SCHEDULING ALGORITHM

HIGHEST RESPONSE RATIO NEXT SCHEDULING

HRRN ALGORITHM

Highest Response Ratio Next (HRNN). This algorithm is a non-preemptive algorithm in which, HRRN scheduling is done based on an extra parameter, which is called Response Ratio. Given N processes with their Arrival times and Burst times, the task is to find the average waiting time and an average turnaround time using the HRRN scheduling algorithm.

The name itself states that we need to find the response ratio of all available processes and select the one with the highest Response Ratio. It is designed to improve upon simpler algorithms like **First-Come-First-Serve (FCFS)** and **Shortest Job Next (SJN)** by balancing both the waiting time and the burst time of processes. A process once selected will run till completion.

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Formula to calculate the Response Ratio.

Response Ratio = (W + S)/S

Where:

W : Waiting time of the process so far

S : Burst time of the process / service time

Characteristics of HRRN Scheduling

A. Highest Response Ratio Next is a non-preemptive CPU Scheduling algorithm and it is considered as one of the most optimal scheduling algorithms.

B. The criteria for HRRN is Response Ratio, and the mode is Non-Preemptive.

C. HRRN is considered as the modification of the Shortest Job First to reduce the problem of starvation.

D. In comparison with SJF, during the HRRN scheduling algorithm, the CPU is allotted to the next process which has the highest response ratio, and not to the process having less burst time.

HRRN ALGORITHM

Consider following five processes P1 to P5. Each process has its burst time, and arrival time.

PROCESS	AT	BT
P1	1	3
P2	3	6
P3	5	8
P4	7	4
P5	8	5

Response Ratio
Objective: Find the Highest Value

Case 1:
P3 = (10-5) + 8 / 8 = 1.62
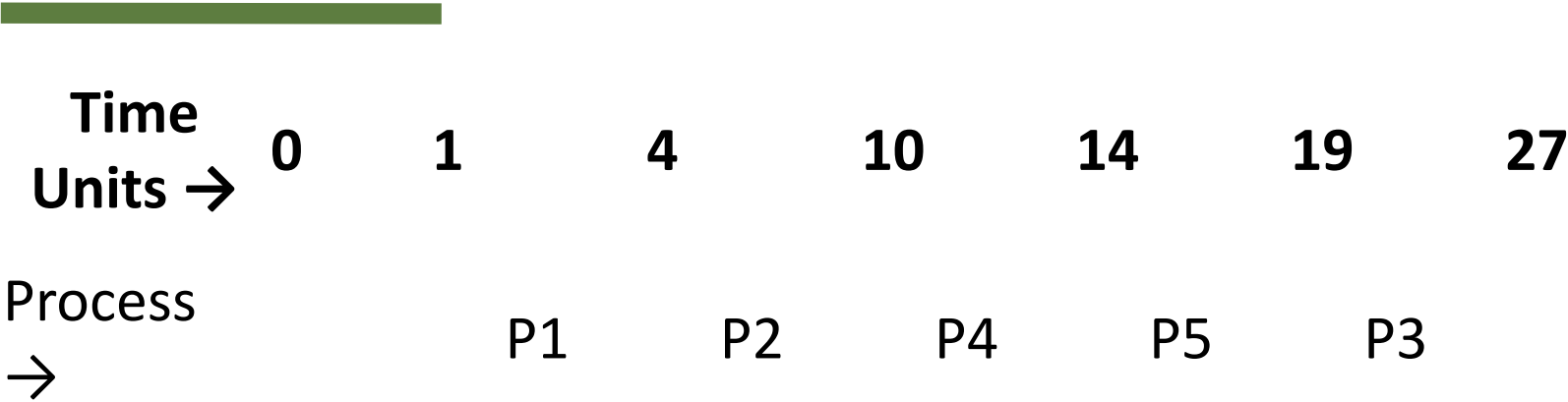P4 = (10-7) + 4 / 4 = 1.75
P5 = (10-8) + 5 / 5 = 1.4

Case 2:
P3 = (14-5) + 8 / 8 = 2.12
P5 = (14-8) + 5 / 5 = 2.2

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Gantt Chart

Time Units →	0	1	4	10	14	19	27
Process →		P1	P2	P4	P5	P3	

ACTIVITY 5

HRRN

HRRN ALGORITHM

INSTRUCTIONS

1. Make a Java program that will compute for the following.
a. Turn Around Time = Completion Time – Arrival Time.
b. Waiting Time = Turn Around Time – Burst Time
c. Average Turn Around Time.
d. Average Waiting Time.
e. RT = ST – AT.
f. Gannt Chart.
2. The user will have the choice to input 3 to 5 process, including Arrival Time and Burst time.
3. The program will ask the user if he/she wants to try again?
4. Upload the java file using the filename format: SNFN5.java
5. Upload a sample output of the program.
6. Java file and sample output will be uploaded at teams.

Criteria: 50 points

1. Complete and running program no errors. **50 points**.
2. Incomplete but running program no errors. **35 points**.
3. Running but no correct output **15 points**. (for the effort)
4. 2nd checking must be complete and working no errors **20 points**.
5. Programs to be checked should be error free. No checking of program if error persists.
6. Once I checked the program it is recorded. If you request for 2nd checking you be in the last priority.

PROGRAM OUTPUT

ACTIVITY 5:
HRRN ALGORITHM

ACTIVITY 5: HRRN ALGORITHM

Title: HRRN SCHEDULING ALGORITHM

Enter no. of process: (IN)

Process	AT	BT	CT	TAT	WT	RT
P1	(IN)	(IN)	(O)	(O)	(O)	(O)
P2	(IN)	(IN)	(O)	(O)	(O)	(O)
P3	(IN)	(IN)	(O)	(O)	(O)	(O)
P4	(IN)	(IN)	(O)	(O)	(O)	(O)
P5	(IN)	(IN)	(O)	(O)	(O)	(O)

Average TAT: (O)

Average WT: (O)

Gannt Chart: | P1 | P2 | P3 | P4 | P5 |

(Example)   0   4   7   8   10   14

EOA

Activity 5: HRRN Algorithm

Enter no. of process: (IN)

Process	AT	BT	CT	TAT	WT	RT
P1	1	3	4	3	0	0
P2	3	6	10	7	1	1
P3	5	8	27	22	14	14
P4	7	4	14	7	3	3
P5	8	5	19	11	6	6

AVERAGE TAT = 10ms
AVERAGE WT = 4.8ms

Gannt Chart: | | P1 | P2 | P4 | P5| P3 |
(Example)　　0　　1　　4　　10　　14　　19　　27