

Scheduling Project

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Programming Project 2

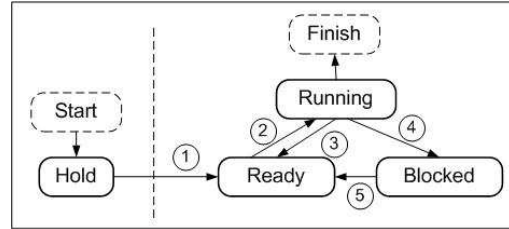


Figure 1: Round Robin State Diagram

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Input file format

- Initialization
I <memory> <resources> <timequantum>
- Job arrival
A <jobnum> <arrivaltime> <cpu-time> <memory>
- Resource request
Q <jobnum> <reqtime> <numresources>
- Resource release
L <jobnum> <reltime> <numresources>
- Display statistics
D <displaytime>

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Example 1 (No resources)

- Input file
I 48 5 10
A 1 00 60 16
A 2 10 50 8
A 3 40 40 8

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Example 1 (...continued)

| Time | Event | HoldQ | Ready | Run | MM | Res | Time left |
|------|--------|-------|-------|-----|----|-----|----------------------|
| 00 | 1 A, S | - | - | 1 | 16 | 5 | 1 60 |
| 10 | 2 A, R | - | 2 | 1 | 8 | 5 | 1 50 2 50 |
| 20 | CX | - | 1 | 2 | 8 | 5 | 1 40 2 50 |
| 30 | CX | - | 2 | 1 | 8 | 5 | 1 40 2 40 |
| 40 | CX | - | 1 | 2 | 8 | 5 | 1 30 2 40 |
| 50 | 3 A, R | - | 1,3 | 0 | 5 | 5 | 3 40 |
| | CX | - | 3,2 | 1 | 0 | 5 | 1 30 2 30 3 40 |

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Example 1 (... continued)

| Time | Event | HoldQ | Ready | Run | MM | Res | Time left |
|------|-------|-------|-------|-----|----|-----|------------------|
| 60 | CX | - | 2,1 | 3 | 0 | 5 | 1 20, 2 30, 3 40 |
| 70 | CX | - | 1,3 | 2 | 0 | 5 | 1 20, 2 30, 3 30 |
| 80 | CX | - | 3,2 | 1 | 0 | 5 | 1 20, 2 20, 3 30 |
| 90 | CX | - | 2,1 | 3 | 0 | 5 | 1 10, 2 20, 3 30 |
| 100 | CX | - | 1,3 | 2 | 0 | 5 | 1 10, 2 20, 3 20 |
| 110 | CX | - | 3,2 | 1 | 5 | 5 | 1 10, 2 10, 3 20 |
| 120 | 1 F | - | 2 | 3 | 16 | 5 | 2 10, 3 20 |
| 130 | CX | - | 3 | 2 | 16 | 5 | 2 10, 3 10 |
| 140 | 2 F | - | - | 3 | 24 | 5 | 3 10 |
| 150 | 3 F | - | - | - | 32 | 5 | |

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W and T for Example 1

| Job # | Ai | Fi | Wi | Trnd | Wt. Trnd |
|-------|----|-----|----|------|----------|
| 1 | 0 | 120 | 0 | 120 | 2.0 |
| 2 | 10 | 140 | 10 | 130 | 2.6 |
| 3 | 40 | 150 | 20 | 110 | 2.75 |
| Sum | | | 30 | 360 | 7.35 |
| Avg. | | | 10 | 120 | 2.45 |

Example 2

- Input file

```
I 48 5 10
A 1 00 40 16
A 2 10 30 8
A 3 40 20 8
A 4 50 10 8
A 5 60 10 8
```

Example 2 (... continued)

| Time | Event | HoldQ | Ready | Run | MM | Res | Time left |
|------|--------|-------|-------|-----|----|-----|------------|
| 00 | 1 A, S | - | - | 1 | 16 | 5 | 1 40 |
| 10 | 2 A, R | - | 2 | 1 | 8 | 5 | 1 30 |
| | | | | | | | 2 30 |
| 20 | CX | - | 1 | 2 | 8 | 5 | 1 20 |
| | | | | | | | 2 30 |
| 30 | CX | - | 2 | 1 | 8 | 5 | 1 20 |
| | | | | | | | 2 20 |
| 40 | CX | - | 1,3 | 2 | 8 | 5 | 1 10 |
| | | | | | | | 2 20 |
| | 3 A, R | - | | | | | |
| 50 | CX | - | 3,2 | 1 | 0 | 5 | 1 10 |
| | | | | | | | 2 10, 3 20 |
| | 4 A, H | 4 | | | | | 4 10 |

