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## OPERATING SYSTEMS COURSE

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### Topic 2 Presentation Guide: Processes and threads.

This topic describes the concepts and problems related to the management of processes and threads in operating systems. All programs whose execution is requested by users do in the form of processes, hence the importance of knowing in the concepts in detail. A process can be defined as a running program and in a little more precise way as the processing unit managed by the operating system.

A thread is a running program (execution flow) that shares the memory image and other information with other lightweight processes. A process flow may contain a single run, as in classical processes, or more than one execution flow. From the point of view of programming, each thread is defined as a function whose execution can be launched in parallel with each other. The primary thread of execution, or primary lightweight process, corresponds to the main function.

The operating system maintains tables of processes and threads within which a control process block BCP is stored for each process or a thread control block for every thread BCT.

Throughout their life, processes and threads can be changed to at least three states (run, ready and blocked), which change depending on the evolution of their needs. The operating system provides scheduling services to manage multiple processes and threads simultaneously on a computer, based on defined system configuration criteria, such as priority user, slices of time, first come first served, etc. This topic also shows the concepts of processes scheduling and then services associated with it.

The operating system provides services to create, destroy and manage processes and threads. In the case of processes, services are usually restricted, being extended to the case of threads. In this issue the main services that POSIX provides for the management of processes, threads and scheduling are described. Services for working with signals and timers are also presented.

The topic includes three lessons:

- Introduction to project management.
- Process scheduling.
- Processes and threads.

The primary objective of the subject is to present the concepts and problems related to the management of processes and threads in operating systems and the scheduling techniques thereof. This general objective is broken down into a series of specific objectives, which are listed below:

- Show the students some basic concepts of processes from the point of view of user and their life cycle and internal aspects of the system.
- To introduce the concept of multitasking , state of processes and context switching .
- Show services for processes that gives the operating system to manage processes and threads.
- Insert the threading model ( threads) and their relationship with the processes and planning.
- To introduce the concepts of signals, exceptions and timers that allow you to synchronize processes and threads .
- Show the reader some basic planning concepts operating system from the user point of view .
- Describe the services it provides the operating system.
- Propose a set of practices which will cover the basics of management and planning processes and threads.

### **Associated Materials**

The theoretical lessons are complemented with exercises for each of them, to be resolved after the classes, as specified in the schedule associated with the teaching guide.

Mandatory and recommended reading with more problems and solved exercises are included, so that students can complete their training.

This topic is complemented with a lab to use systems calls for Project management.