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Operating System Project: Student Assignment Scheduling (Animation): SJF, SRTF, Priority Algorithm

By Group 13

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Section 07

Abstract

Process scheduling is the activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy. In this particular project, 3 scheduling algorithms of Shortest Job Next (SJN), Shortest Remaining Time First (SRTF), and Priority will be selected to be the topic of discussion. The main aim of this project is to explain and represent the equivalent real life activity that would better represent the three selected algorithms. Animation will be selected as the media of the explanation of the selected process scheduling algorithm. This would create an easily understood and comprehend explanation of selected discussion of process scheduling to not only specific demographics such as computer science students but also to the general viewer with no background of this field.

1. Introduction

Process Scheduling:

As the progression of our study is going, our understanding of the topic shall be put into a review to enhance comprehension of the topic in the operating system for the group as well as those who view the project. In this project we decided to select the topic of process scheduling and selected **SJF, SRTF**, and **Priority** as the three selected algorithms to hold the discussion around for this project. Process scheduling is the activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy (tutorialspoint, n.d.). Animation is chosen to represent the three selected algorithms in this project to show what they are and how they work using a real life activity to explain such a topic in a concise and easily understood manner.

In the Operating System (OS) there are several scheduling algorithms implemented by the OS. In our project, we focused on the Shortest-Job-First or known as (SJF), Shortest-remaining-time-first or known as (SRTF), and Priority scheduling.

- **Shortest-Job-First (SJF)**

SJF is one of the scheduling algorithm used by operating system, this scheduling is known as Non Preemptive scheduling because in SJF, the CPU allocates the process until it terminates or switches to waiting state or that means there is no interrupt in the middle of the execution, SJF is an algorithm which works with the process that having smallest execution time is chosen for the next execution.

- **Shortest-remaining-time-first (SRTF)**

Shortest-remaining-time-first or (SRTF), is the preemptive version of SJF, preemptive is a scheduling wherese the CPU allocated the limited time for a process to be executed, in other words, Preemptive scheduling can be interrupted when there is a higher priority that come to the process. SRTF is a scheduling algorithm that allocates the shortest completion time first to be executed, but if there is a newer job that has a shorter completion time so the job will be preempted.

- **Priority Scheduling**

Priority Scheduling is a Non preemptive scheduling but it also can be a preemptive scheduling, The priority scheduling is a scheduling process that when the CPU allocated the process with a priority number so that means priority scheduling based on the priority allocated by the CPU, the smallest integer assigned to the process so the highest priority that process will be.

2. Problem Statement

Although known as an OS task that focuses on scheduling the processes of different states, Process Scheduling can be applied to solving problems of daily life. Many issues in real life can be implemented and solved through Process Scheduling by implementing the basic concept of Process Scheduling which prioritizes mapping of ready, waiting, and running. For this project, we took a daily life sample in implementing this Process Scheduling problem on Setting Time Management for university students in doing their assignments. Therefore, through this project, we want to prove whether Process Scheduling can be used as a solution to manage planning for student lectures efficiently.

3. Project Objectives

The specific objectives of the research include:

1. Can give a clear and attractive explanation about the implementation of Process Scheduling, using the SJF, SRTF, and Priority algorithms in a coherent, rational, and accurate way.
2. Able to provide straightforward solutions through every problem by implementing process scheduling using the SJF, SRTF, and Priority algorithms in a coherent, rational, and accurate way.
3. The solution given is expected to be implemented in real life, following the basic concept of Process Scheduling.

4. Scope of Project

The focus of this project is to represent process scheduling (SJF, SRTF, & Priority) using real world representation.

1. Student assignment is the focus of real world application of selected process scheduling algorithms.
2. Each algorithm will have their own scenario based on student assignment example
3. Presentation of the algorithm will be presented by animation video using powtoon.
4. Animation videos will be shared for informative purposes.

5. Significance of the Project

The goal of the project is to explain the process scheduling algorithm of SRJ, SRTF, and Priority.

1. It will explain the understanding of SRJ, SRTF, and Priority in a simple way using real world examples.
2. It would help people besides computing students to understand a basic knowledge of process scheduling.
3. Project development challenged the understanding of material of team members.
4. Sharing informational videos that are engaging and compelling.

