Introduction to Process Management

Process management is a fundamental aspect of operating systems. It involves managing the lifecycle of processes, which are essentially programs in execution.

Process Control Block (PCB)

A Process Control Block (PCB) is a data structure that contains all the information about a process, such as its state, priority, memory allocation, and I/O resources.

1. ## Process ID

   A unique identifier for each process.

2. ## Process State

   The current state of the process, such as running, ready, or waiting.

3. ## Program Counter

   The address of the next instruction to be executed.

4. ## Memory Allocation

   Details of the memory allocated to the process.

Context Switching

Context switching is the process of switching the CPU from one process to another. This involves saving the current state of the running process and loading the state of the new process to be executed.

1

Save Current State

The CPU saves the context of the currently running process.

2

Load New Process Context

The CPU loads the context of the new process to be executed.

3

Resume Execution

The CPU begins executing the new process.

Scheduling Algorithms

Scheduling algorithms determine which process should be executed next when multiple processes are waiting for the CPU. They aim to optimize resource utilization and minimize waiting times.

First-Come, First-Served (FCFS)

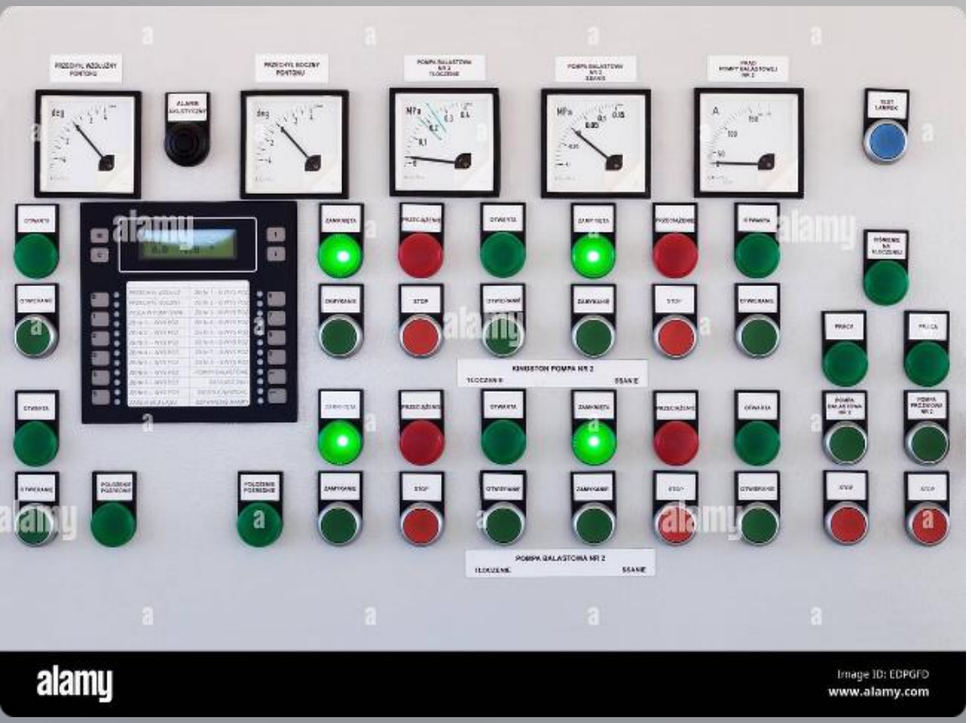
Processes are executed in the order they arrive in the ready queue.

Shortest Job First (SJF)

The process with the shortest estimated execution time is selected next.

Priority Scheduling

Processes with higher priority are given preference.



Process Dispatching

Process dispatching is the actual act of transferring control of the CPU to a selected process. It involves switching the context and making the process ready for execution.

1

Process Selection

The scheduler chooses the next process to be executed.

2

Context Switch

The CPU saves the current process context and loads the context of the selected process.

3

Process Execution

The selected process begins running on the CPU.

Conclusion and Key Takeaways

Process management is crucial for efficient operating system performance. It involves a complex interplay of processes, their control, scheduling, and dispatching. Understanding these concepts is essential for software development and system administration.

Processes

Programs in execution.

PCB

Process control block.

Scheduling

Determining process execution order.