 13 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 18 |
| 5 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 207 |
| 6 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 207 |
| 7 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 207 |
| 17 | 1 | 0 | 666 | 0 | 0 | 0 | 3 | 194 |
| 18 | 1 | 0 | 666 | 0 | 0 | 19 | 0 | 193 |
| 19 | 1 | 0 | 666 | 0 | 0 | 19 | 0 | 193 |
| 20 | 1 | 0 | 666 | 0 | 0 | 19 | 0 | 193 |
| 21 | 1 | 0 | 666 | 0 | 0 | 19 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 19 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 19 | 0 | 193 |

PID: 17 | arrival_time: 666 | completion_time: 1003 | first_run_time: 789 | rtime: 5

PID: 17 | Waiting: 139 | Turnaround: 337 | Response: 123

Average Waiting Time: 96

Average Turnaround Time: 223

Average Response Time: 66

task4, pid : 18

Process: 14 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 19 |
| 5 | 1 | 0 | 664 | 0 | 0 | 1 | 0 | 208 |
| 6 | 1 | 0 | 664 | 0 | 0 | 1 | 0 | 208 |
| 7 | 1 | 0 | 664 | 0 | 0 | 1 | 0 | 208 |
| 18 | 1 | 0 | 666 | 0 | 0 | 0 | 2 | 194 |
| 19 | 1 | 0 | 666 | 0 | 0 | 24 | 0 | 193 |
| 20 | 1 | 0 | 666 | 0 | 0 | 24 | 0 | 193 |
| 21 | 1 | 0 | 666 | 0 | 0 | 24 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 24 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 24 | 0 | 193 |

PID: 18 | arrival_time: 666 | completion_time: 1008 | first_run_time: 789 | rtime: 4

PID: 18 | Waiting: 145 | Turnaround: 342 | Response: 123

Average Waiting Time: 100

Average Turnaround Time: 232

Average Response Time: 71

task4, pid : 19

Process: 15 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 20 |
| 5 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 209 |
| 6 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 209 |
| 7 | 1 | 0 | 664 | 0 | 0 | 2 | 0 | 209 |
| 19 | 1 | 0 | 666 | 0 | 0 | 0 | 3 | 194 |
| 20 | 1 | 0 | 666 | 0 | 0 | 29 | 0 | 193 |
| 21 | 1 | 0 | 666 | 0 | 0 | 29 | 0 | 193 |
| 22 | 1 | 0 | 667 | 0 | 0 | 29 | 0 | 193 |
| 23 | 1 | 0 | 667 | 0 | 0 | 29 | 0 | 193 |

PID: 19 | arrival_time: 666 | completion_time: 1013 | first_run_time: 789 | rtime: 5

PID: 19 | Waiting: 149 | Turnaround: 347 | Response: 123

Average Waiting Time: 104

Average Turnaround Time: 241

Average Response Time: 75

task1, pid : 5

Process: 1 Finished

PID: 5 | arrival_time: 664 | completion_time: 1067 | first_run_time: 667 | rtime: 0

PID: 5 | Waiting: 146 | Turnaround: 403 | Response: 3

Average Waiting Time: 107

Average Turnaround Time: 253

Average Response Time: 70

task1, pid : 6

Process: 2 Finished

PID: 6 | arrival_time: 664 | completion_time: 1267 | first_run_time: 667 | rtime: 0

PID: 6 | Waiting: 150 | Turnaround: 603 | Response: 3

Average Waiting Time: 110

Average Turnaround Time: 276

Average Response Time: 65

task1, pid : 7

Process: 3 Finished

PID: 7 | arrival_time: 664 | completion_time: 1467 | first_run_time: 667 | rtime: 0

PID: 7 | Waiting: 155 | Turnaround: 803 | Response: 3

Average Waiting Time: 113

Average Turnaround Time: 309

Average Response Time: 61

task5, pid : 20

Process: 16 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 24 |
| 20 | 1 | 14 | 666 | 0 | 0 | 0 | 16 | 1569 |
| 21 | 1 | 15 | 666 | 0 | 0 | 2 | 15 | 1561 |
| 22 | 1 | 15 | 667 | 0 | 0 | 2 | 15 | 1554 |
| 23 | 1 | 16 | 667 | 0 | 0 | 2 | 16 | 1547 |

PID: 20 | arrival_time: 666 | completion_time: 2431 | first_run_time: 789 | rtime: 18

PID: 20 | Waiting: 179 | Turnaround: 1765 | Response: 123

Average Waiting Time: 117

Average Turnaround Time: 395

Average Response Time: 65

task5, pid : 21

Process: 17 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 25 |
| 21 | 1 | 17 | 666 | 0 | 0 | 0 | 17 | 1758 |
| 22 | 1 | 18 | 667 | 0 | 0 | 0 | 18 | 1749 |
| 23 | 1 | 19 | 667 | 0 | 0 | 0 | 19 | 1741 |

PID: 21 | arrival_time: 666 | completion_time: 2634 | first_run_time: 789 | rtime: 18

PID: 21 | Waiting: 193 | Turnaround: 1968 | Response: 123

Average Waiting Time: 121

Average Turnaround Time: 482

Average Response Time: 68

task5, pid : 22

Process: 18 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 26 |
| 22 | 1 | 18 | 667 | 0 | 0 | 0 | 20 | 1752 |
| 23 | 1 | 19 | 667 | 0 | 0 | 2 | 19 | 1743 |

PID: 22 | arrival_time: 667 | completion_time: 2639 | first_run_time: 789 | rtime: 21


```
PID: 22 | Waiting: 200 | Turnaround: 1972 | Response: 122
Average Waiting Time: 125
Average Turnaround Time: 560
Average Response Time: 71
task5, pid : 23
Process: 19 Finished
```

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 |
| 3 | 1 | 4 | 663 | 0 | 0 | 0 | 4 | 27 |
| 23 | 1 | 21 | 667 | 0 | 0 | 0 | 21 | 1944 |

```
PID: 23 | arrival_time: 667 | completion_time: 2843 | first_run_time: 789 | rtime: 22
PID: 23 | Waiting: 211 | Turnaround: 2176 | Response: 122
Average Waiting Time: 129
Average Turnaround Time: 641
Average Response Time: 73
Average Waiting Time: 129
Average Turnaround Time: 641
Average Response Time: 73
```

PBS:

```
xv6...
Scheduling: Priority Based Scheduling
cpu0: starting 0
sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58
init: starting sh
$ contrastTest
Process 0 PID 4 started
Process 1 PID 5 started
Process 2 PID 6 started
Process 3 PID 7 started
Process 4 PID 8 started
Process 5 PID 9 started
Process 6 PID 10 started
Process 7 PID 11 started
Process 8 PID 12 started
Process 9 PID 13 started
Process 10 PID 14 started
Process 11 PID 15 started
Process 12 PID 16 started
Process 13 PID 17 started
Process 14 PID 18 started
Process 15 PID 19 started
Process 16 PID 20 started
Process 17 PID 21 started
Process 18 PID 22 started
```

Process 19 PID 23 started

Process: 4 Finished

PID: 8 | arrival_time: 305 | completion_time: 385 | first_run_time: 322 | rtime: 25

PID: 8 | Waiting: 55 | Turnaround: 80 | Response: 17

Average Waiting Time: 55

Average Turnaround Time: 80

Average Response Time: 17

Process: 5 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|---------------------|-------|-------|-------|-------|-------|
| Priority | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 386 | 11 | 4 | 9 |
| 60 | | | | | | | | |
| 4 | 1 | 0 | 304 | 0 | 386 | 21 | 0 | 2 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 11 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 11 |
| 58 | | | | | | | | |
| 7 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 11 |
| 57 | | | | | | | | |
| 8 | 1 | 25 | 305 | 385 | 0 | 0 | 25 | 2 |
| 60 | | | | | | | | |
| 9 | 1 | 14 | 305 | 0 | 337 | 0 | 25 | 2 |
| 60 | | | | | | | | |
| 10 | 1 | 14 | 305 | 0 | 351 | 46 | 14 | 1 |
| 60 | | | | | | | | |
| 11 | 1 | 14 | 305 | 0 | 365 | 32 | 14 | 1 |
| 60 | | | | | | | | |
| 12 | 1 | 2 | 305 | 0 | 370 | 29 | 2 | 1 |
| 60 | | | | | | | | |
| 13 | 1 | 3 | Process: 6 Finished | | | | | |

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 386 | 25 | 4 | 9 |
| 60 | | | | | | | | |
| 4 | 1 | 0 | 304 | 0 | 386 | 35 | 0 | 2 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 12 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 12 |
| 58 | | | | | | | | |

| | | | | | | | | |
|-----------|---------------|-------|-------|-------|------------------------|-------|-------|-------|
| 7 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 12 |
| 57 | | | | | | | | |
| 8 | 1 | 25 | 305 | 385 | 0 | 0 | 25 | 2 |
| 60 | | | | | | | | |
| 9 | 1 | 28 | 305 | 0 | 400 | 11 | 28 | 2 |
| 60 | | | | | | | | |
| 10 | 1 | 14 | 305 | 0 | 351 | 0 | 25 | 2 |
| 60 | | | | | | | | |
| 11 | 1 | 14 | 305 | 0 | 365 | 46 | 14 | 1 |
| 60 | | | | | | | | |
| 12 | 1 | 2 | 305 | 0 | 370 | 43 | 2 | 1 |
| 60 | | | | | | | | |
| 13 | 1 | 3 | 306 | 0 | 372 | 40 | 3 | 1 |
| 64 | | | | | | | | |
| 14 | 1 | 2 | 306 | 0 | 375 | 38 | 2 | 1 |
| 60 | | | | | | | | |
| 15 | 1 | 3 | 306 | 0 | 386 | 35 | 3 | 1 |
| 60 | | | | | | | | |
| 16 | 1 | 0 | 306 | 0 | 386 | 35 | 0 | 1 |
| 60 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 386 | 35 | 0 | 1 |
| 69 | | | | | | | | |
| 18 | 1 | 0 | 306 | 0 | 386Process: 7 Finished | | | |
| | | | | | | | | |
| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
| Priority | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 386 | 39 | 4 | 9 |
| 60 | | | | | | | | |
| 4 | 1 | 0 | 304 | 0 | 386 | 49 | 0 | 2 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 13 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 13 |
| 58 | | | | | | | | |
| 7 | 1 | 0 | 304 | 0 | 0 | 10 | 0 | 13 |
| 57 | | | | | | | | |
| 8 | 1 | 25 | 305 | 385 | 0 | 0 | 25 | 2 |
| 60 | | | | | | | | |
| 9 | 1 | 28 | 305 | 0 | 400 | 25 | 28 | 2 |
| 60 | | | | | | | | |
| 10 | 1 | 28 | 305 | 0 | 414 | 11 | 28 | 2 |
| 60 | | | | | | | | |
| 11 | 1 | 14 | 305 | 0 | 365 | 0 | 25 | 2 |
| 60 | | | | | | | | |
| 12 | 1 | 2 | 305 | 0 | 370 | 57 | 2 | 1 |
| 60 | | | | | | | | |
| 13 | 1 | 3 | 306 | 0 | 372 | 54 | 3 | 1 |
| 64 | | | | | | | | |

| | | | | | | | | |
|----|---|---|-----|---|-----|----|---|---|
| 14 | 1 | 2 | 306 | 0 | 375 | 52 | 2 | 1 |
| 60 | | | | | | | | |
| 15 | 1 | 3 | 306 | 0 | 386 | 49 | 3 | 1 |
| 60 | | | | | | | | |
| 16 | 1 | 0 | 306 | 0 | 386 | 49 | 0 | 1 |
| 60 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 386 | 49 | 0 | 1 |
| 69 | | | | | | | | |
| 18 | 1 | 0 | 306 | 0 | 386 | 49 | 0 | 1 |
| 60 | | | | | | | | |
| 19 | 1 | 0 | 307 | 0 | 386 | 49 | 0 | 1 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 386 | 49 | 0 | 1 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 386 | 49 | 0 | 1 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 386 | 49 | 0 | 1 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 386 | 49 | 0 | 1 |
| 98 | | | | | | | | |

