Sri SAI RAM ENGINEERING COLLEGE
INSTITUTE OF TECHNOLOGY
West Tambaram, Chennai - 44

SAIRAM DIGITAL RESOURCES

YEAR II SEM III

CS8392

OBJECT ORIENTED PROGRAMMING
(Common to EEE, CSE, EIE, ICE, IT)

UNIT NO 4

4.1 Differences between multi-threading and multitasking

COMPUTER SCIENCE & ENGINEERING

Differences between Multi threading and Multi tasking

In programming there are two main ways to improve the throughput of a program

i) By using multi threading
ii) By using Multi tasking

Both these methods take advantage of parallelism to efficiently utilize the power of CPU and improve the through put of program.

- Multitasking is when a single CPU performs several tasks (program, process, task, threads) at the same time

- Multithreading is a conceptual programming concept where a program (process) is divided into two or more subprograms (process), which can be implemented at the same time in parallel.

Multi Threading

- Multithreading allows multiple threads of a single task (program, process) to be processed by CPU at the same time.

- Multithreading is a conceptual programming concept where a program (process) is divided into two or more subprograms (process) which can be implemented at the same time in parallel.

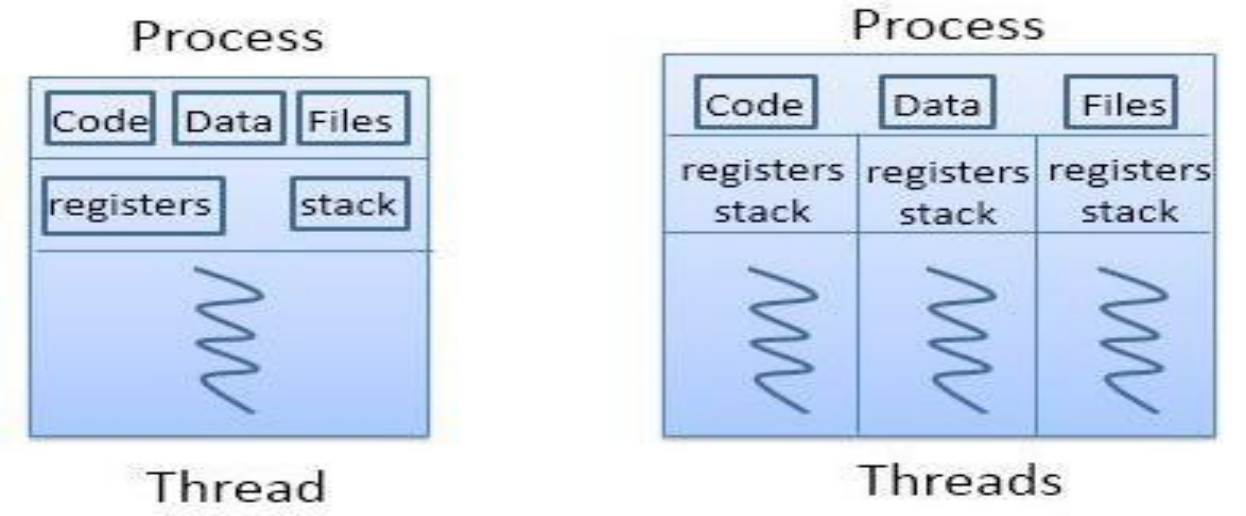
- A thread is a basic execution unit which has its own program counter, set of the register and stack. But it shares the code, data, and file of the process to which it belongs.

- A process can have multiple threads simultaneously, and the CPU switches among these thread.

- so these threads making an impression on the user that all threads are running simultaneously

Multi Threading

Multithreading of process, code, stack, registers, data are shown in figure.



Benefits

Increase the responsiveness of a system.
Allows resource sharing as threads belonging to the same process.
Multiple threads at the same time active in same address space.

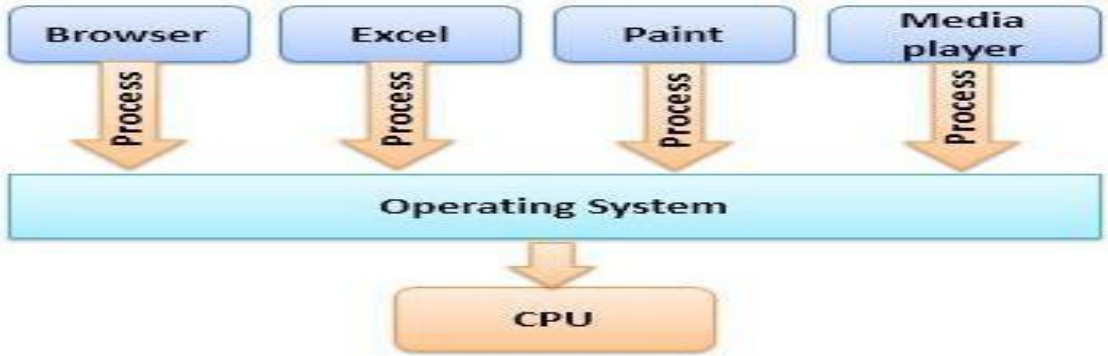
Multi Tasking

Multitasking is when a single CPU performs several tasks (program, process, task, threads) at the same time.

To perform multitasking, the CPU switches among these tasks very frequently so that user can interact with ach program simultaneously.

In a multitasking operating system, several users can share the system simultaneously.

CPU rapidly switches among the tasks, so little time is needed to switch from one user to the next user.



Multi Tasking

Executing several tasks simultaneously is called multi-tasking.

There are 2 types of multi-tasking

1. Process-based multitasking
2. Thread-based multi-tasking

1. Process-based multi-tasking

Executing various jobs together where each job is a separate independent operation is called process-based multi-tasking.

2. Thread-based multi-tasking

Executing several tasks simultaneously where each task is a separate independent part of the same program is called Thread-based multitasking and each independent part is called Thread.

It is best suitable for the programmatic level. The main goal of multi-tasking is to make better performance of the system by reducing response time

Differences between Multi Threading and Multi Tasking

1)
=>The basic difference between multitasking and multithreading is that in multi tasking the system allows executing multiple programs and tasks at the same time

=>In multithreading, the system executes multiple threads of the same or different processes at the same time.

2)
=>In multi-tasking, CPU switches between multiple programs to complete their execution in real time.

=>In multi-threading CPU switches between multiple threads of the same program.

=>Switching between multiple processes has more context switching cost than switching between multiple threads of the same program.

Differences between Multi threading and Multi tasking

3)
=>Multitasking allocates separate memory and resources for each process/ program.
=>In Multithreading thread belonging to the same process share the same memory and resources as that of the process

4)
=>Processes are heavyweight as compared to threads.
=>They require their own address space, Which means multi-tasking is heavy compared to multithreading.

Differences between Multi threading and Multi tasking

Parameter	Multithreading	Multitasking
Basic	Multithreading is to execute multiple threads in a process concurrently	Multitasking is to run multiple processes on a computer concurrently.
Execution	In Multithreading, the CPU switches between multiple threads in the same process.	In Multitasking, the CPU switches between multiple processes to complete the execution
Resource Sharing	In Multithreading, resources are shared among multiple threads in a process.	In Multitasking, resources are shared among multiple processes
Complexity	Multithreading is light-weight and easy to create.	Multitasking is heavy-weight and harder to create

Video Link

https://www.youtube.com/watch?v=_-nL6vljqzI