Round Robin

▶ **Decision Mode:** Pre-emptive; **Selection Function:** Constant

▶ Uses preemption based on a clock

  ▶ also known as time slicing, because each process is given a slice of time before being preempted.

Round Robin

- Clock interrupt is generated at periodic intervals
- When an interrupt occurs, the currently running process is placed in the ready queue
    - Next ready job is selected

Pros and Cons

▶ **Advantages**

    ▶ Fair (Each process gets a fair chance to run on the CPU)

    ▶ Faster response time

▶ **Disadvantages**

    ▶ Increased process and mode switching

    ▶ Turnaround time typically larger than SRTF

Major Design Issue

▶ Selecting the value of time quantum (q)

▶ Performance depends on quantum q

   ▶ Small q: Overhead due to Process switches (& scheduling) q should be large wrt process-switching time

   ▶ Large q: Behaves like FCFS rule of thumb: 80% of bursts should be shorter than q (also improves turnaround time)

Round Robin Algorithms Problems

(1)

PRCS	AT	BT	CT	TAT	WT	RT
P1	0	5̶3̶1	13	13	8	0
P2	1	3̶1	12	11	8	1
P3	2	1̶0	5	3	2	2
P4	3	2	9	6	4	4
P5	4	3̶1	14	10	7	5

Time Q = 2

Ready Queue : | P1 | P2 | P3 | P1 | P4 | P5 | P2 | P1 | P5 |

Gantt chart : | P1 | P2 | P3 | P1 | P4 | P5 | P2 | P1 | P5 |
0   2   4 5 7 9 11 12 13 14

$$R.T = (CPU \ first \ time - AT)$$

(2)

PRCS	AT	BT	CT	TAT	WT	RT
P1	0	5̶3̶1	12	12	7	0
P2	1	4̶2	11	10	6	1
P3	2	2̶0	6	4	2	2
P4	4	1	9	5	4	4

TQ = 2

Ready Queue | P1 | P2 | P3 | P1 | P4 | P2 | P1 |

Gantt chart | P1 | P2 | P3 | P1 | P4 | P2 | P1 |
0   2   4   6   8 9 11 12

PRCS	AT	BT	CT	TAT	WT	RT
P1	0	4→20	8	8	4	0
P2	1	5→10 18	17	12	1	
P3	2	10	6	4	2	
P4	3	10	6	4	2	
P5	4	6→2	21	9	6	5
P6	6	31	19	13	10	7

T·Q = 2

Ready Queue :

P1	P2	P3	P1	P4	P4	P5	P2	P6	P6	P5	P2	P6	P5

Gantt Chart :

P1	P2	P3	P1	P4	P5	P2	P6	P5	P6
0   2   4   6   8   9   11   13   15   17   18   19   19   21

Ready Queue =

P1	P2	P3	P1	P4	P5	P2	P6	P5	P2	P6	P5

Gantt chart =

P1	P2	P3	P1	P4	P5	P2	P6	P5	P2	P6	P5
0   2   4   6   8   9   11   13   15   17   18   19   19   21

④

PRCS	AT	BT	CT	TAT	WT	RT
P1	0	8→4→2	20	20	12	0
P2	1	4→6	13	12	8	1
P3	2	2→0	6	4	2	2
P4	3	1	9	6	5	5
P5	4	3→1	18	14	11	5
P6	5	2	15	10	8	8

T·Q = 2

Ready Queue =

P1	P2	P3	P1	P4	P5	P2	P6	P1	P5	P3	P1

Gantt chart =

P1	P2	P3	P1	P4	P5	P2	P6	P1	P5
6   2   4   6   8   9   11   13   15   17   18   20