A Report on Implementation of Round Robin Scheduling Algorithm and Heuristic Bin Packing

The code is written in Python 3 and can be easily executed using the following command in command line: python3 rr_hbp.py (rr_hbp.py is the file name)

Implementation of the Code:

- Enter number of tasks: Please enter an integer number.
- Then, Enter the four constraints of each tasks separating by a ‘comma’.
  (Ex: S1,S2,Pathchar,20).
- Now enter another integer for bin-size time.
- After entering these values we can get the output of the code.

Assumptions made:

- The execution time should be less than the bin-size time.
- All the tasks are first arranged in decreasing order or execution time.
- In one bin-size time only one task can run in the case of Round Robin Scheduling and maximum of 2 task can run in Heuristic Bin Packing given that the two tasks are non-conflicting.
- Non-conflicting tasks are defined as those corresponding tasks (say Task1 and Task2) whose source and destinations don’t match and vice versa.

Flow of the code:

- At first, all the tasks are arranged in decreasing order of Execution Time.
- After that, according to the bin-size time all the tasks are given to execute and it is made sure that no single bins-size time has more than one tasks in it in the case of Round Robin Scheduling.
- Similarly, the task number along with its start time and end time is printed along with time cycle of the entire process.
- After that we check the non-conflicting conditions for heuristic bin packing and make sure if two tasks are non-conflicting then a maximum of two tasks are concurrently run over a single time slot.
- Finally, the task number along with its start time and end time is printed along with time cycle of the entire process.

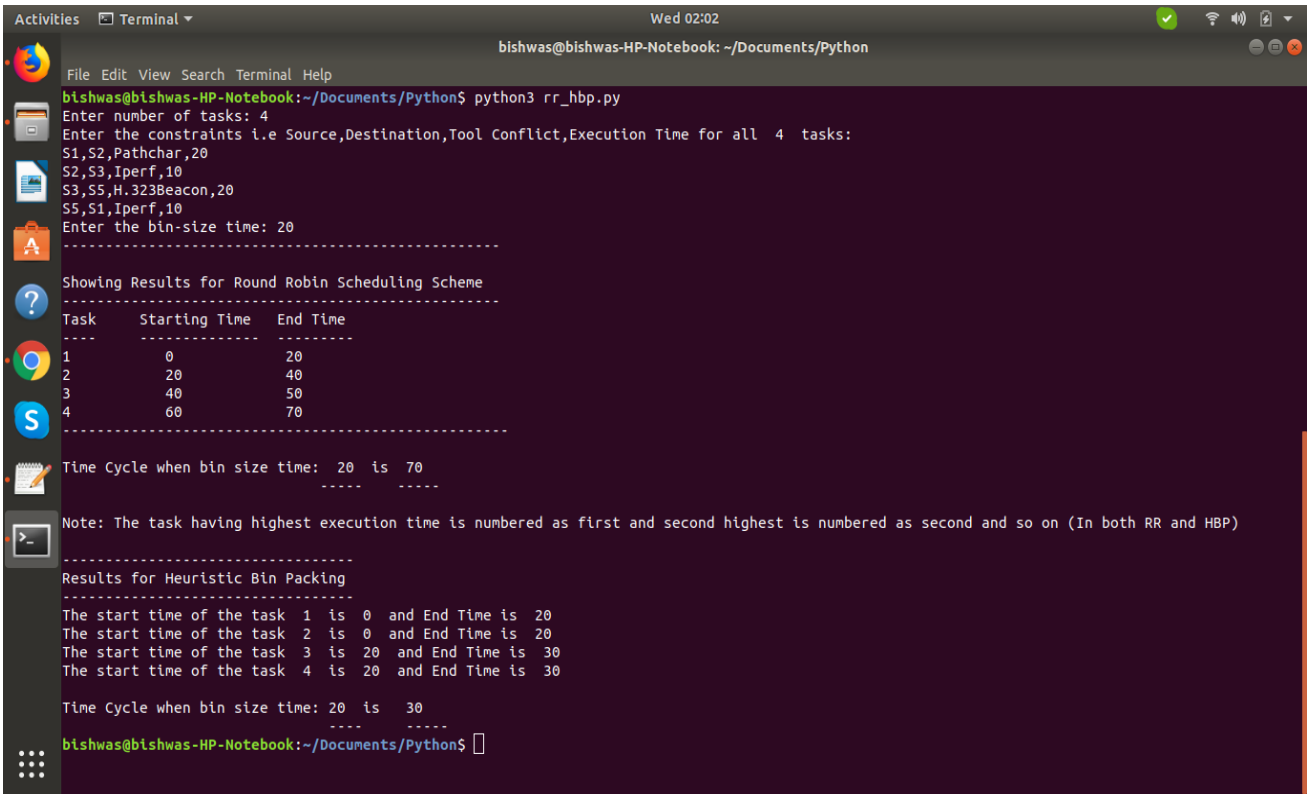
Output of the Code:

