OS Innovative Assignment

Scheduling Algorithms

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Introduction

A Process Scheduler schedules different processes to be assigned to the CPU based on particular scheduling algorithms. There are three popular process scheduling algorithms which we are going to discuss in this project–

- *First-Come, First-Served (FCFS) Scheduling*
- *Shortest-Job-Next (SJN) Scheduling*
- *Round Robin(RR) Scheduling*

These algorithms are either non-preemptive or preemptive. Non-preemptive algorithms are designed so that once a process enters the running state, it cannot be preempted until it completes its allotted time, whereas the preemptive scheduling is based on priority where a scheduler may preempt a low priority running process anytime when a high priority process enters into a ready state.

Project Description

The project is a simulation of all the scheduling algorithms listed above. It is implemented in python. Ide used is jupyter notebooks and the final output is presented using gantt charts and a complete process description table with ***Turnaround times and waiting times*** *to compare performance.*

Inputs:-

```
Enter the Number of processes:5
Enter Process Name: P0
Enter Process-P0 Arrival time: 0
Enter Process-P0 Burst time: 4
Enter Process Name: P1
Enter Process-P1 Arrival time: 3
Enter Process-P1 Burst time: 7
Enter Process Name: P2
Enter Process-P2 Arrival time: 2
Enter Process-P2 Burst time: 1
Enter Process Name: P3
Enter Process-P3 Arrival time: 6
Enter Process-P3 Burst time: 8
Enter Process Name: P4
Enter Process-P4 Arrival time: 3
Enter Process-P4 Burst time: 5
Press 1. for ROUND ROBIN
Press 2. for FCFS
3. for SJF
1
```

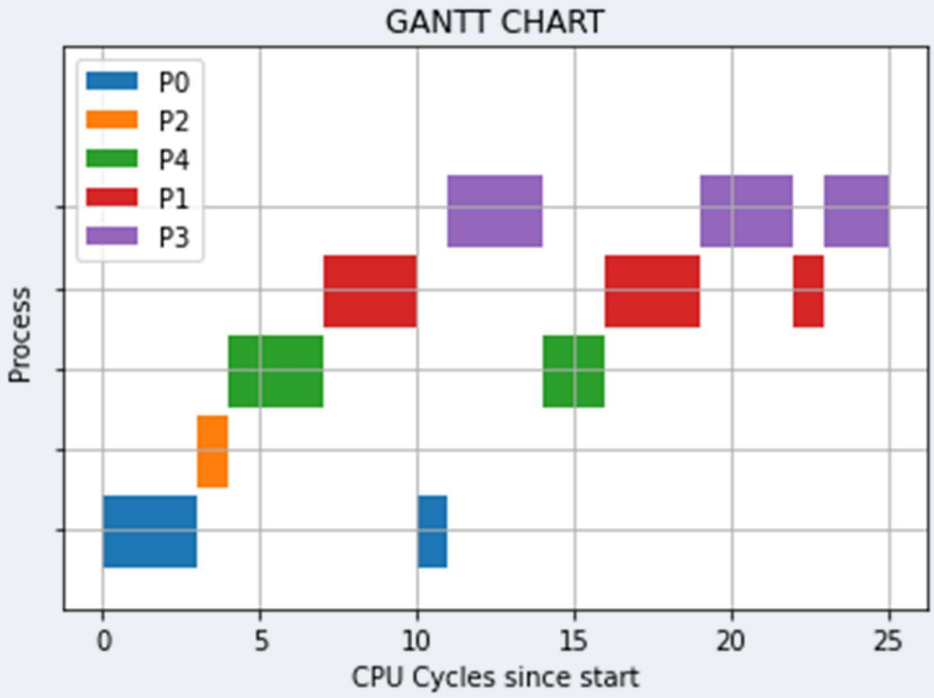
It is a CLI which prompts the user to enter the total number of processes and burst and arrival time for each process.

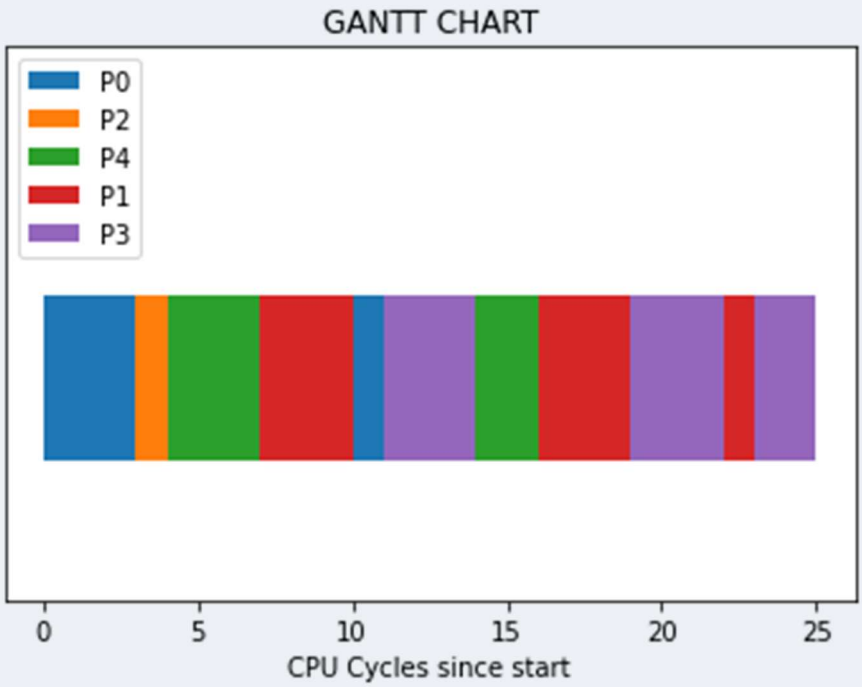
Output:-

```
Enter Time Quantum:3
Process:P0 arrived at 0
Process:P2 arrived at 2
Process:P4 arrived at 3
Process:P1 arrived at 3
Time Slice over for P0 at 3
Process P2 has completed at 4
Process:P3 arrived at 6
Time Slice over for P4 at 7
Time Slice over for P1 at 10
Process P0 has completed at 11
Time Slice over for P3 at 14
Process P4 has completed at 16
Time Slice over for P1 at 19
Time Slice over for P3 at 22
Process P1 has completed at 23
Process P3 has completed at 25
Over
```

As we have selected Round Robin we are further asked to select ***Time Quantum****. Upon Entering we are displayed the* ***summary*** *of process execution*

Output(Continued) :-





Two gantt charts are also generated as part of the output which make it easy to understand the sequence of execution.

Output(Continued):-

```
+-----+--------------+------------+-----------------+--------------+
| Job | Arrival Time | Burst time | TurnAround Time | Waiting Time |
+-----+--------------+------------+-----------------+--------------+
|  P0 |      0       |     4      |        11       |      7       |
|  P2 |      2       |     1      |        2        |      1       |
|  P4 |      3       |     5      |        13       |      8       |
|  P1 |      3       |     7      |        20       |      13      |
|  P3 |      6       |     8      |        19       |      11      |
+-----+--------------+------------+-----------------+--------------+
Average Turnaround time:13.0
Average Waiting time:8.0
```

*A Table is also generated using the **Prettytable** library and **Average turnaround and waiting times** are also shown.*