Introduction to Real-Time Operating Systems

Name

Universidad Panamericana

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Contents

What is an operating system?

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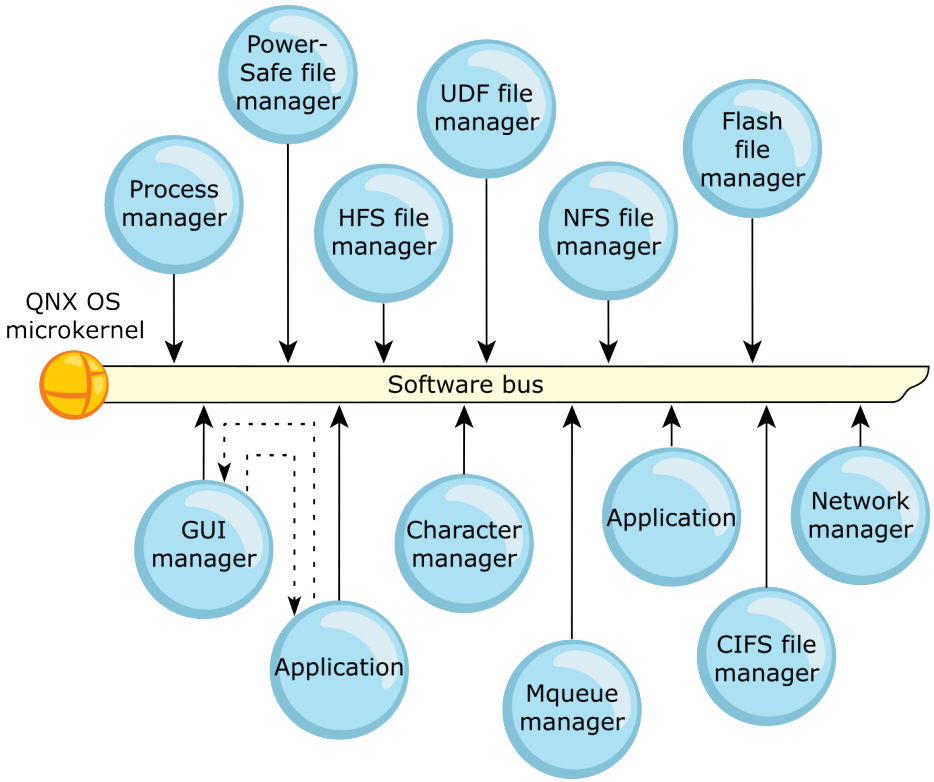
Block Title

Is a software that manages and distributes multiple running applications across a computer or platform, with the main objective to **efficiently manage multiple tasks simultaneously**.

- It acts as a mediator between the computer's hardware and the applications that run on it, providing a user-friendly interface and managing the execution of software programs.

Modularity

- Modularity: Operating systems should be modular in design, allowing for parts of the system to be modified or enhanced without affecting other parts. This supports easier updates and maintenance.



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Portability, Usability, and Responsiveness

- **Portability**: The ability of the operating system to run on different types of hardware without significant modifications. This is crucial for reducing the development time and cost when moving software among different systems.
- **Usability**: The operating system should be designed for ease of use, with interfaces and tools that are intuitive and easy to learn for various categories of users.
- **Responsiveness**: The system should respond in a timely manner to user inputs and system events. This is particularly important in interactive environments and real-time operating systems.
- $\rightarrow$ Check the video

Safety in Operating Systems

Definition of Safety

Ensuring that an operating system operates without leading to catastrophic consequences in the environment it controls.

Objectives

- Prevent system failures that might lead to hazardous situations.
- Ensure reliability and fault tolerance.

Strategies

- Redundancy in critical system components.
- Regular system audits and error checks.
- Use of watchdog timers to recover from hardware/software failures.

Security in Operating Systems

Definition of Security

Protecting system resources and data from unauthorized access and ensuring confidentiality, integrity, and availability.

Objectives

- Protect data confidentiality and integrity.
- Ensure system availability against attacks and breaches.

Strategies

- Implementation of user authentication mechanisms.
- Use of encryption for data protection.
- Regular updates and patches to fix vulnerabilities.

What is a Real-Time Operating System (RTOS)?

