National University of Computer & Emerging Sciences
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Project Proposal
OPERATING SYSTEMS
Section: H

[Scheduling Algorithms using Raspberry Pi]

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Title

Scheduling Algorithms using Raspberry Pi (2 Algorithms)

Introduction

CPU scheduling is done to assign tasks to the CPU according to their priorities, and their arrival time (depending on the algorithm) to ensure timely completion of tasks, and prevent the CPU sitting idle. E.g. First Come First Serve, Shortest Job First, etc. CPU scheduling can be done using any type of a computer. In this project, we will implement two scheduling algorithms using raspberry pi. Raspberry pi is a credit card sized computer which can be connected to any screen, or monitor. It uses a standard mouse and keyboard, and it is capable enough to perform any tasks that a desktop computer can do, but it is comparatively cheaper.

The algorithms we would be making on raspberry pi are:

1) First Come First Serve Algorithm: the FCFS algorithm is a non-preemptive algorithm. The job that has the minimal arrival time is executed first, and no job can interfere between its executions. As soon as one job completes, the CPU takes the job following the completed one.

2) Shortest Remaining Time First Algorithm: this is a pre-emptive version of the Shortest Job First algorithm. In this algorithm, the job with the least burst time is executed on every clock cycle, which means at every cycle, the CPU checks if any other job has a lesser Burst time requirement, and if any job does, it replaces the task that is running.

Methodology

Pi OS is already a complicated metal program, but it can't still be called an operating system as it can't do the tasks that operating system are obligated to do such as process scheduling. Which means operating system should be able to share the cpu time between the processes. Process should not know that the scheduling is happening, it should only see itself as one having cpu at that time.

Installing Raspberry pi:

1. Make Sure the OS Is Installed on the SD Card. Your SD might have **Raspberry Pi** Operating System installed.
2. Configure the Wifi Connection on Your SD Card.
3. Turn on Your **Raspberry Pi**.
4. Connect to Your **Raspberry Pi** with SSH.
5. Install VNC Server.
6. Install a VNC Viewer on Your **Laptop.**

Writing Scheduling Algorithms:

The two algorithms that we'll be using in our project as mentioned above is First Come First Serve (FCFS) and Shortest Remaining Time First (SRTF). These 2 algorithms will be coded in C language on Linux terminal using gcc compiler.

Compiling Scheduling Algorithms on Pi Machine:

As soon as we login onto the Raspberry Pi, we are presented with the GUI desktop or perhaps the command line if we have not enabled the desktop. We will be using command line in our project. The pi machine will be connected with the VGA to the monitor and first OS will be installed there, including some python libraries as well.

Our first job is to install gcc compiler on the pi machine.

Then we create a directory using mkdir command followed by creating a .c code for our scheduling algorithms.

.c file will entail libraries, main functions, codes, segments and the algorithms that we want them to run.

Then with the help of gcc compiler and using sudo gcc –o file file.c command we will compile the program.

And finally we will execute the program in the terminal using ./ followed by our file name.

The code will be executed in pi terminal.