PID: 11 | arrival_time: 305 | completion_time: 428 | first_run_time: 364 | rtime: 29

PID: 11 | Waiting: 94 | Turnaround: 123 | Response: 59

Average Waiting Time: 74

Average Turnaround Time: 101

Average Response Time: 38

| | | | | | | | | | |
|-----|---|-----|----|---|-----|----|-----|----|---|
| 306 | 0 | 372 | 26 | 3 | 1 | 64 | | | |
| 14 | 1 | | | 2 | 306 | 0 | 375 | 24 | 2 |
| 60 | | | | | | | | | |
| 15 | 1 | | | 3 | 306 | 0 | 386 | 21 | 3 |
| 60 | | | | | | | | | |
| 16 | 1 | | | 0 | 306 | 0 | 386 | 21 | 0 |
| 60 | | | | | | | | | |
| 17 | 1 | | | 0 | 306 | 0 | 386 | 21 | 0 |
| 69 | | | | | | | | | |
| 18 | 1 | | | 0 | 306 | 0 | 386 | 21 | 0 |
| 60 | | | | | | | | | |
| 19 | 1 | | | 0 | 307 | 0 | 386 | 21 | 0 |
| 60 | | | | | | | | | |
| 20 | 1 | | | 0 | 307 | 0 | 386 | 21 | 0 |
| 60 | | | | | | | | | |
| 21 | 1 | | | 0 | 307 | 0 | 386 | 21 | 0 |
| 74 | | | | | | | | | |
| 22 | 1 | | | 0 | 307 | 0 | 386 | 21 | 0 |
| 97 | | | | | | | | | |
| 23 | 1 | | | 0 | 307 | 0 | 386 | 21 | 0 |
| 98 | | | | | | | | | |

PID: 9 | arrival_time: 305 | completion_time: 431 | first_run_time: 336 | rtime: 30

PID: 9 | Waiting: 96 | Turnaround: 126 | Response: 31

Average Waiting Time: 81

Average Turnaround Time: 109

Average Response Time: 35

| | | | |
|----|---|---|----|
| 35 | 0 | 1 | 60 |
|----|---|---|----|

| | | | | | | | | |
|----|---|---|-----|---|-----|----|---|---|
| 19 | 1 | 0 | 307 | 0 | 386 | 35 | 0 | 1 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 386 | 35 | 0 | 1 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 386 | 35 | 0 | 1 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 386 | 35 | 0 | 1 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 386 | 35 | 0 | 1 |
| 98 | | | | | | | | |

```
PID: 10 | arrival_time: 305 | completion_time: 432 | first_run_time: 350 | rtime: 29
```

PID: 10 | Waiting: 98 | Turnaround: 127 | Response: 45

Average Waiting Time: 85

Average Turnaround Time: 114

Average Response Time: 38

```
Process: 0 Finished
```

```
PID: 4 | arrival_time: 304 | completion_time: 508 | first_run_time: 308 | rtime: 0
```

```
PID: 4 | Waiting: 124 | Turnaround: 204 | Response: 4
```

Average Waiting Time: 93

Average Turnaround Time: 132

Average Response Time: 31

```
Process: 8 Finished
```

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 60 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 2 60 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 3 60 | 1 | 4 | 303 | 0 | 0 | 0 | 4 | 13 |
| 5 59 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 151 |
| 6 58 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 151 |
| 7 57 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 151 |
| 12 60 | 1 | 2 | 305 | 0 | 567 | 0 | 2 | 137 |
| 13 64 | 1 | 3 | 306 | 0 | 567 | 0 | 3 | 136 |
| 14 60 | 1 | 2 | 306 | 0 | 567 | 0 | 2 | 136 |
| 15 60 | 1 | 3 | 306 | 0 | 567 | 0 | 3 | 136 |
| 16 60 | 1 | 0 | 306 | 0 | 567 | 0 | 0 | 136 |
| 17 69 | 1 | 0 | 306 | 0 | 567 | 0 | 0 | 136 |
| 18 60 | 1 | 0 | 306 | 0 | 567 | 0 | 0 | 136 |

| | | | | | | | | |
|----|---|---|-----|---|-----|---|---|-----|
| 19 | 1 | 0 | 307 | 0 | 567 | 0 | 0 | 136 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 567 | 0 | 0 | 136 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 567 | 0 | 0 | 136 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 567 | 0 | 0 | 136 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 567 | 0 | 0 | 136 |
| 98 | | | | | | | | |

PID: 12 | arrival_time: 305 | completion_time: 569 | first_run_time: 366 | rtime: 5

PID: 12 | Waiting: 123 | Turnaround: 264 | Response: 61

Average Waiting Time: 98

Average Turnaround Time: 154

Average Response Time: 36

Process: 9 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 0 | 0 | 4 | 14 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 152 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 152 |
| 58 | | | | | | | | |
| 7 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 152 |
| 57 | | | | | | | | |
| 13 | 1 | 3 | 306 | 0 | 567 | 0 | 3 | 137 |
| 64 | | | | | | | | |
| 14 | 1 | 2 | 306 | 0 | 0 | 0 | 2 | 137 |
| 60 | | | | | | | | |
| 15 | 1 | 3 | 306 | 0 | 0 | 0 | 3 | 137 |
| 60 | | | | | | | | |
| 16 | 1 | 0 | 306 | 0 | 0 | 0 | 0 | 137 |
| 60 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 567 | 3 | 0 | 136 |
| 69 | | | | | | | | |
| 18 | 1 | 0 | 306 | 0 | 0 | 0 | 0 | 137 |
| 60 | | | | | | | | |
| 19 | 1 | 0 | 307 | 0 | 0 | 0 | 0 | 137 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 0 | 0 | 0 | 137 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 567 | 3 | 0 | 136 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 567 | 3 | 0 | 136 |
| 97 | | | | | | | | |

```

23          1          0          307          0          567          3          0          136
98
PID: 13 | arrival_time: 306 | completion_time: 572 | first_run_time: 369 | rtime: 6
PID: 13 | Waiting: 125 | Turnaround: 266 | Response: 63
Average Waiting Time: 102
Average Turnaround Time: 170
Average Response Time: 40
Process: 10 Finished

```

| ProcessID Priority | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 0 | 0 | 4 | 15 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 153 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 153 |
| 58 | | | | | | | | |
| 7 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 153 |
| 57 | | | | | | | | |
| 14 | 1 | 2 | 306 | 0 | 573 | 0 | 2 | 138 |
| 60 | | | | | | | | |
| 15 | 1 | 3 | 306 | 0 | 573 | 2 | 3 | 137 |
| 60 | | | | | | | | |
| 16 | 1 | 0 | 306 | 0 | 573 | 2 | 0 | 137 |
| 60 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 567 | 6 | 0 | 136 |
| 69 | | | | | | | | |
| 18 | 1 | 0 | 306 | 0 | 573 | 2 | 0 | 137 |
| 60 | | | | | | | | |
| 19 | 1 | 0 | 307 | 0 | 573 | 2 | 0 | 137 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 573 | 2 | 0 | 137 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 567 | 6 | 0 | 136 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 567 | 6 | 0 | 136 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 567 | 6 | 0 | 136 |
| 98 | | | | | | | | |

```

PID: 14 | arrival_time: 306 | completion_time: 575 | first_run_time: 371 | rtime: 5
PID: 14 | Waiting: 127 | Turnaround: 269 | Response: 65
Average Waiting Time: 105
Average Turnaround Time: 182
Average Response Time: 43
Process: 11 Finished

```

| ProcessID Priority | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------------------|---------------|-------|-------|-------|-------|-------|-------|-------|

| | | | | | | | | |
|----|---|---|-----|-----|-----|---|---|-----|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 576 | 0 | 4 | 15 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 154 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 154 |
| 58 | | | | | | | | |
| 7 | 1 | 0 | 304 | 0 | 0 | 0 | 0 | 154 |
| 57 | | | | | | | | |
| 14 | 1 | 5 | 306 | 575 | 0 | 0 | 5 | 138 |
| 60 | | | | | | | | |
| 15 | 1 | 3 | 306 | 0 | 573 | 0 | 3 | 138 |
| 60 | | | | | | | | |
| 16 | 1 | 0 | 306 | 0 | 573 | 5 | 0 | 137 |
| 60 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 567 | 9 | 0 | 136 |
| 69 | | | | | | | | |
| 18 | 1 | 0 | 306 | 0 | 573 | 5 | 0 | 137 |
| 60 | | | | | | | | |
| 19 | 1 | 0 | 307 | 0 | 573 | 5 | 0 | 137 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 573 | 5 | 0 | 137 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 567 | 9 | 0 | 136 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 567 | 9 | 0 | 136 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 567 | 9 | 0 | 136 |
| 98 | | | | | | | | |

PID: 15 | arrival_time: 306 | completion_time: 578 | first_run_time: 374 | rtime: 6

PID: 15 | Waiting: 129 | Turnaround: 272 | Response: 68

Average Waiting Time: 107

Average Turnaround Time: 192

Average Response Time: 45

Process: 12 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 576 | 5 | 4 | 15 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 1 | 0 | 155 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 1 | 0 | 155 |
| 58 | | | | | | | | |

| | | | | | | | | |
|----|---|---|-----|-----|-----|----|---|-----|
| 7 | 1 | 0 | 304 | 0 | 0 | 1 | 0 | 155 |
| 57 | | | | | | | | |
| 14 | 1 | 5 | 306 | 575 | 0 | 0 | 5 | 138 |
| 60 | | | | | | | | |
| 15 | 1 | 6 | 306 | 578 | 0 | 0 | 6 | 138 |
| 60 | | | | | | | | |
| 16 | 1 | 0 | 306 | 0 | 573 | 0 | 2 | 138 |
| 60 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 567 | 14 | 0 | 136 |
| 69 | | | | | | | | |
| 18 | 1 | 0 | 306 | 0 | 573 | 10 | 0 | 137 |
| 60 | | | | | | | | |
| 19 | 1 | 0 | 307 | 0 | 573 | 10 | 0 | 137 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 573 | 10 | 0 | 137 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 567 | 14 | 0 | 136 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 567 | 14 | 0 | 136 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 567 | 14 | 0 | 136 |
| 98 | | | | | | | | |

PID: 16 | arrival_time: 306 | completion_time: 583 | first_run_time: 374 | rtime: 5

PID: 16 | Waiting: 135 | Turnaround: 277 | Response: 68

Average Waiting Time: 110

Average Turnaround Time: 200

Average Response Time: 48

Process: 14 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 576 | 11 | 4 | 15 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 2 | 0 | 156 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 2 | 0 | 156 |
| 58 | | | | | | | | |
| 7 | 1 | 0 | 304 | 0 | 0 | 2 | 0 | 156 |
| 57 | | | | | | | | |
| 14 | 1 | 5 | 306 | 575 | 0 | 0 | 5 | 138 |
| 60 | | | | | | | | |
| 15 | 1 | 6 | 306 | 578 | 0 | 0 | 6 | 138 |
| 60 | | | | | | | | |
| 16 | 1 | 5 | 306 | 583 | 0 | 0 | 5 | 138 |
| 60 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 567 | 20 | 0 | 136 |
| 69 | | | | | | | | |

| | | | | | | | | |
|----|---|---|-----|---|-----|----|---|-----|
| 18 | 1 | 0 | 306 | 0 | 573 | 0 | 3 | 138 |
| 60 | | | | | | | | |
| 19 | 1 | 0 | 307 | 0 | 573 | 16 | 0 | 137 |
| 60 | | | | | | | | |
| 20 | 1 | 0 | 307 | 0 | 573 | 16 | 0 | 137 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 567 | 20 | 0 | 136 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 567 | 20 | 0 | 136 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 567 | 20 | 0 | 136 |
| 98 | | | | | | | | |

```
PID: 18 | arrival_time: 306 | completion_time: 589 | first_run_time: 374 | rtime: 6
```