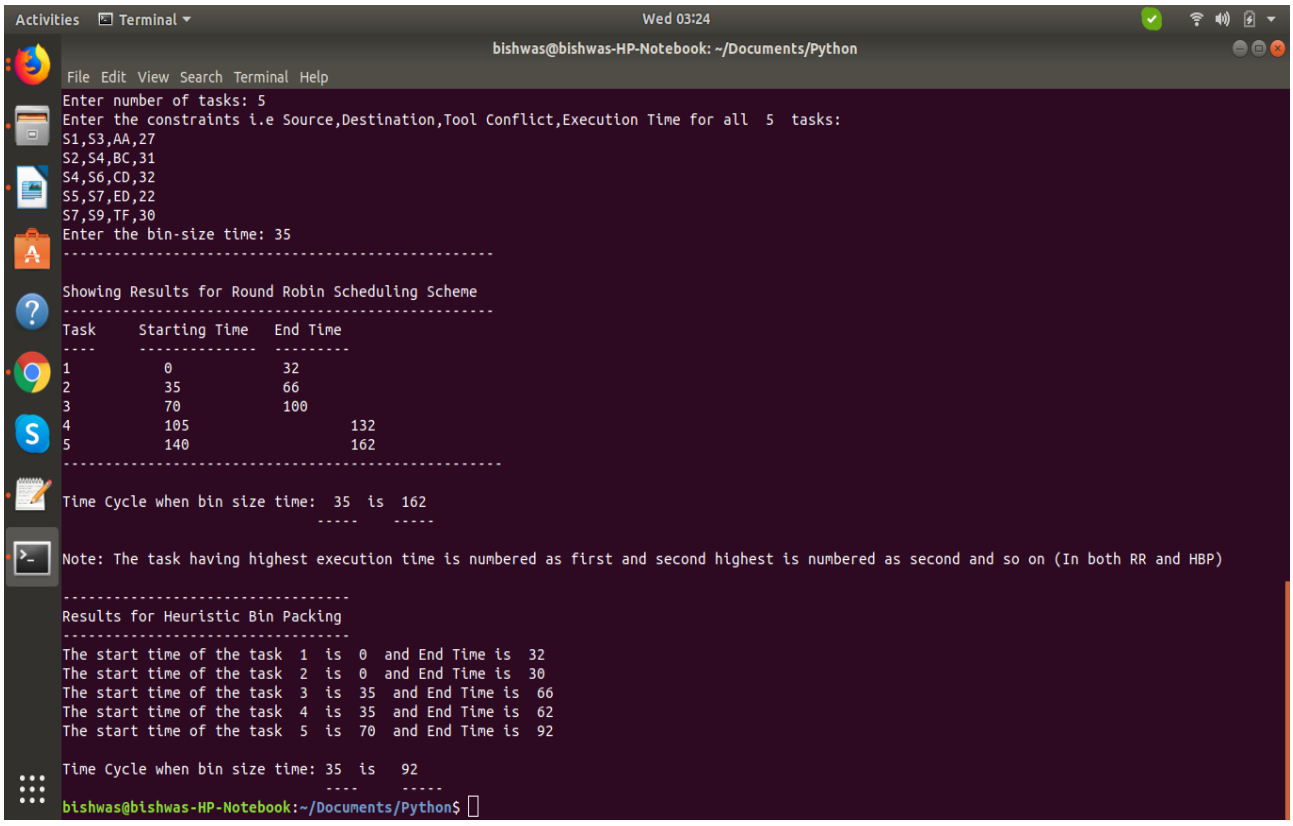
```
Enter number of tasks: 8
Enter the constraints i.e Source,Destination,Tool Conflict,Execution Time for all  8  tasks:
S1,S2,ABC,30
S2,S3,DEF,40
S3,S4,EFG,35
S5,S6,XYZ,42
S7,S8,BCD,50
S9,S10,CDE,21
S2,S12,FDE,9
S18,S20,CEF,27
Enter the bin-size time: 50
------------------------------------------------------------------
Showing Results for Round Robin Scheduling Scheme
------------------------------------------------------------------
Task    Starting Time        End Time
----    --------------       ---------
1           0                  50
2           50                 92
3           100                140
4           150                185
5           200                230
6           250                277
7           300                321
8           350                359
--------------------------------------------------

Time Cycle when bin size time:  50  is  359
                                      -----    -----
Note: The task having highest execution time is numbered as first and second highest is numbered as second and so on (In both RR and HBP)
----------------------------------------
Results for Heuristic Bin Packing
----------------------------------------
The start time of the task  1  is  0  and End Time is  50
The start time of the task  2  is  0  and End Time is  42
The start time of the task  3  is  50  and End Time is  90
The start time of the task  4  is  50  and End Time is  77
The start time of the task  5  is  100  and End Time is  135
The start time of the task  6  is  100  and End Time is  130
The start time of the task  7  is  150  and End Time is  171
The start time of the task  8  is  150  and End Time is  159

Time Cycle when bin size time: 50  is   159
                                      ----    ------
```

Screenshots of the Output :





THANK YOU!