Assignment 4

Overview

This assignment is intended to improve your understanding of how some of the different CPU scheduling algorithms work. You are given a list of processes, including their expected burst times, priorities, and times of arrival. For each algorithm specified in this assignment, you are to use this process list to create a table in the same format as the one used in the slides for Chapter 5, showing the various performance measures for that algorithm applied to that process set.

You must complete this assignment by its deadline, which is Monday, April 19, at 7:00 PM. This is important.

Instructions

You are given the following list of processes, with their times of arrival, total service times, and priorities. Priority values are inverse - if the priority of $P_i$ is smaller than that of $P_k$, then $P_i$ has higher priority than $P_k$.

<table>
<thead>
<tr>
<th>Process ID</th>
<th>Arrival Time</th>
<th>Service Time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>0</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>P1</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>P2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>P3</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>P4</td>
<td>8</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

For each of the following CPU scheduling algorithms, you are to compute the wait time, the turnaround time and the normalized turnaround time, and compute the mean wait time, turnaround time and normalized turnaround time, and display the results by extending the table as shown below.

1. First-Come-First-Served
2. Round-Robin with Quantum = 3
3. Shortest-Job-First
4. Shortest-Remaining-Time-First
5. Preemptive Priority Scheduling, breaking ties with Round Robin, Quantum = 2
Format of the Solution

For each of the above algorithms, you are to create a separate comma-separated-values (CSV) file containing exactly six lines, one for each process and one for the computed means. Each line must contain seven fields, separated by commas. The line does not end in a comma! The files must be plain text files in UNIX format, i.e., not containing the DOS CR/LF line endings.

The above empty table would be in the form

```
P0,0,9,6,,
P1,2,5,3,,
P2,3,2,2,,
P3,5,2,1,,
P4,8,4,1,,
means,\
```

The means and the normalized turnaround time must be expressed as a fixed-point decimal with exactly two digits to the right of the decimal point. If any such value is not in this form, it will be treated as an incorrect answer.

The names of the files should be

```
hwk4_username_FCFS.csv
hwk4_username_RR.csv
hwk4_username_SJF.csv
hwk4_username_SRTF.csv
hwk4_username_PRI.csv
```

where `username` is to be replaced by your username on the CS network.

Submitting the Solution

In these instructions, the dollar sign '$' in the command descriptions is the prompt character by the system. You do not type it.

1. Login to eniac as you have done in the past using `ssh`.
2. When you login successfully, `ssh` to any `cslab` host. For example, to `ssh` to `cslab8` you would type:
   ```
   $ ssh cslab8
   ```
3. Navigate to any directory in which you have write permission. You can work in your home directory if you like.
4. Create a directory named named `hwk4_username`:
   ```
   $ mkdir hwk4_username
   ```
5. Put all five files into this directory:
   ```
   $ mv hwk4_username_*.*.csv hwk4_username
   ```
   **Do not place anything else into this directory.** You will lose 5% for each file that does not belong there, and you will lose 5% if you do not name the directory correctly.
6. Create a zip archive for this directory by running the `zip` command
   ```
   $ zip -r hwk4_username.zip ./hwk4_username
   ```
7. You will use the `submithwk_cs340` command to submit this zip file. To submit your file, you give it the `-z` option:

```
$ submithwk_cs340 -z 4 hwk4_username.zip
```

The program will copy your zip file into the directory

```
/data/biocs/b/student.accounts/cs340_sw/hwks/hwk4/
```

and if it is successful, it will display the message, “File `hwk4_username.zip` successfully submitted.”

You will not be able to read this file, nor will anyone else except for me. But you can double-check that the command succeeded by typing the command

```
ls -l /data/biocs/b/student.accounts/cs340_sw/hwks/hwk4
```

and making sure you see a non-empty file named `hwk4_username.zip`.

8. **You can resubmit as many times as you want. Newer versions of the file will overwrite older ones.**

Grading Rubric

This assignment is 2% of your final grade. Each file is worth 20% of the total value of the assignment. The deadline is, as stated above, **Monday, April 19 at 7:00 PM**.