PID: 18 | Waiting: 140 | Turnaround: 283 | Response: 68

Average Waiting Time: 113

Average Turnaround Time: 208

Average Response Time: 49

```
Process: 15 Finished
```

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 60 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 2 60 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 3 60 | 1 | 4 | 303 | 0 | 576 | 16 | 4 | 15 |
| 5 59 | 1 | 0 | 304 | 0 | 0 | 1 | 0 | 157 |
| 6 58 | 1 | 0 | 304 | 0 | 0 | 1 | 0 | 157 |
| 7 57 | 1 | 0 | 304 | 0 | 0 | 1 | 0 | 157 |
| 14 60 | 1 | 5 | 306 | 575 | 0 | 0 | 5 | 138 |
| 15 60 | 1 | 6 | 306 | 578 | 0 | 0 | 6 | 138 |
| 16 60 | 1 | 5 | 306 | 583 | 0 | 0 | 5 | 138 |
| 17 69 | 1 | 0 | 306 | 0 | 567 | 25 | 0 | 136 |
| 18 60 | 1 | 6 | 306 | 589 | 0 | 0 | 6 | 138 |
| 19 60 | 1 | 0 | 307 | 0 | 573 | 0 | 2 | 138 |
| 20 60 | 1 | 0 | 307 | 0 | 573 | 21 | 0 | 137 |
| 21 74 | 1 | 0 | 307 | 0 | 567 | 25 | 0 | 136 |
| 22 97 | 1 | 0 | 307 | 0 | 567 | 25 | 0 | 136 |

23 1 0 307 0 567 25 0 136
98
PID: 19 | arrival_time: 307 | completion_time: 594 | first_run_time: 374 | rtime: 5
PID: 19 | Waiting: 145 | Turnaround: 287 | Response: 67
Average Waiting Time: 115
Average Turnaround Time: 214
Average Response Time: 51
Process: 13 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | | | | | | | | |
| 2 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 60 | | | | | | | | |
| 3 | 1 | 4 | 303 | 0 | 0 | 0 | 4 | 16 |
| 60 | | | | | | | | |
| 5 | 1 | 0 | 304 | 0 | 0 | 2 | 0 | 159 |
| 59 | | | | | | | | |
| 6 | 1 | 0 | 304 | 0 | 0 | 2 | 0 | 159 |
| 58 | | | | | | | | |
| 7 | 1 | 0 | 304 | 0 | 0 | 2 | 0 | 159 |
| 57 | | | | | | | | |
| 17 | 1 | 0 | 306 | 0 | 567 | 0 | 3 | 137 |
| 69 | | | | | | | | |
| 20 | 1 | 3 | 307 | 0 | 0 | 2 | 3 | 138 |
| 60 | | | | | | | | |
| 21 | 1 | 0 | 307 | 0 | 567 | 34 | 0 | 136 |
| 74 | | | | | | | | |
| 22 | 1 | 0 | 307 | 0 | 567 | 34 | 0 | 136 |
| 97 | | | | | | | | |
| 23 | 1 | 0 | 307 | 0 | 567 | 34 | 0 | 136 |
| 98 | | | | | | | | |

PID: 17 | arrival_time: 306 | completion_time: 602 | first_run_time: 374 | rtime: 5
PID: 17 | Waiting: 156 | Turnaround: 296 | Response: 68
Average Waiting Time: 119
Average Turnaround Time: 221
Average Response Time: 52
Process: 1 Finished

PID: 5 | arrival_time: 304 | completion_time: 710 | first_run_time: 308 | rtime: 2
PID: 5 | Waiting: 144 | Turnaround: 406 | Response: 4
Average Waiting Time: 120
Average Turnaround Time: 234
Average Response Time: 49
Process: 2 Finished

PID: 6 | arrival_time: 304 | completion_time: 908 | first_run_time: 308 | rtime: 1
PID: 6 | Waiting: 152 | Turnaround: 604 | Response: 4
Average Waiting Time: 122
Average Turnaround Time: 258
Average Response Time: 46
Process: 3 Finished

PID: 7 | arrival_time: 304 | completion_time: 1108 | first_run_time: 308 | rtime: 0

PID: 7 | Waiting: 155 | Turnaround: 804 | Response: 4
Average Waiting Time: 124
Average Turnaround Time: 293
Average Response Time: 43
Process: 16 Finished

| ProcessID Priority | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 60 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 2 60 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 3 60 | 1 | 4 | 303 | 0 | 0 | 0 | 4 | 20 |
| 20 60 | 1 | 17 | 307 | 0 | 2011 | 0 | 19 | 1505 |
| 21 74 | 1 | 14 | 307 | 0 | 2011 | 2 | 14 | 1495 |
| 22 97 | 1 | 15 | 307 | 0 | 2011 | 2 | 15 | 1488 |
| 23 98 | 1 | 15 | 307 | 0 | 2011 | 2 | 15 | 1481 |

PID: 20 | arrival_time: 307 | completion_time: 2014 | first_run_time: 374 | rtime: 21
PID: 20 | Waiting: 182 | Turnaround: 1707 | Response: 67
Average Waiting Time: 128
Average Turnaround Time: 376
Average Response Time: 44
Process: 17 Finished

| ProcessID Priority | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 60 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 2 60 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 13 |
| 3 60 | 1 | 4 | 303 | 0 | 0 | 0 | 4 | 21 |
| 21 74 | 1 | 16 | 307 | 0 | 2219 | 0 | 16 | 1696 |
| 22 97 | 1 | 17 | 307 | 0 | 2219 | 0 | 17 | 1687 |
| 23 98 | 1 | 17 | 307 | 0 | 2219 | 0 | 17 | 1679 |

PID: 21 | arrival_time: 307 | completion_time: 2219 | first_run_time: 374 | rtime: 17
PID: 21 | Waiting: 201 | Turnaround: 1912 | Response: 67
Average Waiting Time: 132
Average Turnaround Time: 461
Average Response Time: 46
Process: 18 Finished

| ProcessID Priority | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------------------|---------------|-------|-------|-------|-------|-------|-------|-------|

```

1          1          0          0          0          0          0          0          12
60
2          1          2          1          0          0          0          2          13
60
3          1          4          303         0          0          0          4          22
60
22         1          17         307         0         2222         0          19         1690
97
23         1          17         307         0         2222         2          17         1681
98
PID: 22 | arrival_time: 307 | completion_time: 2224 | first_run_time: 374 | rtime: 20
PID: 22 | Waiting: 209 | Turnaround: 1917 | Response: 67
Average Waiting Time: 136
Average Turnaround Time: 538
Average Response Time: 47
Process: 19 Finished

```

```

ProcessID      Runnable(0/1)  Ticks   ctime   etime   qtime   wtime   rtime   N_run
Priority
1              1              0        0        0        0        0        0        12
60
2              1              2        1        0        0        0        2        13
60
3              1              4        303      0        0        0        4        23
60
23             1              20       307      0        2428     0        20       1882
98
PID: 23 | arrival_time: 307 | completion_time: 2428 | first_run_time: 374 | rtime: 21
PID: 23 | Waiting: 220 | Turnaround: 2121 | Response: 67
Average Waiting Time: 140
Average Turnaround Time: 617
Average Response Time: 48
Average Waiting Time: 140
Average Turnaround Time: 617
Average Response Time: 48

```

MLFQ:

```

xv6...
Scheduling: Multi Level Feedback Queue
cpu0: starting 0
sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58
init: starting sh
$ contrastTest
Process 0 PID 4 started
Process 1 PID 5 started
Process 2 PID 6 started
Process 3 PID 7 started

```

```

Process 4 PID 8 started
Process 5 PID 9 started
Process 6 PID 10 started
Process 7 PID 11 started
Process 8 PID 12 started
Process 9 PID 13 started
Process 10 PID 14 started
Process 11 PID 15 started
Process 12 PID 16 started
Process 13 PID 17 started
Process 14 PID 18 started
Process 15 PID 19 started
Process 16 PID 20 started
Process 17 PID 21 started
Process 18 PID 22 started
Process 19 PID 23 started
task2, pid : 8
Process: 4 Finished
PID: 8 | arrival_time: 526 | completion_time: 608 | first_run_time: 529 | rtime: 25
PID: 8 | Waiting: 57 | Turnaround: 82 | Response: 3
Average Waiting Time: 57
Average Turnaround Time: 82
Average Response Time: 3
task2, pid : 9
Process: 5 Finished

```

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 12 |
| 4 | 1 | 0 | 525 | 0 | 611 | 10 | 0 | 22 |
| 5 | 1 | 0 | 525 | 0 | 611 | 10 | 0 | 22 |
| 6 | 1 | 0 | 525 | 0 | 611 | 10 | 0 | 22 |
| 7 | 1 | 0 | 525 | 0 | 611 | 10 | 0 | 22 |
| 9 | 1 | 15 | 526 | 0 | 583 | 0 | 26 | 5 |
| 10 | 1 | 15 | 526 | 0 | 591 | 30 | 15 | 4 |
| 11 | 1 | 15 | 526 | 0 | 599 | 22 | 15 | 4 |
| 12 | 1 | 2 | 526 | 0 | 611 | 10 | 2 | 16 |
| 13 | 1 | 2 | 526 | 0 | 611 | 10 | 2 | 15 |
| 14 | 1 | 3 | 527 | 0 | 611 | 10 | 3 | 9 |
| 15 | 1 | 2 | 527 | 0 | 611 | 10 | 2 | 13 |
| 16 | 1 | 0 | 527 | 0 | 611 | 10 | 0 | 20 |
| 17 | 1 | 0 | 527 | 0 | 611 | 10 | 0 | 20 |
| 18 | 1 | 0 | 527 | 0 | 611 | 10 | 0 | 20 |
| 19 | 1 | 0 | 549 | 0 | 611 | 10 | 0 | 11 |
| 20 | 1 | 0 | 549 | 0 | 611 | 10 | 0 | 11 |
| 21 | 1 | 0 | 550 | 0 | 611 | 10 | 0 | 11 |
| 22 | 1 | 0 | 550 | 0 | 611 | 10 | 0 | 11 |
| 23 | 1 | 0 | 550 | 0 | 611 | 10 | 0 | 11 |

```

PID: 9 | arrival_time: 526 | completion_time: 624 | first_run_time: 530 | rtime: 30
PID: 9 | Waiting: 68 | Turnaround: 98 | Response: 4
Average Waiting Time: 62

```

Average Turnaround Time: 90

Average Response Time: 3

task2, pid : 10

Process: 6 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 13 |
| 4 | 1 | 0 | 525 | 0 | 626 | 8 | 0 | 23 |
| 5 | 1 | 0 | 525 | 0 | 626 | 8 | 0 | 23 |
| 6 | 1 | 0 | 525 | 0 | 626 | 8 | 0 | 23 |
| 7 | 1 | 0 | 525 | 0 | 626 | 8 | 0 | 23 |
| 10 | 1 | 15 | 526 | 0 | 591 | 0 | 24 | 5 |
| 11 | 1 | 15 | 526 | 0 | 599 | 35 | 15 | 4 |
| 12 | 1 | 2 | 526 | 0 | 626 | 8 | 2 | 17 |
| 13 | 1 | 2 | 526 | 0 | 626 | 8 | 2 | 16 |
| 14 | 1 | 3 | 527 | 0 | 626 | 8 | 3 | 10 |
| 15 | 1 | 2 | 527 | 0 | 626 | 8 | 2 | 14 |
| 16 | 1 | 0 | 527 | 0 | 626 | 8 | 0 | 21 |
| 17 | 1 | 0 | 527 | 0 | 626 | 8 | 0 | 21 |
| 18 | 1 | 0 | 527 | 0 | 626 | 8 | 0 | 21 |
| 19 | 1 | 0 | 549 | 0 | 626 | 8 | 0 | 12 |
| 20 | 1 | 0 | 549 | 0 | 626 | 8 | 0 | 12 |
| 21 | 1 | 0 | 550 | 0 | 626 | 8 | 0 | 12 |
| 22 | 1 | 0 | 550 | 0 | 626 | 8 | 0 | 12 |
| 23 | 1 | 0 | 550 | 0 | 626 | 8 | 0 | 12 |

PID: 10 | arrival_time: 526 | completion_time: 636 | first_run_time: 531 | rtime: 27