Example 2 (... continued)

| Time | Event | HoldQ | Ready | Run | MM | Res | Time left |
|------|---------|-------|-------|-----|----|-----|------------------|
| 60 | 1F, CX | 4 | 2 | 3 | 16 | 5 | 2 10, 3 20 |
| | 4 M | - | 2,4 | 3 | 8 | 5 | 4,10 |
| | 5 A, R | - | 2,4,5 | 3 | 0 | 5 | 5,10 |
| 70 | CX | - | 4,5,3 | 2 | 0 | 5 | 2 10, 3 10, 4 10 |
| | | | | | | | 5 10 |
| 80 | 2 F, CX | - | 5,3 | 4 | 8 | 5 | 3 10, 4 10, 5 10 |
| 90 | 4 F, CX | - | 3 | 5 | 16 | 5 | 3 10, 5 10 |
| 100 | 5 F, CX | - | - | 3 | 24 | 5 | 3,10 |
| 110 | 3 F | - | - | - | 32 | 5 | |

W and T for Example 2

| Job # | Ai | Fi | Wi | Trnd | Wt. Trnd |
|-------|----|-----|----|------|----------|
| 1 | 0 | 60 | 0 | 60 | 1.5 |
| 2 | 10 | 80 | 10 | 70 | 2.33 |
| 3 | 40 | 110 | 20 | 70 | 3.5 |
| 4 | 50 | 90 | 30 | 40 | 4.0 |
| 5 | 60 | 100 | 30 | 40 | 4.0 |
| Sum | | | 90 | 280 | 15.33 |
| Avg. | | | 18 | 56 | 3.066 |

Example 3

- Input file

```
I 48 5 10
A 1 00 40 16
Q 1 05 5
A 2 10 30 8
Q 2 25 2
L 1 30 3
A 3 40 10 8
L 1 50 2
L 2 70 2
```

Example 3 (... continued)

| Time | Event | Blocked | Ready | Run | MM | Res | Time left |
|------|-----------|---------|-------|-----|----|-----|--------------------|
| 00 | 1 A, S | - | - | 1 | 16 | 5 | 1 40 |
| 05 | 1 Q | - | - | 1 | 16 | 0 | 1 35(5) |
| 10 | 2 A, R | - | 2 | 1 | 8 | 0 | 1 30(5) 2 30 |
| 20 | CX | - | 1 | 2 | 8 | 0 | 1 20(5) 2 30 |
| 25 | 2 Q, CX 2 | - | 1 | 8 | 0 | 0 | 1 20(5) 2 25 |
| 30 | 1 L, 2 M- | 2 | 1 | 8 | 1 | 1 | 1 15(2) 2 25(2) |
| 35 | CX | - | 1 | 2 | 8 | 1 | 1 10(2) 2 25(2) |

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Example 3 (... continued)

| Time | Event | HoldO | Ready | Run | MM | Res | Time left |
|------|---------|-------|-------|-----|----|-----|--------------------------|
| 40 | 3 A, R | - | 1,3 | 2 | 0 | 1 | 1 10(2) 2 20(2), 3 10 |
| 45 | CX | - | 3,2 | 1 | 0 | 1 | 1 10(2) 2 15(2), 3 10 |
| 50 | 1 L | - | 3,2 | 1 | 0 | 3 | 1 5 2 15(2), 3 10 |
| 55 | 1 F, CX | - | 2 | 3 | 16 | 3 | 2 15(2), 3 10 |
| 65 | 3 F, CX | - | - | 2 | 24 | 3 | 2 15(2) |
| 70 | 2 L | - | - | 2 | 24 | 5 | 2 10 |
| 75 | CX | - | - | 2 | 24 | 5 | 2 5 |
| 80 | 2 F | - | - | - | 32 | 5 | - |

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W and T for Example 3

| Job # | Ai | Fi | Wi | Trnd | Wt. Trnd |
|-------|----|----|-------|------|----------|
| 1 | 0 | 55 | 0 | 55 | 1.375 |
| 2 | 10 | 80 | 20 | 70 | 2.333 |
| 3 | 40 | 65 | 15 | 25 | 2.5 |
| Sum | | | 35 | 150 | 6.2083 |
| Avg. | | | 11.67 | 50 | 2.07 |

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