Assignment : 01

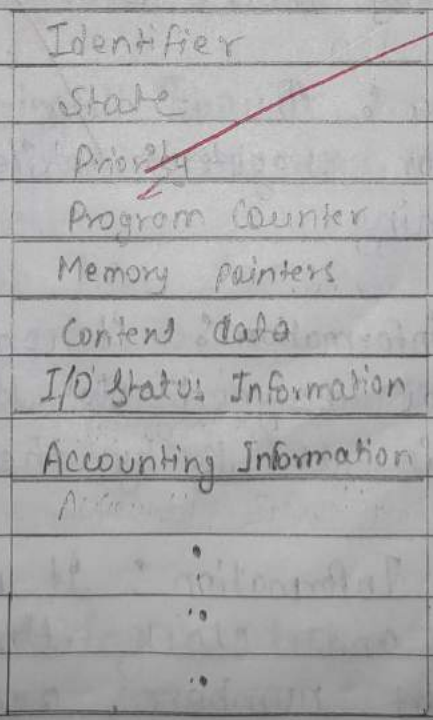
Date
Page 1

Name - Aman Kumar Singh
EN - 20051010115g
Batch - C
BCA / Operating System

Q.1) Draw and Describe in detail the Structure of process control Block.

Ans * Operating System maintains a unique data Structured called the PCB (Process control Block).

* All the information related to each process is stored in the PCB & maintained by OS.



Identifier: A unique identifier associated with this process, to distinguish it from all other processes.

State: If the process is currently running, it is in running state.

Priority: Priority level compared to other processes.

Program Counter: The address of the next instruction in the program to be executed.

Memory Pointers: Add pointers to the program code & data associated with this process, plus any memory blocks shared with other process.

Content data: This is data that are present in processor registers while the process is running.

I/O Status information: It contains I/O requests, I/O devices assigned to this process, a list of files in use by the process.

Accounting Information: It may contain processor time and clock time, time limits, account numbers, and so on.

(Q.2) List Out Features of OS and explain in detail.

Ans :

Features of Operating System :-

(i) Multi - Tasking
(ii) Multi Programming
(iii) Parallel Processing
(iv) Buffering

(i) Multi - Tasking : Conducting two or more programs at the same time from the understanding of a single user.

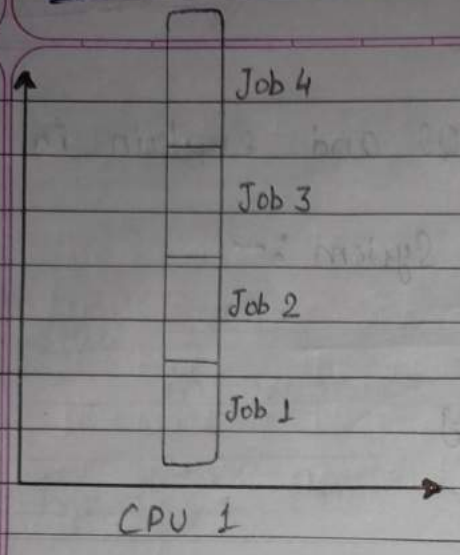
* The CPU can only do one task at a time, however, it is very fast and can do two or more tasks at the same time.

(ii) Multi Programming : Two or more programs are stored in main memory at the same time.

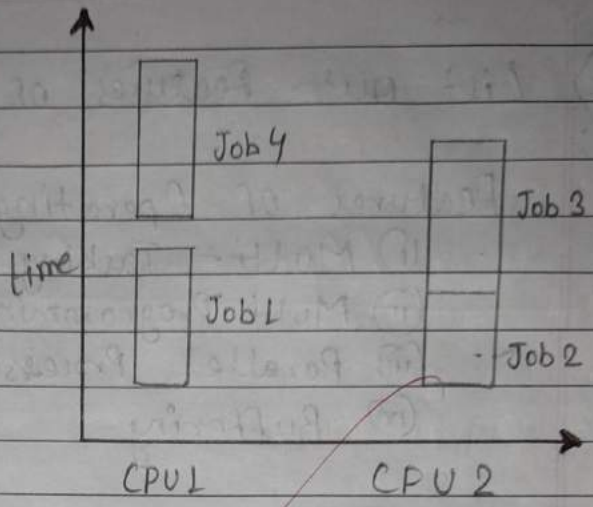
* When the job has to wait, the CPU switches to another job to run.
* When the first job expectation is completed, the first job to be executed is returned to the CPU.

(iii) Parallel Processing : Use two or more CPUs to manage working computer

without multiprocessing



with multiprocessing



(iv) Buffering : Temporary storage area (buffers) for reading data from the input device or sending data to the output device.