- **Purpose:** Real-time systems are designed to respond to input or events within a guaranteed time frame, typically measured in milliseconds or microseconds. The term "real-time" refers to the system's ability to process and respond to inputs almost instantaneously, ensuring outputs are produced within a strictly defined time period relative to an event.
- **Deterministic:** Behavior in terms of timing and execution is predictable.
- **Use Cases:**
  - Embedded systems (e.g., medical devices, automotive controls)
  - Industrial automation
  - Telecommunications systems

What is a Real-Time Operating System (RTOS)?

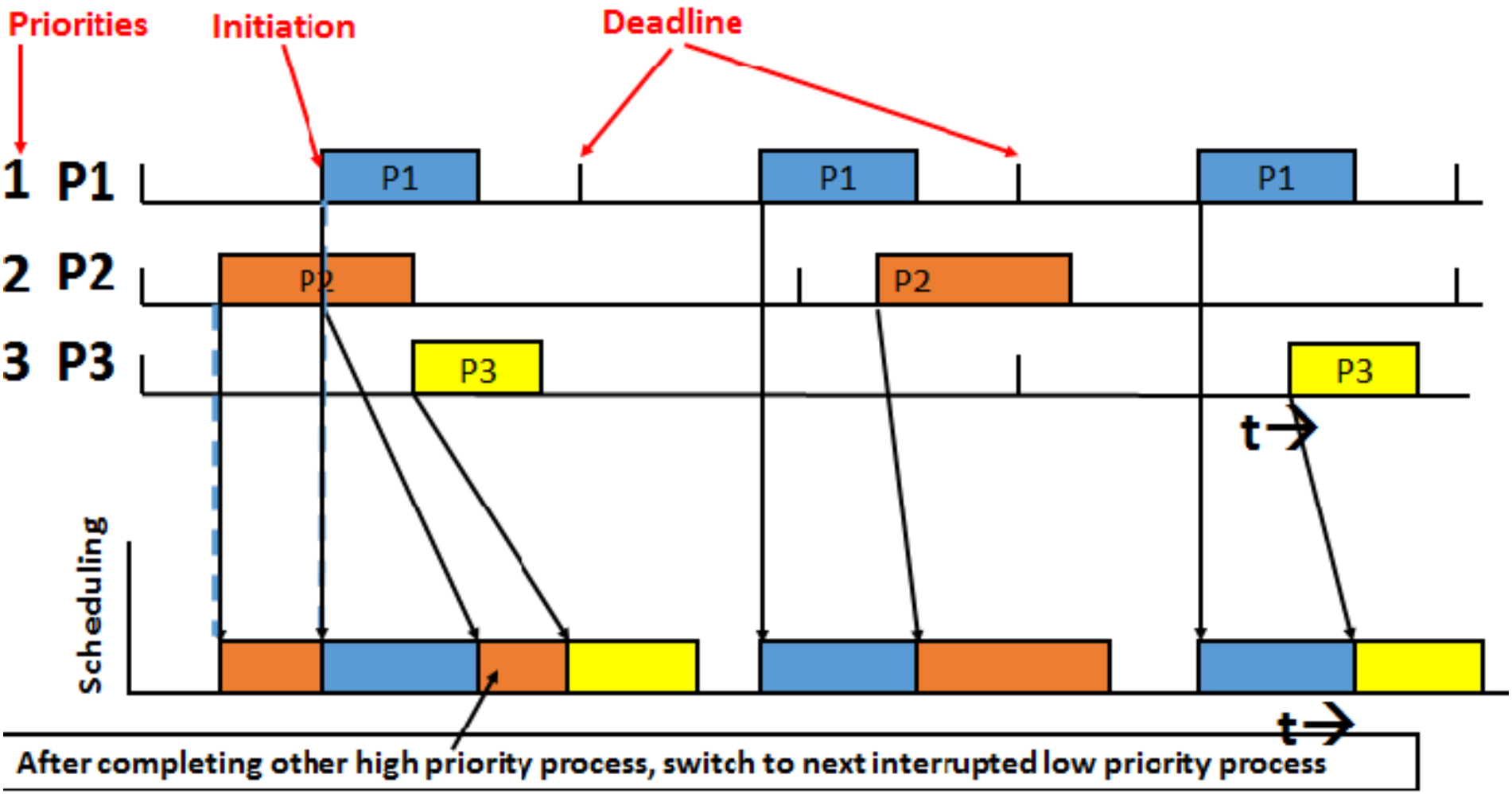

Fig. 3 Priority-based Preemtive Scheduling

What does mean Free? And what is Open Source?

Terms of service you didn't read

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Important

Thats why open source is soo important
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Thank you!