PID: 10 | Waiting: 83 | Turnaround: 110 | Response: 5

Average Waiting Time: 69

Average Turnaround Time: 96

Average Response Time: 4

task2, pid : 11

Process: 7 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 14 |
| 4 | 1 | 0 | 525 | 0 | 638 | 9 | 0 | 24 |
| 5 | 1 | 0 | 525 | 0 | 638 | 9 | 0 | 24 |
| 6 | 1 | 0 | 525 | 0 | 638 | 9 | 0 | 24 |
| 7 | 1 | 0 | 525 | 0 | 638 | 9 | 0 | 24 |
| 11 | 1 | 15 | 526 | 0 | 599 | 0 | 25 | 5 |
| 12 | 1 | 2 | 526 | 0 | 638 | 9 | 2 | 18 |
| 13 | 1 | 2 | 526 | 0 | 638 | 9 | 2 | 17 |
| 14 | 1 | 3 | 527 | 0 | 638 | 9 | 3 | 11 |
| 15 | 1 | 2 | 527 | 0 | 638 | 9 | 2 | 15 |
| 16 | 1 | 0 | 527 | 0 | 638 | 9 | 0 | 22 |
| 17 | 1 | 0 | 527 | 0 | 638 | 9 | 0 | 22 |
| 18 | 1 | 0 | 527 | 0 | 638 | 9 | 0 | 22 |
| 19 | 1 | 0 | 549 | 0 | 638 | 9 | 0 | 13 |

| | | | | | | | | |
|----|---|---|-----|---|-----|---|---|----|
| 20 | 1 | 0 | 549 | 0 | 638 | 9 | 0 | 13 |
| 21 | 1 | 0 | 550 | 0 | 638 | 9 | 0 | 13 |
| 22 | 1 | 0 | 550 | 0 | 638 | 9 | 0 | 13 |
| 23 | 1 | 0 | 550 | 0 | 638 | 9 | 0 | 13 |

PID: 11 | arrival_time: 526 | completion_time: 649 | first_run_time: 532 | rtime: 28

PID: 11 | Waiting: 95 | Turnaround: 123 | Response: 6

Average Waiting Time: 75

Average Turnaround Time: 103

Average Response Time: 4

task1, pid : 4

Process: 0 Finished

PID: 4 | arrival_time: 525 | completion_time: 726 | first_run_time: 526 | rtime: 0

PID: 4 | Waiting: 100 | Turnaround: 201 | Response: 1

Average Waiting Time: 80

Average Turnaround Time: 122

Average Response Time: 3

task4, pid : 16

Process: 12 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

task4, pid : 17

Process: 13 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

task4, pid : 18

Process: 14 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

| | | | | | | | | |
|---|---|---|-----------------|--|--|--|--|--|
| 1 | 1 | 0 | task3, pid : 12 | | | | | |
|---|---|---|-----------------|--|--|--|--|--|

Process: 8 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|

| | | | | | | | | |
|----|---|---|-----|---|-----|---|---|-----|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 16 |
| 5 | 1 | 0 | 525 | 0 | 0 | 0 | 0 | 116 |
| 6 | 1 | 0 | 525 | 0 | 0 | 0 | 0 | 116 |
| 7 | 1 | 0 | 525 | 0 | 0 | 0 | 0 | 116 |
| 12 | 1 | 2 | 526 | 0 | 745 | 0 | 2 | 110 |
| 13 | 1 | 2 | 526 | 0 | 745 | 1 | 2 | 108 |
| 14 | 1 | 3 | 527 | 0 | 745 | 1 | 3 | 102 |
| 15 | 1 | 2 | 527 | 0 | 745 | 1 | 2 | 106 |
| 16 | 1 | 3 | 527 | 0 | 742 | 4 | 3 | 111 |
| 17 | 1 | 3 | 527 | 0 | 744 | 2 | 3 | 111 |
| 18 | 1 | 3 | 527 | 0 | 746 | 0 | 3 | 111 |
| 19 | 1 | 0 | 549 | 0 | 745 | 1 | 0 | 103 |
| 20 | 1 | 0 | 549 | 0 | 745 | 1 | 0 | 103 |
| 21 | 1 | 0 | 550 | 0 | 745 | 1 | 0 | 103 |
| 22 | 1 | 0 | 550 | 0 | 745 | 1 | 0 | 103 |
| 23 | 1 | 0 | 550 | 0 | 745 | 1 | 0 | 103 |

PID: 12 | arrival_time: 526 | completion_time: 747 | first_run_time: 533 | rtime: 4

PID: 12 | Waiting: 109 | Turnaround: 221 | Response: 7

Average Waiting Time: 85
 Average Turnaround Time: 139
 Average Response Time: 4
 task3, pid : 13
 Process: 9 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-----------------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 748 | 1 | 5 | 16 |
| 5 | 1 | 0 | 525 | 0 | 748 | task3, pid : 15 | | |

Process: 11 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 748 | 2 | 5 | 16 |
| 5 | 1 | 0 | 525 | 0 | 0 | 0 | 0 | 118 |
| 6 | 1 | 0 | 525 | 0 | 0 | 0 | 0 | 118 |
| 7 | 1 | 0 | 525 | 0 | 0 | 0 | 0 | 118 |
| 12 | 1 | 4 | 526 | 747 | 0 | 0 | 4 | 111 |
| 13 | 1 | 3 | 526 | 0 | 750 | 0 | 3 | 110 |
| 14 | 1 | 3 | 527 | 0 | 0 | 0 | 3 | 104 |
| 15 | 1 | 2 | 527 | 0 | 748 | 0 | 2 | 108 |
| 16 | 1 | 3 | 527 | 0 | 742 | 8 | 3 | 111 |
| 17 | 1 | 3 | 527 | 0 | 744 | 6 | 3 | 111 |
| 18 | 1 | 3 | 527 | 0 | 746 | 4 | 3 | 111 |
| 19 | 1 | 0 | 549 | 0 | 748 | 2 | 0 | 104 |
| 20 | 1 | 0 | 549 | 0 | 748 | 2 | 0 | 104 |
| 21 | 1 | 0 | 550 | 0 | 748 | 2 | 0 | 104 |
| 22 | 1 | 0 | 550 | 0 | 748 | 2 | 0 | 104 |
| 2 | 1 | 0 | 117 | | | | | |
| 6 | 1 | 0 | 525 | 0 | 748 | 1 | 0 | 117 |
| 7 | 1 | 0 | 525 | 0 | 748 | 1 | 0 | 117 |
| 12 | 1 | 4 | 526 | 747 | 0 | 0 | 4 | 111 |
| 13 | 1 | 2 | 526 | 0 | 747 | 0 | 2 | 110 |
| 14 | 1 | 3 | 527 | 0 | 748 | 1 | 3 | 103 |
| 15 | 1 | 2 | 527 | 0 | 748 | 1 | 2 | 107 |
| 16 | 1 | 3 | 527 | 0 | 742 | 7 | 3 | 111 |

1task4, pid : 19
 Process: 15 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 16 |
| 5 | 1 | 0 | 525 | 0 | 743 | 0 | 0 | 114 |
| 6 | 1 | 0 | 525 | 0 | 743 | 0 | 0 | 114 |
| 7 | 1 | 0 | 525 | 0 | 743 | 0 | 0 | 114 |
| 12 | 1 | 2 | 526 | 0 | 743 | 0 | 2 | 108 |
| 13 | 1 | 2 | 526 | 0 | 743 | 0 | 2 | 107 |
| 14 | 1 | 3 | 527 | 0 | 743 | 0 | 3 | 101 |

| | | | | | | | | |
|----|---|---|-----|---|-----|---|---|-----|
| 15 | 1 | 2 | 527 | 0 | 743 | 0 | 2 | 105 |
| 16 | 1 | 3 | 527 | 0 | 742 | 1 | 3 | 111 |
| 17 | 1 | 1 | 527 | 0 | 739 | 0 | 2 | 111 |
| 18 | 1 | 1 | 527 | 0 | 740 | 3 | 1 | 110 |
| 19 | 1 | 0 | 549 | 0 | 743 | 0 | 0 | 102 |
| 20 | 1 | 0 | 549 | 0 | 743 | 0 | 0 | 102 |
| 21 | 1 | 0 | 550 | 0 | 743 | 0 | 0 | 102 |
| 22 | 1 | 0 | 550 | 0 | 743 | 0 | 0 | 102 |
| 23 | 1 | 0 | 550 | 0 | 743 | 0 | 0 | 102 |

PID: 17 | arrival_time: 527 | completion_time: 767 | first_run_time: 536 | rtime: 5

PID: 17 | Waiting: 126 | Turnaround: 240 | Response: 9

Average Waiting Time: 91

Average Turnaround Time: 153

Average Response Time: 5

| | | | | | | | | |
|----|---|---|-----|---|-----|---|---|-----|
| 7 | 1 | 3 | 527 | 0 | 744 | 5 | 3 | 111 |
| 18 | 1 | 3 | 527 | 0 | 746 | 3 | 3 | 111 |
| 19 | 1 | 0 | 549 | 0 | 748 | 1 | 0 | 104 |
| 20 | 1 | 0 | 549 | 0 | 748 | 1 | 0 | 104 |
| 21 | 1 | 0 | 550 | 0 | 748 | 1 | 0 | 104 |
| 22 | 1 | 0 | 550 | 0 | 748 | 1 | 0 | 104 |
| 23 | 1 | 0 | 550 | 0 | 748 | 1 | 0 | 104 |

PID: 13 | arrival_time: 526 | completion_time: 768 | first_run_time: 534 | rtime: 5

PID: 13 | Waiting: 130 | Turnaround: 242 | Response: 8

Average Waiting Time: 96

Average Turnaround Time: 164

Average Response Time: 5

task3, pid : 14

Process: 10 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 769 | 1 | 5 | 18 |
| 5 | 1 | 0 | 525 | 0 | 770 | 0 | 0 | 126 |
| 6 | 1 | 0 | 525 | 0 | 770 | 0 | 0 | 126 |
| 7 | 1 | 0 | 525 | 0 | 770 | 0 | 0 | 126 |
| 13 | 1 | 5 | 526 | 768 | 0 | 0 | 5 | 115 |
| 14 | 1 | 3 | 527 | 0 | 769 | 0 | 3 | 113 |
| 15 | 1 | 5 | 527 | 0 | 758 | 12 | 5 | 109 |
| 16 | 1 | 3 | 527 | 0 | 769 | 1 | 3 | 113 |
| 18 | 1 | 3 | 527 | 0 | 746 | 24 | 3 | 111 |
| 19 | 1 | 3 | 549 | 0 | 761 | 9 | 3 | 106 |
| 20 | 1 | 2 | 549 | 0 | 770 | 0 | 2 | 110 |
| 21 | 1 | 2 | 550 | 0 | 770 | 0 | 2 | 109 |
| 22 | 1 | 3 | 550 | 0 | 765 | 5 | 3 | 106 |
| 23 | 1 | 2 | 550 | 0 | 770 | 0 | 2 | 107 |

PID: 14 | arrival_time: 527 | completion_time: 771 | first_run_time: 535 | rtime: 5

PID: 14 | Waiting: 130 | Turnaround: 244 | Response: 8

Average Waiting Time: 99

Average Turnaround Time: 173

Average Response Time: 5

| | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
|---|---|---|---|---|---|---|---|----|

| | | | | | | | | |
|----|---|---|-----|---|-----|---|---|-----|
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 16 |
| 5 | 1 | 0 | 525 | 0 | 741 | 0 | 0 | 113 |
| 6 | 1 | 0 | 525 | 0 | 741 | 0 | 0 | 113 |
| 7 | 1 | 0 | 525 | 0 | 741 | 0 | 0 | 113 |
| 12 | 1 | 2 | 526 | 0 | 741 | 0 | 2 | 107 |
| 13 | 1 | 2 | 526 | 0 | 741 | 0 | 2 | 106 |
| 14 | 1 | 3 | 527 | 0 | 741 | 0 | 3 | 100 |
| 15 | 1 | 2 | 527 | 0 | 741 | 0 | 2 | 104 |
| 16 | 1 | 1 | 527 | 0 | 738 | 0 | 2 | 111 |
| 17 | 1 | 1 | 527 | 0 | 739 | 2 | 1 | 110 |
| 18 | 1 | 1 | 527 | 0 | 740 | 1 | 1 | 110 |
| 19 | 1 | 0 | 549 | 0 | 741 | 0 | 0 | 101 |
| 20 | 1 | 0 | 549 | 0 | 741 | 0 | 0 | 101 |
| 21 | 1 | 0 | 550 | 0 | 741 | 0 | 0 | 101 |
| 22 | 1 | 0 | 550 | 0 | 741 | 0 | 0 | 101 |
| 23 | 1 | 0 | 550 | 0 | 741 | 0 | 0 | 101 |

