

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 of 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 :

```
Activities Terminal Wed 02:02
bishwas@bishwas-HP-Notebook: ~/Documents/Python

File Edit View Search Terminal Help
bishwas@bishwas-HP-Notebook:~/Documents/Python$ python3 rr_hbp.py
Enter number of tasks: 4
Enter the constraints i.e Source, Destination, Tool Conflict, Execution Time for all 4 tasks:
S1,S2,Pathchar,20
S2,S3,Iperf,10
S3,S5,H.323Beacon,20
S5,S1,Iperf,10
Enter the bin-size time: 20
-----
Showing Results for Round Robin Scheduling Scheme
-----
Task    Starting Time  End Time
-----
1        0             20
2        20            40
3        40            50
4        60            70
-----
Time Cycle when bin size time: 20 is 70
-----
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 20
The start time of the task 2 is 0 and End Time is 20
The start time of the task 3 is 20 and End Time is 30
The start time of the task 4 is 20 and End Time is 30
Time Cycle when bin size time: 20 is 30
-----
bishwas@bishwas-HP-Notebook:~/Documents/Python$
```

```
Activities Terminal Wed 03:24
bishwas@bishwas-HP-Notebook: ~/Documents/Python

File Edit View Search Terminal Help
Enter number of tasks: 5
Enter the constraints i.e Source, Destination, Tool Conflict, Execution Time for all 5 tasks:
S1,S3,AA,27
S2,S4,BC,31
S4,S6,CD,32
S5,S7,ED,22
S7,S9,TF,30
Enter the bin-size time: 35
-----
Showing Results for Round Robin Scheduling Scheme
-----
Task    Starting Time  End Time
-----
1        0             32
2        35            66
3        70            100
4       105         132
5       140         162
-----
Time Cycle when bin size time: 35 is 162
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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)
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Results for Heuristic Bin Packing
-----
The start time of the task 1 is 0 and End Time is 32
The start time of the task 2 is 0 and End Time is 30
The start time of the task 3 is 35 and End Time is 66
The start time of the task 4 is 35 and End Time is 62
The start time of the task 5 is 70 and End Time is 92
Time Cycle when bin size time: 35 is 92
-----
bishwas@bishwas-HP-Notebook:~/Documents/Python$
```

THANK YOU!