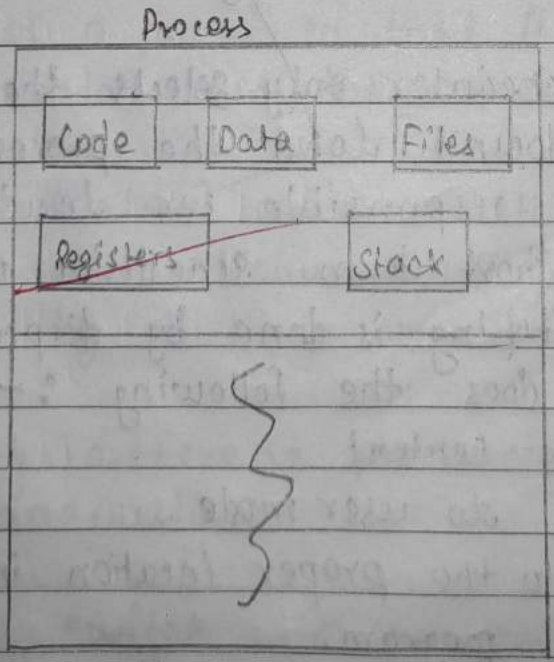
* The CPU is busy because I/O performance is slow.

Q. 3.) Write down difference between thread and process.

Ans

Process	Thread
* Process means any program is in execution.	* Thread means segment of a process.
* Process takes more time to terminate.	* Thread takes less time to terminate.
* It takes more time for creation.	* It takes less time for creation.

* It also takes more time for ~~creation~~ content switching.	* It takes less time for content switching.
* Process is less efficient in term of communication.	* Thread is more efficient in term of communication.
* Process consume more resources.	* Thread consume less resources.
* Process is isolated.	* Thread shares memory.
* Process is called heavy weight process.	* Thread is lightweight as each thread in a process shares code, data and resources.
* Process switching uses interface in operating system.	* Thread switching does not require to call a O.S and cause an interrupt to the kernel.
* If one process is blocked then it will not effect the execution of other process.	* Second thread in the same task could not run, while one server thread is blocked.



Thread

Q.4.) List out types of schedulers and explain in detail.

Ans

There are three types of process scheduler :-

(i) Long Term or Job scheduler :
It brings the new process to the 'Ready State'.
It controls Degree of Multi-programming, i.e., number of process present in ready state at any point of time.
* It is important that the long-term scheduler make a careful selection of both IO and CPU bound process.

(ii) Short term or CPU scheduler :
It is responsible for selecting one process from ready state for scheduling it on the running state.
* Short-term scheduler only selects the process to schedule it doesn't load the process on running.
* Dispatcher is responsible for loading the process selected by Short-term scheduler on the CPU. Content switching is done by dispatcher only.
* A dispatcher does the following :-
  (i) Switching content
  (ii) Switching to user mode.
  (iii) Jumping to the proper location in the newly loaded program.

(iii) Medium-term scheduler :
It is responsible for suspending and resuming the process.
* It mainly does swapping (moving processes from main memory disk and vice versa).
* Swapping may be necessary to improve the process min or because a change in memory requirements has overcommited available memory, requiring memory to be freed up.
* It reduces the degree of multiprogramming.

Q.5.) Write a short note on Content Switching.

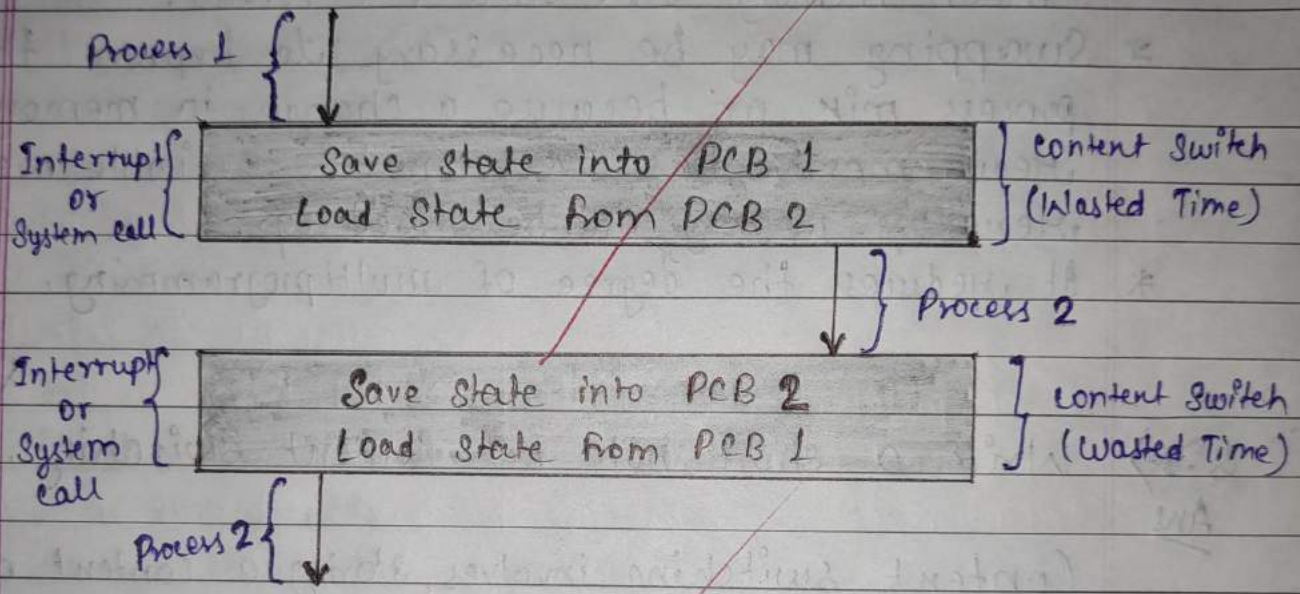
Ans

Content switching involves storing a content or state of a process so that it can be reloaded when needed and the execution can be resumed as before.
* It is a feature of a multi-tasking operating system and allows a single CPU to be shared by multiple processes.