PID: 16 | arrival_time: 527 | completion_time: 774 | first_run_time: 536 | rtime: 5

PID: 16 | Waiting: 133 | Turnaround: 247 | Response: 9

Average Waiting Time: 103

Average Turnaround Time: 180

Average Response Time: 6

| | | | | | | | | |
|----|---|---|-----|---|-----|----|---|-----|
| | 0 | 0 | 0 | 0 | 0 | 22 | | |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 16 |
| 5 | 1 | 0 | 525 | 0 | 745 | 0 | 0 | 115 |
| 6 | 1 | 0 | 525 | 0 | 745 | 0 | 0 | 115 |
| 7 | 1 | 0 | 525 | 0 | 745 | 0 | 0 | 115 |
| 12 | 1 | 2 | 526 | 0 | 745 | 0 | 2 | 109 |
| 13 | 1 | 2 | 526 | 0 | 745 | 0 | 2 | 108 |
| 14 | 1 | 3 | 527 | 0 | 745 | 0 | 3 | 102 |
| 15 | 1 | 2 | 527 | 0 | 745 | 0 | 2 | 106 |
| 16 | 1 | 3 | 527 | 0 | 742 | 3 | 3 | 111 |
| 17 | 1 | 3 | 527 | 0 | 744 | 1 | 3 | 111 |
| 18 | 1 | 1 | 527 | 0 | 740 | 0 | 2 | 111 |
| 19 | 1 | 0 | 549 | 0 | 745 | 0 | 0 | 103 |
| 20 | 1 | 0 | 549 | 0 | 745 | 0 | 0 | 103 |
| 21 | 1 | 0 | 550 | 0 | 745 | 0 | 0 | 103 |
| 22 | 1 | 0 | 550 | 0 | 745 | 0 | 0 | 103 |
| 23 | 1 | 0 | 550 | 0 | 745 | 0 | 0 | 103 |

PID: 18 | arrival_time: 527 | completion_time: 777 | first_run_time: 536 | rtime: 6

PID: 18 | Waiting: 135 | Turnaround: 250 | Response: 9

Average Waiting Time: 106

Average Turnaround Time: 187

Average Response Time: 6

| | | | | | | | | |
|---|---|---|-----|---|-----|---|---|-----|
| 3 | 1 | 0 | 550 | 0 | 748 | 2 | 0 | 104 |
|---|---|---|-----|---|-----|---|---|-----|

PID: 15 | arrival_time: 527 | completion_time: 777 | first_run_time: 536 | rtime: 5

PID: 15 | Waiting: 139 | Turnaround: 250 | Response: 9

Average Waiting Time: 108

Average Turnaround Time: 192

Average Response Time: 6

| | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
|---|---|---|---|---|---|---|---|----|

| | | | | | | | | |
|----|---|---|-----|---|-----|----|---|-----|
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 17 |
| 5 | 1 | 0 | 525 | 0 | 760 | 0 | 0 | 120 |
| 6 | 1 | 0 | 525 | 0 | 760 | 0 | 0 | 120 |
| 7 | 1 | 0 | 525 | 0 | 760 | 0 | 0 | 120 |
| 13 | 1 | 4 | 526 | 0 | 759 | 1 | 4 | 112 |
| 14 | 1 | 3 | 527 | 0 | 760 | 0 | 3 | 106 |
| 15 | 1 | 5 | 527 | 0 | 758 | 2 | 5 | 109 |
| 16 | 1 | 3 | 527 | 0 | 742 | 18 | 3 | 111 |
| 17 | 1 | 3 | 527 | 0 | 744 | 16 | 3 | 111 |
| 18 | 1 | 3 | 527 | 0 | 746 | 14 | 3 | 111 |
| 19 | 1 | 1 | 549 | 0 | 752 | 0 | 2 | 106 |
| 20 | 1 | 1 | 549 | 0 | 753 | 7 | 1 | 105 |
| 21 | 1 | 1 | 550 | 0 | 754 | 6 | 1 | 105 |
| 22 | 1 | 1 | 550 | 0 | 755 | 5 | 1 | 105 |
| 23 | 1 | 1 | 550 | 0 | 756 | 4 | 1 | 105 |

PID: 19 | arrival_time: 549 | completion_time: 779 | first_run_time: 550 | rtime: 5

PID: 19 | Waiting: 121 | Turnaround: 230 | Response: 1

Average Waiting Time: 109

Average Turnaround Time: 195

Average Response Time: 6

task1, pid : 5

Process: 1 Finished

PID: 5 | arrival_time: 525 | completion_time: 926 | first_run_time: 526 | rtime: 0

PID: 5 | Waiting: 125 | Turnaround: 401 | Response: 1

Average Waiting Time: 110

Average Turnaround Time: 209

Average Response Time: 5

task1, pid : 6

Process: 2 Finished

PID: 6 | arrival_time: 525 | completion_time: 1126 | first_run_time: 526 | rtime: 0

PID: 6 | Waiting: 127 | Turnaround: 601 | Response: 1

Average Waiting Time: 111

Average Turnaround Time: 236

Average Response Time: 5

task1, pid : 7

Process: 3 Finished

PID: 7 | arrival_time: 525 | completion_time: 1326 | first_run_time: 526 | rtime: 0

PID: 7 | Waiting: 129 | Turnaround: 801 | Response: 1

Average Waiting Time: 112

Average Turnaround Time: 271

Average Response Time: 5

task5, pid : 20

Process: 16 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 27 |
| 20 | 1 | 15 | 549 | 0 | 2181 | 0 | 16 | 1498 |
| 21 | 1 | 15 | 550 | 0 | 2182 | 1 | 15 | 1490 |
| 22 | 1 | 15 | 550 | 0 | 2183 | 0 | 15 | 1483 |

23 1 19 550 0 2183 0 19 1487
PID: 20 | arrival_time: 549 | completion_time: 2187 | first_run_time: 550 | rtime: 18
PID: 20 | Waiting: 131 | Turnaround: 1638 | Response: 1
Average Waiting Time: 114
Average Turnaround Time: 351
Average Response Time: 4
task5, pid : 21
Process: 17 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 28 |
| 21 | 1 | 16 | 550 | 0 | 2386 | 0 | 16 | 1690 |
| 22 | 1 | 17 | 550 | 0 | 2386 | 0 | 17 | 1683 |
| 23 | 1 | 21 | 550 | 0 | 2386 | 0 | 21 | 1685 |

PID: 21 | arrival_time: 550 | completion_time: 2387 | first_run_time: 550 | rtime: 17
PID: 21 | Waiting: 139 | Turnaround: 1837 | Response: 0
Average Waiting Time: 115
Average Turnaround Time: 434
Average Response Time: 4
task5, pid : 22
Process: 18 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 29 |
| 22 | 1 | 18 | 550 | 0 | 2396 | 0 | 19 | 1693 |
| 23 | 1 | 23 | 550 | 0 | 2397 | 0 | 23 | 1692 |

PID: 22 | arrival_time: 550 | completion_time: 2397 | first_run_time: 550 | rtime: 20
PID: 22 | Waiting: 145 | Turnaround: 1847 | Response: 0
Average Waiting Time: 116
Average Turnaround Time: 508
Average Response Time: 4
task5, pid : 23
Process: 19 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 13 |
| 3 | 1 | 5 | 524 | 0 | 0 | 0 | 5 | 30 |
| 23 | 1 | 23 | 550 | 0 | 2590 | 0 | 23 | 1885 |

PID: 23 | arrival_time: 550 | completion_time: 2590 | first_run_time: 550 | rtime: 24
PID: 23 | Waiting: 146 | Turnaround: 2040 | Response: 0
Average Waiting Time: 118
Average Turnaround Time: 585
Average Response Time: 4
Average Waiting Time: 118

LOT:

```
xv6...
Scheduling: Lottery Schedule
cpu0: starting 0
sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58
init: starting sh
$ contrastTest
Process 0 PID 4 started
Process 1 PID 5 started
Process 2 PID 6 started
Process 3 PID 7 started
Process 4 PID 8 started
Process 5 PID 9 started
Process 6 PID 10 started
Process 7 PID 11 started
Process 8 PID 12 started
Process 9 PID 13 started
Process 10 PID 14 started
Process 11 PID 15 started
Process 12 PID 16 started
Process 13 PID 17 started
Process 14 PID 18 started
Process 15 PID 19 started
Process 16 PID 20 started
Process 17 PID 21 started
Process 18 PID 22 started
Process 19 PID 23 started
task2, pid : 10
Process: 6 Finished

-----Initially assigned Tickets = 5 -----

ProcessID      Runnable(0/1)  Ticks   ctime   etime   qtime   wtime   rtime   N_run
Tickets
1               1               0       0       0       0       0       0       22      5
2               1               1       2       0       0       0       1       12      5
3               1               4       817     0       0       0       4       9
25
4               1               0       817     0       0       35      0       0       5
5               1               0       817     0       0       35      0       0       5
6               1               0       817     0       0       35      0       0       5
7               1               0       818     0       0       34      0       0       5
8               1               0       818     0       0       34      0       0       5
9               1               0       818     0       0       34      0       0       5
10              1               0       818     0       0       0       24      1       5
11              1               0       818     0       0       34      0       0
10
12              1               0       818     0       0       33      0       0
10
```


| | | | | | | | | |
|----|---|---|-----|---|---|----|---|---|
| 14 | 1 | 2 | 819 | 0 | 0 | 23 | 2 | 2 |
| 10 | | | | | | | | |
| 15 | 1 | 3 | 819 | 0 | 0 | 23 | 3 | 2 |
| 15 | | | | | | | | |
| 16 | 1 | 0 | 819 | 0 | 0 | 90 | 0 | 0 |
| 15 | | | | | | | | |
| 17 | 1 | 0 | 819 | 0 | 0 | 23 | 0 | 1 |
| 15 | | | | | | | | |
| 18 | 1 | 0 | 820 | 0 | 0 | 89 | 0 | 0 |
| 15 | | | | | | | | |
| 19 | 1 | 0 | 820 | 0 | 0 | 23 | 0 | 2 |
| 20 | | | | | | | | |
| 20 | 1 | 0 | 820 | 0 | 0 | 23 | 0 | 2 |
| 20 | | | | | | | | |
| 21 | 1 | 0 | 820 | 0 | 0 | 87 | 0 | 1 |
| 20 | | | | | | | | |
| 22 | 1 | 0 | 820 | 0 | 0 | 23 | 0 | 3 |
| 20 | | | | | | | | |
| 23 | 1 | 0 | 821 | 0 | 0 | 23 | 0 | 3 |
| 25 | | | | | | | | |

```
-----Total Ticks = 12-----
```

```
PID: 11 | arrival_time: 818 | completion_time: 913 | first_run_time: 0 | rtime: 28
```

```
PID: 11 | Waiting: 67 | Turnaround: 95 | Response: 0
```

Average Waiting Time: 38

Average Turnaround Time: 66

Average Response Time: 0

```
task2, pid : 8
```

```
Process: 4 Finished
```

```
PID: 8 | arrival_time: 818 | completion_time: 938 | first_run_time: 0 | rtime: 25
```

```
PID: 8 | Waiting: 95 | Turnaround: 120 | Response: 0
```

Average Waiting Time: 52

Average Turnaround Time: 79

Average Response Time: 0

```
task3, pid : 14
```

```
Process: 10 Finished
```

```
-----Initially assigned Tickets = 5 -----
```