6. Project Methodology

A good project framework increases the quality of any project. It helps to know whether the project is on the right track. Each phase or step has its own deliverables and will guide to the next phase in order to complete the project.

This Project consisted of phases :

- Phase-1 : Project Planning
- Phase-2 : Factor Identification
- Phase-3 : Data collection that will be illustrated
- Phase-4 : Develop the animation using powtoon platform
- Phase-5 : Final report Writing.

7. Results and Discussion

7.1. Findings from the Determined Problems

After reviewing the daily life problems that we have determined, Setting Time Management for university students in doing their assignments, we found three aspects related to each other that triggered the problems. Here are the details of the problems that we have reviewed:

1. Deciding which assignments to do based on closest submission time.
2. New assignments that suddenly pop up with a much closer submission.
3. Determination of tasks that have varied marks.

We find these problems in students that make them burdened to be disciplined and responsible for completing all their assignments. Therefore, several steps and appropriate solutions are needed to solve these problems so that they can manage their time management better.

7.2. Solutions

Therefore, we have provided solutions to these problems that have been implemented and developed based on the three scheduling algorithms in Process Scheduling: **SJF**, **SRTF**, and **Priority** Scheduling. Here are the solutions that we have provided:

- **Shortest-Job-First (SJF)**

For the SJF algorithm, it is very applicable to be a solution to the first problem. Therefore, we have prepared a solution concept. Suppose there are four types of Assignments, namely Assignments 1, 2, 3, and 4. Assignment 1 is the one that has the shortest time to submission, so we select it as the first to be done. Once Assignment 1 is finished, the next assignment will be the next one with the shortest time to submission, which is Assignment 2. This cycle will continue with Assignments 3 & 4; once the current shortest assignment is done, the next shortest one will be done.

Then, the finishing of assignments will implement the SJF algorithm, which the first one that is selected to be done will be the one that has the shortest time until submission. If the shortest assignment is finished and submitted, the next shortest one will be done next, and the process will continue until all assignments are done.

- **Shortest-remaining-time-first (SRTF)**

The solution to this second problem is a complex development of the previous problem, where this problem can be solved using the SRTF algorithm. SRTF is similar to what SJF has implemented, in which the next shortest job will be the one done next. The difference, SRTF will always do a newly arrived job first if it has a shorter time than the next job. So, when a new assignment is released with a shorter submission time, then that new assignment will be the next one done.

When Assignment 1 is finished, suddenly a new one is released with a shorter submission time then Assignment 2. Assignment 2 will be done after the new assignment is submitted as it is currently the next shortest one.

- **Priority Scheduling**

For solving the third problem, the concept of Priority Scheduling is precise and efficient. Priority Scheduling puts forward a priority where the thing that has the greatest marks will have the opportunity to be executed first, according to the weight of the marks.

During the four assignments given, various markings will be based on the type of problems in the assignments. Therefore, the implementation of Priority scheduling can be applied. From this implementation, we will solve every problem in the assignments based on the mark with the highest weight first as a priority and continue until the mark has the lowest weight.

8. Conclusion

Process scheduling is the activity of the process manager that handles the removal of the running process from the CPU. With this topic, our group focuses on the three algorithms of process scheduling, SJF, SRT, and Priority, to produce an animation video that represents the working and representation of the three algorithms. The animation video uses real world examples to produce a sense of ease and understanding for the viewer. In the real world situation there are some students that struggle to manage their work on college assignments. The unmanaged scheduling is one of the dilemmas to finish their tasks within the deadline. Our solution offers a solution for them so they can manage their task allocation within the deadline or time. Using three scheduling algorithm concepts that are implemented in Operating Systems, that is SJF, SRTF and Priority scheduling can be the best task allocation solution for those students that are facing this kind of problem. The findings of the discussion are useful to help students to manage assignments correctly by implementing an operating system aspect which is process scheduling (SRJ, SRTF, Priority). The animation video that has been produced will be useful to help students to understand process scheduling using a real world problem example alongside the solutions.

References

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