* Allowing different processes to run ~~simun~~ simultaneously.

* Content switch is the mechanism for storing and restoring the state or content of a

CPU in process control block so that a process execution can be restarted from the same point at a later time.



* In the diagram above, initially Process 1 is running.
* Process 1 is switched out and Process 2 is switched in due to interruption or system call.
* Content switching involves saving the state of Process 1 into PCB 1 and loading the state of Process 2 from PCB 2.
* After some time again a content switch occurs and Process 2 is switched out and Process 1 is switched in again.
* This involves saving the state of process 2 into PCB 2 and loads the state of process 1 from PCB 1.

Q.6) Write down difference between User Level Thread & kernel Level Thread.

Ans

User level thread	kernel level thread
* User thread are implemented by users.	* kernel threads are implemented by OS.
* OS doesn't recognize user level threads.	* kernel threads are recognized by OS.
* Implementation of user threads is easy.	* Implementation of kernal thread is complicated.
* Content switch time is less	* Content switch time is more.
* Content switch requires no hardware support.	* Hardware support is needed.
* User level threads are designed as dependent threads.	* Kernal level threads are designed as independent threads.
* Example :- Java Thread, POSIX threads.	* Example :- Window Solaris.

Q.7) Explain Five State Process Model.

Ans

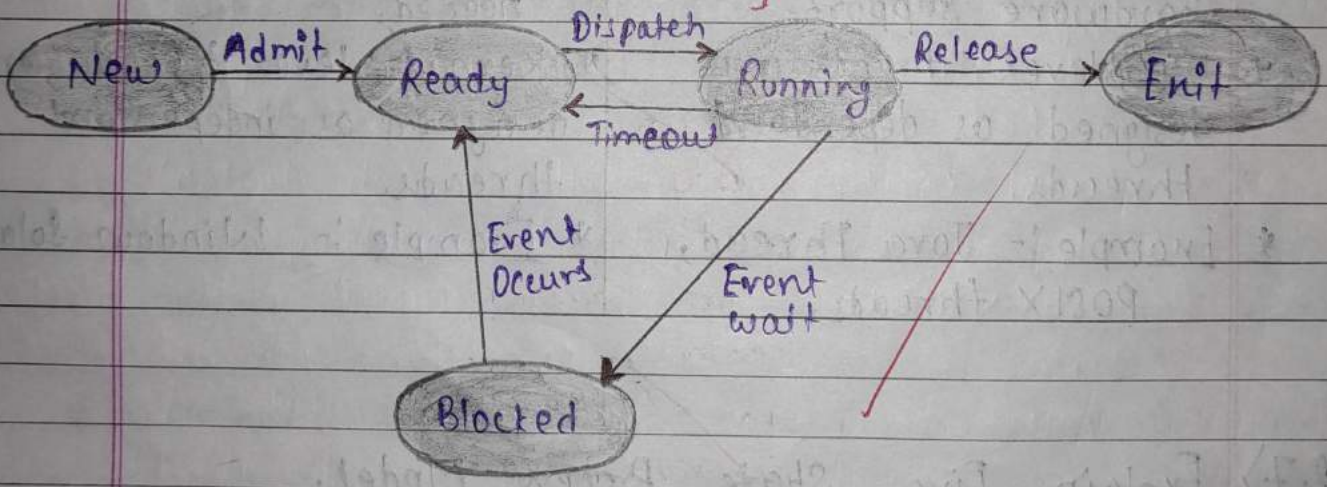
New :- A process that has just been created but has not yet been entered to the pool of executable processes by the OS.

Ready : A process that is ready to run when given the opportunity.

Running: The process that is currently being executed.

Blocked / Waiting: A process that cannot execute until some event occurs, such as the completion of an I/O operation.

Exit: The process that has been released from the pool of executable processes by the OS, either because it halted or because it aborted for some reason.



Null → New: A new process has been created to execute a program.

New → Ready: The O.S will move a process from the New State to the Ready

state when it is ready to perform an additional process.

Ready → Running : When it is time to select a process to run, the OS will select one of the processes in the Ready state. This is the job of the scheduler or dispatcher.

Running → Exit : The currently running process is terminated by the OS if the process indicates that it has completed, or if it aborts.

Running → Ready : The most common reason for this transition is that the running process has reached the maximum allowed time to run continuously.

Running → Blocked : A process is put in the Blocked state if it requests something for which it must wait.

Blocked → Ready : A process in the Blocked state is moved to the Ready state when waiting event occurs.

07-12-21