[illegible]

-----Total Ticks = 23-----

PID: 13 | arrival_time: 819 | completion_time: 1044 | first_run_time: 828 | rtime: 5

PID: 13 | Waiting: 138 | Turnaround: 225 | Response: 9

Average Waiting Time: 90

Average Turnaround Time: 148

Average Response Time: 3

task4, pid : 17

Process: 13 Finished

-----Initially assigned Tickets = 5 -----

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run | |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|---|
| Tickets | | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 5 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 | 5 |
| 3 | 1 | 4 | 817 | 0 | 0 | 0 | 4 | 15 | |
| 25 | | | | | | | | | |
| 4 | 1 | 0 | 817 | 0 | 0 | 2 | 0 | 120 | 5 |
| 5 | 1 | 0 | 817 | 0 | 0 | 2 | 0 | 121 | 5 |
| 6 | 1 | 0 | 817 | 0 | 0 | 2 | 0 | 122 | 5 |
| 7 | 1 | 0 | 818 | 0 | 0 | 2 | 0 | 121 | 5 |
| 12 | 1 | 3 | 818 | 0 | 0 | 1 | 3 | 121 | |
| 10 | | | | | | | | | |
| 16 | 1 | 0 | 819 | 0 | 0 | 1 | 0 | 125 | |
| 15 | | | | | | | | | |
| 17 | 1 | 0 | 819 | 0 | 0 | 0 | 2 | 122 | |
| 15 | | | | | | | | | |
| 18 | 1 | 0 | 820 | 0 | 0 | 2 | 0 | 122 | |
| 15 | | | | | | | | | |
| 20 | 1 | 2 | 820 | 0 | 0 | 1 | 2 | 127 | |
| 20 | | | | | | | | | |
| 21 | 1 | 2 | 820 | 0 | 0 | 2 | 2 | 124 | |
| 20 | | | | | | | | | |
| 22 | 1 | 3 | 820 | 0 | 0 | 1 | 3 | 127 | |
| 20 | | | | | | | | | |
| 23 | 1 | 2 | 821 | 0 | 0 | 2 | 2 | 126 | |
| 25 | | | | | | | | | |

-----Total Ticks = 17-----

PID: 17 | arrival_time: 819 | completion_time: 1090 | first_run_time: 885 | rtime: 5

PID: 17 | Waiting: 145 | Turnaround: 271 | Response: 66

Average Waiting Time: 96

Average Turnaround Time: 162

Average Response Time: 10

task4, pid : 16

Process: 12 Finished

-----Initially assigned Tickets = 5 -----


```

20          1          2          820          0          0          1          2          174
20
21          1          2          820          0          0          1          2          172
20
22          1          3          820          0          0          2          3          174
20
23          1          2          821          0          0          1          2          174
25

```

-----Total Ticks = 17-----

```

PID: 18 | arrival_time: 820 | completion_time: 1146 | first_run_time: 941 | rtime: 5
PID: 18 | Waiting: 152 | Turnaround: 326 | Response: 121
Average Waiting Time: 106
Average Turnaround Time: 189
Average Response Time: 27
task3, pid : 12
Process: 8 Finished

```

-----Initially assigned Tickets = 5 -----

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run | |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|---|
| Tickets | | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 5 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 | 5 |
| 3 | 1 | 4 | 817 | 0 | 0 | 0 | 4 | 17 | |
| 25 | | | | | | | | | |
| 4 | 1 | 0 | 817 | 0 | 0 | 5 | 0 | 166 | 5 |
| 5 | 1 | 0 | 817 | 0 | 0 | 5 | 0 | 167 | 5 |
| 6 | 1 | 0 | 817 | 0 | 0 | 0 | 0 | 169 | 5 |
| 7 | 1 | 0 | 818 | 0 | 0 | 5 | 0 | 167 | 5 |
| 12 | 1 | 3 | 818 | 0 | 0 | 0 | 3 | 168 | |
| 10 | | | | | | | | | |
| 18 | 1 | 5 | 820 | 1146 | 0 | 0 | 5 | 170 | |
| 15 | | | | | | | | | |
| 20 | 1 | 2 | 820 | 0 | 0 | 0 | 2 | 175 | |
| 20 | | | | | | | | | |
| 21 | 1 | 2 | 820 | 0 | 0 | 0 | 2 | 173 | |
| 20 | | | | | | | | | |
| 22 | 1 | 3 | 820 | 0 | 0 | 0 | 3 | 175 | |
| 20 | | | | | | | | | |
| 23 | 1 | 2 | 821 | 0 | 0 | 0 | 2 | 175 | |
| 25 | | | | | | | | | |

-----Total Ticks = 22-----

```

PID: 12 | arrival_time: 818 | completion_time: 1149 | first_run_time: 941 | rtime: 6
PID: 12 | Waiting: 158 | Turnaround: 331 | Response: 123
Average Waiting Time: 110
Average Turnaround Time: 201
Average Response Time: 35
task1, pid : 4

```

```

Process: 0 Finished
PID: 4 | arrival_time: 817 | completion_time: 1149 | first_run_time: 941 | rtime: 0
PID: 4 | Waiting: 166 | Turnaround: 332 | Response: 124
Average Waiting Time: 114
Average Turnaround Time: 211
Average Response Time: 42
task1, pid : 5
Process: 1 Finished
PID: 5 | arrival_time: 817 | completion_time: 1338 | first_run_time: 938 | rtime: 0
PID: 5 | Waiting: 173 | Turnaround: 521 | Response: 121
Average Waiting Time: 119
Average Turnaround Time: 233
Average Response Time: 48
task1, pid : 6
Process: 2 Finished
PID: 6 | arrival_time: 817 | completion_time: 1490 | first_run_time: 885 | rtime: 0
PID: 6 | Waiting: 179 | Turnaround: 673 | Response: 68
Average Waiting Time: 123
Average Turnaround Time: 262
Average Response Time: 49
task1, pid : 7
Process: 3 Finished
PID: 7 | arrival_time: 818 | completion_time: 1749 | first_run_time: 941 | rtime: 0
PID: 7 | Waiting: 186 | Turnaround: 931 | Response: 123
Average Waiting Time: 127
Average Turnaround Time: 304
Average Response Time: 54
task5, pid : 20
Process: 16 Finished

```

-----Initially assigned Tickets = 5 -----

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run | Tickets |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|---------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 5 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 | 5 |
| 3 | 1 | 5 | 817 | 0 | 0 | 0 | 5 | 21 | |
| 25 | | | | | | | | | |
| 20 | 1 | 14 | 820 | 0 | 0 | 0 | 16 | 1453 | |
| 20 | | | | | | | | | |
| 21 | 1 | 16 | 820 | 0 | 0 | 2 | 16 | 1449 | |
| 20 | | | | | | | | | |
| 22 | 1 | 17 | 820 | 0 | 0 | 1 | 17 | 1449 | |
| 20 | | | | | | | | | |
| 23 | 1 | 16 | 821 | 0 | 0 | 1 | 16 | 1454 | |
| 25 | | | | | | | | | |

-----Total Ticks = 69-----

```

PID: 20 | arrival_time: 820 | completion_time: 2474 | first_run_time: 856 | rtime: 18
PID: 20 | Waiting: 184 | Turnaround: 1654 | Response: 36
Average Waiting Time: 130

```


Average Turnaround Time: 384

Average Response Time: 53

task5, pid : 21

Process: 17 Finished

-----Initially assigned Tickets = 5 -----

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Tickets | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 5 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 5 |
| 3 | 1 | 5 | 817 | 0 | 0 | 0 | 5 | 22 |
| 25 | | | | | | | | |
| 21 | 1 | 16 | 820 | 0 | 0 | 0 | 16 | 1612 |
| 20 | | | | | | | | |
| 22 | 1 | 17 | 820 | 0 | 0 | 0 | 17 | 1611 |
| 20 | | | | | | | | |
| 23 | 1 | 16 | 821 | 0 | 0 | 0 | 16 | 1616 |
| 25 | | | | | | | | |

-----Total Ticks = 55-----

PID: 21 | arrival_time: 820 | completion_time: 2639 | first_run_time: 821 | rtime: 18

PID: 21 | Waiting: 190 | Turnaround: 1819 | Response: 1

Average Waiting Time: 133

Average Turnaround Time: 463

Average Response Time: 50

task5, pid : 22

Process: 18 Finished

-----Initially assigned Tickets = 5 -----

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Tickets | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 5 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 5 |
| 3 | 1 | 5 | 817 | 0 | 0 | 0 | 5 | 23 |
| 25 | | | | | | | | |
| 22 | 1 | 17 | 820 | 0 | 0 | 0 | 19 | 1617 |
| 20 | | | | | | | | |
| 23 | 1 | 18 | 821 | 0 | 0 | 1 | 18 | 1622 |
| 25 | | | | | | | | |

-----Total Ticks = 41-----

PID: 22 | arrival_time: 820 | completion_time: 2650 | first_run_time: 826 | rtime: 21

PID: 22 | Waiting: 193 | Turnaround: 1830 | Response: 6

Average Waiting Time: 136

Average Turnaround Time: 535

Average Response Time: 47

task5, pid : 23

Process: 19 Finished

-----Initially assigned Tickets = 5 -----

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run | Tickets |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|---------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 5 |
| 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 12 | 5 |
| 3 | 1 | 5 | 817 | 0 | 0 | 0 | 5 | 24 | |
| 25 | | | | | | | | | |
| 23 | 1 | 18 | 821 | 0 | 0 | 0 | 18 | 1818 | |
| 25 | | | | | | | | | |

-----Total Ticks = 24-----

PID: 23 | arrival_time: 821 | completion_time: 2846 | first_run_time: 826 | rtime: 19
PID: 23 | Waiting: 189 | Turnaround: 2025 | Response: 5
Average Waiting Time: 139
Average Turnaround Time: 610
Average Response Time: 45
Average Waiting Time: 139
Average Turnaround Time: 610
Average Response Time: 45

CFS:

```
xv6...
Scheduling: Complete Fair Schedule
cpu0: starting 0
sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58
init: starting sh
$ contrastTest
Process 0 PID 4 started
Process 1 PID 5 started
Process 2 PID 6 started
Process 3 PID 7 started
Process 4 PID 8 started
Process 5 PID 9 started
Process 6 PID 10 started
Process 7 PID 11 started
Process 8 PID 12 started
Process 9 PID 13 started
Process 10 PID 14 started
Process 11 PID 15 started
Process 12 PID 16 started
Process 13 PID 17 started
Process 14 PID 18 started
Process 15 PID 19 started
Process 16 PID 20 started
```

