MIT World Peace University

Computer Networks
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Operating Systems

Notes from Tananbaum and Classes

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Contents

1 Processes

A process is an instance of a program in exeuction. It is an entity that can be assigned to and executed on a procesor.

1. Process is compromised of Program Code
2. Data
3. Stack
4. A number of attribute describing the state of process.

1.1 Process states

1. New
2. Ready
3. Running
4. Waiting
5. Terminated
6. Suspended

1.1.1 Suspended State

- Process is faster than IO so man processes could be waiting for IO
- Swap this proces to disk (SSD/ HDD) to free up RAM memory.
- Ready or waiting state becomes suspended state when swapped to disk.

2 Process Control Block

It is a data structure maintained by the Operating System. It holds all necessary information related to Process. Information Associated with each process is as follows:

1. Process state
2. Program Counter
3. CPU Registers
4. CPU Scheduling information
5. Memory Management Information
6. Accounting Information
7. IO Status information

3 Switches

3.1 Context Switches

1. It switches the execution of a process to another, so for that it has to do some stuff,
2. It saves the state of the first program, and then reloads the state of the next one.
3. And only then it runs the next process. This takes time, and is a major disadvantage.
4. It is a mode switch, but a mode switch isnt a context switch.
5. It is a mode switch coz it requires you to switch mode from user to kernel.

4 Process Execution

Consider three processes being executed, all are in the meory, plus the dispatcher.

Dispatcher Dispatcher is a small program which switches from one program to another. -

5 Process Creation

When a new process is created, the following happens:

1. Allocates space to the process in memory
2. Assign a unique Process ID to the Process
3. A process control Block PCB gets associated with the process
4. OS Maintains pointers to each process's PCB in a process table sothat it can access the PCB quickly.

Reasons to create a Process

1. New User Job
2. Created by OS to provide a service
3. Spawned by existing Process: The action of creating a new process at the explicit request of another process is called process spawning.

After Creation

1. Stay in the parent Process
2. Transfer Control to the child process. The system call for that is called Fork. This child process inherits everything from the parent.
3. Transfer control to another process.

5.1 fork()

A system call fork() is used to create processes. It takes no arguments and returns a process ID. The syntax for the fork system call pid = fork();
in the Parent process, pid is the child process
In the child process, pid is 0

1. It allocates a slot in the process table for the new process
2. It assigns a unique ID number to the child process
3. It makes a copy of the context of the parent process.
4. It returns the ID number of the child to the parent process, and a 0 value to the child process process is assigned.