Process 17 PID 21 started
 Process 18 PID 22 started
 Process 19 PID 23 started
 task2, pid : 11
 Process: 7 Finished

| ProcessID Priority | Runnable(0/1) Vruntime | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 9 |
| 60 | 20 | | | | | | | |
| 4 | 1 | 0 | 336 | 0 | 349 | 28 | 0 | 2 |
| 90 | 0 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 349 | 28 | 0 | 1 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 342 | 38 | 0 | 0 |
| 60 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 349 | 28 | 0 | 1 |
| 62 | 0 | | | | | | | |
| 8 | 1 | 0 | 336 | 0 | 342 | 38 | 0 | 0 |
| 60 | 0 | | | | | | | |
| 9 | 1 | 0 | 336 | 0 | 342 | 38 | 0 | 0 |
| 60 | 0 | | | | | | | |
| 10 | 1 | 0 | 337 | 0 | 342 | 37 | 0 | 0 |
| 60 | 0 | | | | | | | |
| 11 | 1 | 0 | 337 | 0 | 342 | 0 | 24 | 1 |
| 93 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 0 | 23 | 2 | 1 |
| 90 | 12 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 351 | 25 | 3 | 1 |
| 64 | 12 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 349 | 28 | 2 | 1 |
| 72 | 8 | | | | | | | |
| 15 | 1 | 2 | 337 | 0 | 346 | 30 | 2 | 1 |
| 73 | 8 | | | | | | | |
| 16 | 1 | 0 | 338 | 0 | 349 | 28 | 0 | 2 |
| 90 | 0 | | | | | | | |
| 17 | 1 | 0 | 338 | 0 | 349 | 28 | 0 | 2 |
| 64 | 0 | | | | | | | |
| 18 | 1 | 0 | 338 | 0 | 349 | 28 | 0 | 2 |
| 72 | 0 | | | | | | | |
| 19 | 1 | 0 | 338 | 0 | 349 | 28 | 0 | 2 |
| 73 | 0 | | | | | | | |
| 20 | 1 | 0 | 338 | 0 | 344 | 32 | 0 | 1 |
| 90 | 0 | | | | | | | |
| 21 | 1 | 0 | 340 | 0 | 349 | 28 | 0 | 2 |
| 64 | 0 | | | | | | | |
| 22 | 1 | 0 | 340 | 0 | 349 | 28 | 0 | 2 |
| 72 | 0 | | | | | | | |

```

23          1          0          340          0          0          23          0          3
73          0
PID: 11 | arrival_time: 337 | completion_time: 378 | first_run_time: 0 | rtime: 28
PID: 11 | Waiting: 13 | Turnaround: 41 | Response: 0
Average Waiting Time: 13
Average Turnaround Time: 41
Average Response Time: 0
task2, pid : 8
Process: 4 Finished
PID: 8 | arrival_time: 336 | completion_time: 402 | first_run_time: 0 | rtime: 24
PID: 8 | Waiting: 42 | Turnaround: 66 | Response: 0
Average Waiting Time: 27
Average Turnaround Time: 53
Average Response Time: 0
task2, pid : 9
Process: 5 Finished

```

| ProcessID Priority | Runnable(0/1) Vruntime | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 379 | 49 | 5 | 9 |
| 60 | 20 | | | | | | | |
| 4 | 1 | 0 | 336 | 0 | 0 | 24 | 0 | 4 |
| 90 | 0 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 0 | 24 | 0 | 2 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 0 | 24 | 0 | 1 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 0 | 24 | 0 | 2 |
| 62 | 0 | | | | | | | |
| 8 | 1 | 24 | 336 | 402 | 0 | 0 | 24 | 1 |
| 70 | 96 | | | | | | | |
| 9 | 1 | 0 | 336 | 0 | 342 | 0 | 25 | 1 |
| 91 | 0 | | | | | | | |
| 10 | 1 | 0 | 337 | 0 | 342 | 90 | 0 | 0 |
| 60 | 0 | | | | | | | |
| 11 | 1 | 28 | 337 | 378 | 0 | 0 | 28 | 1 |
| 93 | 168 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 379 | 76 | 2 | 1 |
| 90 | 12 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 351 | 78 | 3 | 1 |
| 64 | 12 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 349 | 81 | 2 | 1 |
| 72 | 8 | | | | | | | |
| 15 | 1 | 2 | 337 | 0 | 346 | 83 | 2 | 1 |
| 73 | 8 | | | | | | | |
| 16 | 1 | 0 | 338 | 0 | 0 | 24 | 0 | 4 |
| 90 | 0 | | | | | | | |

| | | | | | | | | |
|----|---|---|-----|---|---|----|---|---|
| 17 | 1 | 0 | 338 | 0 | 0 | 24 | 0 | 4 |
| 64 | 0 | | | | | | | |
| 18 | 1 | 0 | 338 | 0 | 0 | 24 | 0 | 4 |
| 72 | 0 | | | | | | | |
| 19 | 1 | 0 | 338 | 0 | 0 | 24 | 0 | 4 |
| 73 | 0 | | | | | | | |
| 20 | 1 | 0 | 338 | 0 | 0 | 24 | 0 | 3 |
| 90 | 0 | | | | | | | |
| 21 | 1 | 0 | 340 | 0 | 0 | 24 | 0 | 4 |
| 64 | 0 | | | | | | | |
| 22 | 1 | 0 | 340 | 0 | 0 | 24 | 0 | 4 |
| 72 | 0 | | | | | | | |
| 23 | 1 | 0 | 340 | 0 | 0 | 24 | 0 | 5 |
| 73 | 0 | | | | | | | |

PID: 9 | arrival_time: 336 | completion_time: 430 | first_run_time: 0 | rtime: 28

PID: 9 | Waiting: 66 | Turnaround: 94 | Response: 0

Average Waiting Time: 40

Average Turnaround Time: 67

Average Response Time: 0

task2, pid : 10

Process: 6 Finished

| ProcessID Priority | Runnable(0/1) Vruntime | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 379 | 76 | 5 | 9 |
| 60 | 20 | | | | | | | |
| 4 | 1 | 0 | 336 | 0 | 431 | 51 | 0 | 4 |
| 90 | 0 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 431 | 51 | 0 | 2 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 431 | 51 | 0 | 1 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 431 | 51 | 0 | 2 |
| 62 | 0 | | | | | | | |
| 8 | 1 | 24 | 336 | 402 | 0 | 0 | 24 | 1 |
| 70 | 96 | | | | | | | |
| 9 | 1 | 28 | 336 | 430 | 0 | 0 | 28 | 1 |
| 91 | 168 | | | | | | | |
| 10 | 1 | 0 | 337 | 0 | 342 | 0 | 24 | 1 |
| 92 | 0 | | | | | | | |
| 11 | 1 | 28 | 337 | 378 | 0 | 0 | 28 | 1 |
| 93 | 168 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 379 | 103 | 2 | 1 |
| 90 | 12 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 351 | 105 | 3 | 1 |
| 64 | 12 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 349 | 108 | 2 | 1 |
| 72 | 8 | | | | | | | |

| | | | | | | | | |
|----|---|---|-----|---|-----|-----|---|---|
| 15 | 1 | 2 | 337 | 0 | 346 | 110 | 2 | 1 |
| 73 | 8 | | | | | | | |
| 16 | 1 | 0 | 338 | 0 | 431 | 51 | 0 | 4 |
| 90 | 0 | | | | | | | |
| 17 | 1 | 0 | 338 | 0 | 431 | 51 | 0 | 4 |
| 64 | 0 | | | | | | | |
| 18 | 1 | 0 | 338 | 0 | 431 | 51 | 0 | 4 |
| 72 | 0 | | | | | | | |
| 19 | 1 | 0 | 338 | 0 | 431 | 51 | 0 | 4 |
| 73 | 0 | | | | | | | |
| 20 | 1 | 0 | 338 | 0 | 431 | 51 | 0 | 3 |
| 90 | 0 | | | | | | | |
| 21 | 1 | 0 | 340 | 0 | 431 | 51 | 0 | 4 |
| 64 | 0 | | | | | | | |
| 22 | 1 | 0 | 340 | 0 | 431 | 51 | 0 | 4 |
| 72 | 0 | | | | | | | |
| 23 | 1 | 0 | 340 | 0 | 431 | 51 | 0 | 5 |
| 73 | 0 | | | | | | | |

PID: 10 | arrival_time: 337 | completion_time: 458 | first_run_time: 0 | rtime: 28

PID: 10 | Waiting: 93 | Turnaround: 121 | Response: 0

Average Waiting Time: 53

Average Turnaround Time: 80

Average Response Time: 0

task1, pid : 4

Process: 0 Finished

PID: 4 | arrival_time: 336 | completion_time: 541 | first_run_time: 341 | rtime: 0

PID: 4 | Waiting: 118 | Turnaround: 205 | Response: 5

Average Waiting Time: 66

Average Turnaround Time: 105

Average Response Time: 1

task4, pid : 16

Process: 12 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 542 | 7 | 5 | 10 |
| 60 | 40 | | | | | | | |
| 4 | 1 | 0 | 336 | 541 | 0 | 0 | 0 | 88 |
| 90 | 0 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 544 | 6 | 0 | 86 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 542 | 7 | 0 | 84 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 0 | 1 | 0 | 87 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 7 | 2 | 84 |
| 90 | 1008 | | | | | | | |

| | | | | | | | | |
|----|------|---|-----|---|-----|---|---|----|
| 13 | 1 | 3 | 337 | 0 | 542 | 7 | 3 | 84 |
| 64 | 1008 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 542 | 7 | 2 | 84 |
| 72 | 672 | | | | | | | |
| 15 | 1 | 2 | 337 | 0 | 542 | 7 | 2 | 84 |
| 73 | 672 | | | | | | | |
| 16 | 1 | 0 | 338 | 0 | 542 | 0 | 2 | 88 |
| 90 | 0 | | | | | | | |
| 17 | 1 | 0 | 338 | 0 | 542 | 7 | 0 | 87 |
| 64 | 0 | | | | | | | |
| 18 | 1 | 0 | 338 | 0 | 542 | 7 | 0 | 87 |
| 72 | 0 | | | | | | | |
| 19 | 1 | 0 | 338 | 0 | 542 | 7 | 0 | 87 |
| 73 | 0 | | | | | | | |
| 20 | 1 | 0 | 338 | 0 | 542 | 7 | 0 | 86 |
| 90 | 0 | | | | | | | |
| 21 | 1 | 0 | 340 | 0 | 542 | 7 | 0 | 87 |
| 64 | 0 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 547 | 4 | 2 | 88 |
| 72 | 8 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 0 | 1 | 3 | 89 |
| 73 | 12 | | | | | | | |

PID: 16 | arrival_time: 338 | completion_time: 551 | first_run_time: 341 | rtime: 5

PID: 16 | Waiting: 121 | Turnaround: 213 | Response: 3

Average Waiting Time: 75

Average Turnaround Time: 123

Average Response Time: 1

task4, pid : 17

Process: 13 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 542 | 13 | 5 | 10 |
| 60 | 40 | | | | | | | |
| 4 | 1 | 0 | 336 | 541 | 0 | 0 | 0 | 88 |
| 90 | 0 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 0 | 2 | 0 | 87 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 542 | 13 | 0 | 84 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 552 | 7 | 0 | 87 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 13 | 2 | 84 |
| 90 | 1008 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 542 | 13 | 3 | 84 |
| 64 | 1008 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 542 | 13 | 2 | 84 |
| 72 | 672 | | | | | | | |

| | | | | | | | | |
|----|-----|---|-----|-----|-----|----|---|----|
| 15 | 1 | 2 | 337 | 0 | 542 | 13 | 2 | 84 |
| 73 | 672 | | | | | | | |
| 16 | 1 | 5 | 338 | 551 | 0 | 0 | 5 | 88 |
| 90 | 30 | | | | | | | |
| 17 | 1 | 0 | 338 | 0 | 542 | 0 | 3 | 88 |
| 64 | 0 | | | | | | | |
| 18 | 1 | 0 | 338 | 0 | 542 | 13 | 0 | 87 |
| 72 | 0 | | | | | | | |
| 19 | 1 | 0 | 338 | 0 | 542 | 13 | 0 | 87 |
| 73 | 0 | | | | | | | |
| 20 | 1 | 0 | 338 | 0 | 542 | 13 | 0 | 86 |
| 90 | 0 | | | | | | | |
| 21 | 1 | 0 | 340 | 0 | 542 | 13 | 0 | 87 |
| 64 | 0 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 547 | 10 | 2 | 88 |
| 72 | 8 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 552 | 7 | 3 | 89 |
| 73 | 12 | | | | | | | |

PID: 17 | arrival_time: 338 | completion_time: 557 | first_run_time: 341 | rtime: 6

PID: 17 | Waiting: 126 | Turnaround: 219 | Response: 3

Average Waiting Time: 82

Average Turnaround Time: 137

Average Response Time: 1

task4, pid : 18

Process: 14 Finished

| ProcessID Priority | Runnable(0/1) Vruntime | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 542 | 22 | 5 | 10 |
| 60 | 40 | | | | | | | |
| 4 | 1 | 0 | 336 | 541 | 0 | 0 | 0 | 88 |
| 90 | 0 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 561 | 4 | 0 | 88 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 542 | 22 | 0 | 84 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 561 | 4 | 0 | 88 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 22 | 2 | 84 |
| 90 | 1008 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 542 | 22 | 3 | 84 |
| 64 | 1008 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 542 | 22 | 2 | 84 |
| 72 | 672 | | | | | | | |
| 15 | 1 | 2 | 337 | 0 | 542 | 22 | 2 | 84 |
| 73 | 672 | | | | | | | |
| 16 | 1 | 5 | 338 | 551 | 0 | 0 | 5 | 88 |
| 90 | 30 | | | | | | | |

| | | | | | | | | |
|----|----|---|-----|-----|-----|----|---|----|
| 17 | 1 | 6 | 338 | 557 | 0 | 0 | 6 | 88 |
| 64 | 24 | | | | | | | |
| 18 | 1 | 0 | 338 | 0 | 542 | 0 | 3 | 88 |
| 72 | 0 | | | | | | | |
| 19 | 1 | 0 | 338 | 0 | 542 | 22 | 0 | 87 |
| 73 | 0 | | | | | | | |
| 20 | 1 | 2 | 338 | 0 | 0 | 2 | 2 | 87 |
| 90 | 12 | | | | | | | |
| 21 | 1 | 0 | 340 | 0 | 542 | 22 | 0 | 87 |
| 64 | 0 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 547 | 19 | 2 | 88 |
| 72 | 8 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 552 | 16 | 3 | 89 |
| 73 | 12 | | | | | | | |

PID: 18 | arrival_time: 338 | completion_time: 565 | first_run_time: 341 | rtime: 5

PID: 18 | Waiting: 135 | Turnaround: 227 | Response: 3

Average Waiting Time: 89

Average Turnaround Time: 148

Average Response Time: 1

task4, pid : 19

Process: 15 Finished

| ProcessID Priority | Runnable(0/1) Vruntime | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 542 | 27 | 5 | 10 |
| 60 | 40 | | | | | | | |
| 4 | 1 | 0 | 336 | 541 | 0 | 0 | 0 | 88 |
| 90 | 0 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 561 | 9 | 0 | 88 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 0 | 1 | 0 | 85 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 0 | 1 | 0 | 89 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 27 | 2 | 84 |
| 90 | 1008 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 542 | 27 | 3 | 84 |
| 64 | 1008 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 542 | 27 | 2 | 84 |
| 72 | 672 | | | | | | | |
| 15 | 1 | 2 | 337 | 0 | 542 | 27 | 2 | 84 |
| 73 | 672 | | | | | | | |
| 16 | 1 | 5 | 338 | 551 | 0 | 0 | 5 | 88 |
| 90 | 30 | | | | | | | |
| 17 | 1 | 6 | 338 | 557 | 0 | 0 | 6 | 88 |
| 64 | 24 | | | | | | | |
| 18 | 1 | 5 | 338 | 565 | 0 | 0 | 5 | 88 |
| 72 | 20 | | | | | | | |

| | | | | | | | | |
|----|----|---|-----|---|-----|----|---|----|
| 19 | 1 | 0 | 338 | 0 | 542 | 0 | 2 | 88 |
| 73 | 0 | | | | | | | |
| 20 | 1 | 2 | 338 | 0 | 567 | 7 | 2 | 87 |
| 90 | 12 | | | | | | | |
| 21 | 1 | 0 | 340 | 0 | 542 | 27 | 0 | 87 |
| 64 | 0 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 547 | 24 | 2 | 88 |
| 72 | 8 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 552 | 21 | 3 | 89 |
| 73 | 12 | | | | | | | |

PID: 19 | arrival_time: 338 | completion_time: 571 | first_run_time: 341 | rtime: 5

PID: 19 | Waiting: 141 | Turnaround: 233 | Response: 3

Average Waiting Time: 95

Average Turnaround Time: 157

Average Response Time: 1

task3, pid : 15

Process: 11 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 11 |
| 60 | 60 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 90 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 87 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 90 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 33 | 2 | 84 |
| 90 | 1008 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 542 | 33 | 3 | 84 |
| 64 | 1008 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 542 | 33 | 2 | 84 |
| 72 | 672 | | | | | | | |
| 15 | 1 | 2 | 337 | 0 | 542 | 0 | 2 | 85 |
| 73 | 672 | | | | | | | |
| 20 | 1 | 2 | 338 | 0 | 0 | 0 | 2 | 88 |
| 90 | 24 | | | | | | | |
| 21 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 88 |
| 64 | 12 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 0 | 0 | 2 | 89 |
| 72 | 16 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 90 |
| 73 | 24 | | | | | | | |

PID: 15 | arrival_time: 337 | completion_time: 576 | first_run_time: 343 | rtime: 4

PID: 15 | Waiting: 151 | Turnaround: 239 | Response: 6

Average Waiting Time: 100

Average Turnaround Time: 165

Average Response Time: 2

task3, pid : 14

Process: 10 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 12 |
| 60 | 80 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 91 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 88 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 91 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 36 | 2 | 84 |
| 90 | 1008 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 542 | 36 | 3 | 84 |
| 64 | 1008 | | | | | | | |
| 14 | 1 | 2 | 337 | 0 | 542 | 0 | 2 | 85 |
| 72 | 672 | | | | | | | |
| 20 | 1 | 2 | 338 | 0 | 0 | 0 | 2 | 89 |
| 90 | 36 | | | | | | | |
| 21 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 89 |
| 64 | 24 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 0 | 0 | 2 | 90 |
| 72 | 24 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 91 |
| 73 | 36 | | | | | | | |

PID: 14 | arrival_time: 337 | completion_time: 579 | first_run_time: 345 | rtime: 4

PID: 14 | Waiting: 154 | Turnaround: 242 | Response: 8

Average Waiting Time: 105

Average Turnaround Time: 172

Average Response Time: 2

task3, pid : 13

Process: 9 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 13 |
| 60 | 100 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 92 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 89 |
| 63 | 0 | | | | | | | |

| | | | | | | | | |
|----|------|---|-----|---|-----|----|---|----|
| 7 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 92 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 38 | 2 | 84 |
| 90 | 1008 | | | | | | | |
| 13 | 1 | 3 | 337 | 0 | 542 | 0 | 3 | 85 |
| 64 | 1008 | | | | | | | |
| 20 | 1 | 2 | 338 | 0 | 0 | 0 | 2 | 90 |
| 90 | 48 | | | | | | | |
| 21 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 90 |
| 64 | 36 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 0 | 0 | 2 | 91 |
| 72 | 32 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 92 |
| 73 | 48 | | | | | | | |

PID: 13 | arrival_time: 337 | completion_time: 581 | first_run_time: 348 | rtime: 5

PID: 13 | Waiting: 155 | Turnaround: 244 | Response: 11

Average Waiting Time: 109

Average Turnaround Time: 178

Average Response Time: 3

task3, pid : 12

Process: 8 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 14 |
| 60 | 120 | | | | | | | |
| 5 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 93 |
| 64 | 0 | | | | | | | |
| 6 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 90 |
| 63 | 0 | | | | | | | |
| 7 | 1 | 0 | 336 | 0 | 0 | 0 | 0 | 93 |
| 62 | 0 | | | | | | | |
| 12 | 1 | 2 | 337 | 0 | 542 | 0 | 3 | 85 |
| 90 | 1008 | | | | | | | |
| 20 | 1 | 2 | 338 | 0 | 0 | 0 | 2 | 91 |
| 90 | 60 | | | | | | | |
| 21 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 91 |
| 64 | 48 | | | | | | | |
| 22 | 1 | 2 | 340 | 0 | 0 | 0 | 2 | 92 |
| 72 | 40 | | | | | | | |
| 23 | 1 | 3 | 340 | 0 | 0 | 0 | 3 | 93 |
| 73 | 60 | | | | | | | |

PID: 12 | arrival_time: 337 | completion_time: 583 | first_run_time: 350 | rtime: 4

PID: 12 | Waiting: 158 | Turnaround: 246 | Response: 13

Average Waiting Time: 113

Average Turnaround Time: 183

Average Response Time: 4

task1, pid : 5

Process: 1 Finished

PID: 5 | arrival_time: 336 | completion_time: 751 | first_run_time: 345 | rtime: 0

PID: 5 | Waiting: 157 | Turnaround: 415 | Response: 9

Average Waiting Time: 116

Average Turnaround Time: 200

Average Response Time: 4

task1, pid : 6

Process: 2 Finished

PID: 6 | arrival_time: 336 | completion_time: 1002 | first_run_time: 402 | rtime: 0

PID: 6 | Waiting: 166 | Turnaround: 666 | Response: 66

Average Waiting Time: 119

Average Turnaround Time: 231

Average Response Time: 8

task1, pid : 7

Process: 3 Finished

PID: 7 | arrival_time: 336 | completion_time: 1147 | first_run_time: 345 | rtime: 0

PID: 7 | Waiting: 163 | Turnaround: 811 | Response: 9

Average Waiting Time: 122

Average Turnaround Time: 267

Average Response Time: 8

task5, pid : 20

Process: 16 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 18 |
| 60 | 200 | | | | | | | |
| 20 | 1 | 14 | 338 | 0 | 1973 | 0 | 16 | 1428 |
| 90 | 64980 | | | | | | | |
| 21 | 1 | 15 | 340 | 0 | 0 | 1 | 15 | 1441 |
| 64 | 48600 | | | | | | | |
| 22 | 1 | 16 | 340 | 0 | 0 | 1 | 16 | 1448 |
| 72 | 44824 | | | | | | | |
| 23 | 1 | 17 | 340 | 0 | 0 | 1 | 17 | 1435 |
| 73 | 49644 | | | | | | | |

PID: 20 | arrival_time: 338 | completion_time: 1976 | first_run_time: 341 | rtime: 18

PID: 20 | Waiting: 193 | Turnaround: 1638 | Response: 3

Average Waiting Time: 126

Average Turnaround Time: 348

Average Response Time: 8

task5, pid : 22

Process: 18 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |

| | | | | | | | | |
|----|-------|----|-----|---|------|---|----|------|
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 19 |
| 60 | 220 | | | | | | | |
| 21 | 1 | 17 | 340 | 0 | 2158 | 2 | 17 | 1619 |
| 64 | 60632 | | | | | | | |
| 22 | 1 | 16 | 340 | 0 | 2158 | 0 | 18 | 1628 |
| 72 | 56280 | | | | | | | |
| 23 | 1 | 17 | 340 | 0 | 2158 | 2 | 17 | 1613 |
| 73 | 61748 | | | | | | | |

PID: 22 | arrival_time: 340 | completion_time: 2160 | first_run_time: 341 | rtime: 19

PID: 22 | Waiting: 174 | Turnaround: 1820 | Response: 1

Average Waiting Time: 129

Average Turnaround Time: 430

Average Response Time: 7

task5, pid : 21

Process: 17 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 20 |
| 60 | 240 | | | | | | | |
| 21 | 1 | 17 | 340 | 0 | 2189 | 0 | 17 | 1646 |
| 64 | 62400 | | | | | | | |
| 23 | 1 | 19 | 340 | 0 | 2189 | 0 | 19 | 1638 |
| 73 | 63648 | | | | | | | |

PID: 21 | arrival_time: 340 | completion_time: 2189 | first_run_time: 341 | rtime: 18

PID: 21 | Waiting: 186 | Turnaround: 1849 | Response: 1

Average Waiting Time: 132

Average Turnaround Time: 504

Average Response Time: 7

task5, pid : 23

Process: 19 Finished

| ProcessID | Runnable(0/1) | Ticks | ctime | etime | qtime | wtime | rtime | N_run |
|-----------|---------------|-------|-------|-------|-------|-------|-------|-------|
| Priority | Vruntime | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 60 | 0 | | | | | | | |
| 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 13 |
| 60 | 0 | | | | | | | |
| 3 | 1 | 5 | 335 | 0 | 0 | 0 | 5 | 21 |
| 60 | 260 | | | | | | | |
| 23 | 1 | 19 | 340 | 0 | 2364 | 0 | 19 | 1813 |
| 73 | 76872 | | | | | | | |

PID: 23 | arrival_time: 340 | completion_time: 2364 | first_run_time: 341 | rtime: 20

PID: 23 | Waiting: 192 | Turnaround: 2024 | Response: 1

Average Waiting Time: 125

Average Turnaround Time: 568

Average Response Time: 5