

NAME : UMAIR KHAN

I.D : 14596

SECTION : A

SEMESTER : 4th BS (SE)

SUBJECT : OPERATING SYSTEM

INSTRUCTOR : DAUD KHAN

EXAMINATION : FINAL TERM

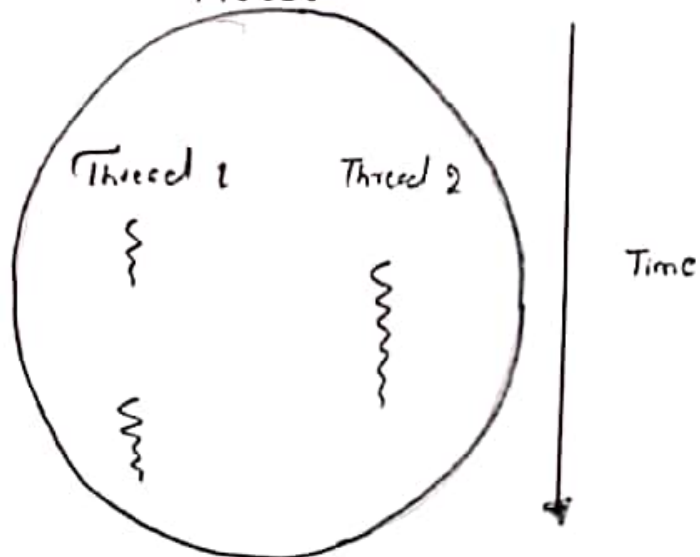
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PROCESS :

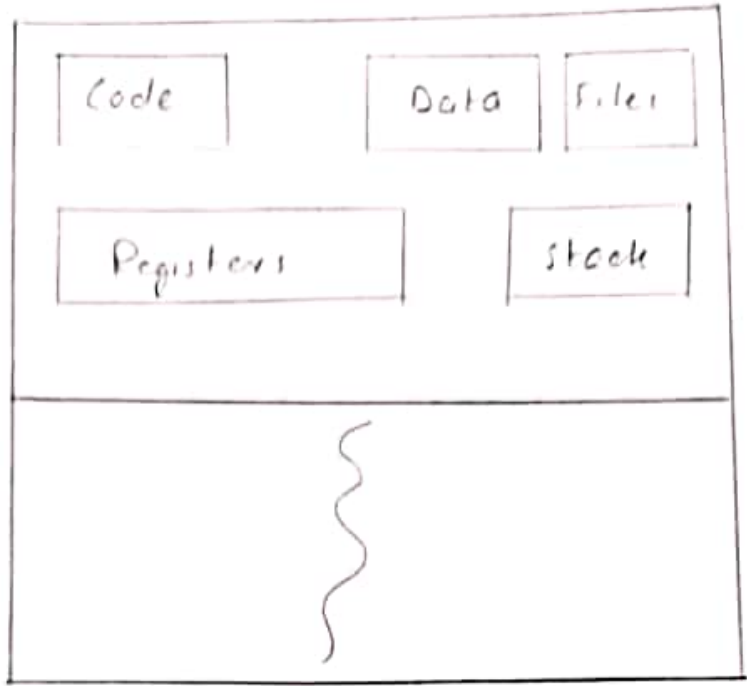
Process means any program is in execution. Process control block controls the operation of any process. Process control block contains information about processes for example Process priority, process id, process state, CPU, register etc. A process can create other processes which are known as child processes. Processes takes more time to terminate and it is isolated means it does not share memory with any other process.

THREAD :

Thread is the segment of a process means a process can have multiple threads and these multiple threads are contained within a process. A thread have three states : running, ready and blocked.



Process



THREAD



Q 2)

3

TYPES OF THREAD:

i) USER LEVEL THREAD:

Is implemented in the user level library, they are not created using the system calls. Thread switching does not created using the system calls. Thread switching does not need to call OS and to cause interrupt to kernel. Kernel doesn't know about the user level thread and manage them as if they were single-threaded processes.

ii) KERNEL LEVEL THREAD:

Kernel knows and manages the threads. Instead of thread table in each process, the kernel itself has thread table that keeps track of all threads in the system. In addition kernel also maintains the traditional process table to keep track of the processes. OS kernel provides system call to create and manage threads.

ADVANTAGES OF ULT:

- Can be implemented on an OS that doesn't support multithreading.
- Simple representation since thread has only program counter, register set, stack space.

DISADVANTAGES

- No or less co-ordination among the threads and kernel.
- If one thread causes a page fault, the entire process blocks.

ADVANTAGES OF KLT:

- Good for application that frequently blocks.

DISADVANTAGES

- Slow and insufficient.
- It requires thread control block so it is an overhead.



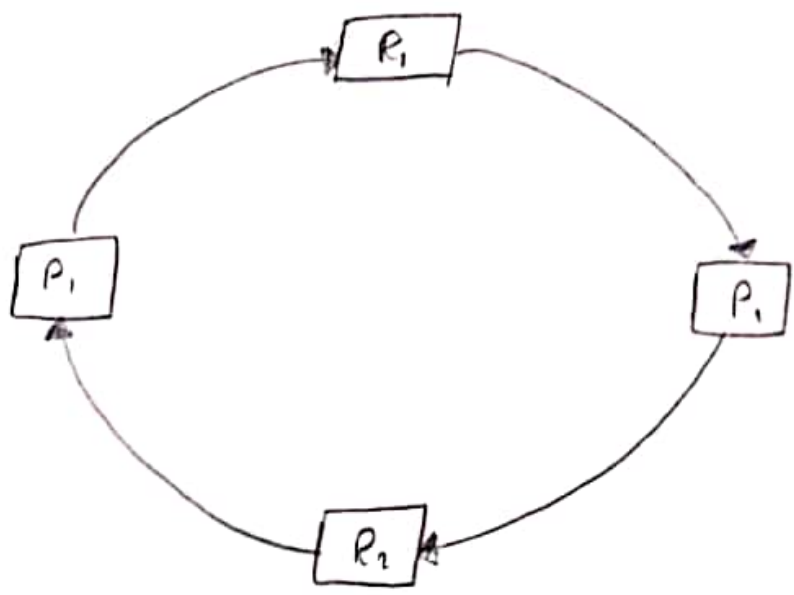
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DEADLOCK :

DEFINITION:

A deadlock is a state in which each member of a group is waiting for another member, including itself, to action, such as sending a message or more commonly releasing a lock.

Deadlock is a common problem in multiprocessing systems, parallel computing and distributed systems where software and hardware locks are used to arbitrate shared resources..



OCOURANCE IN OS:

In operating system, a deadlock occurs when a process or thread enters a waiting state because a requested system resource is held by another waiting process, which in turn is waiting for another process resource held by waiting process.

Deadlock in OS occurs when two or more processes are blocked.

There are four conditions for deadlock occurrence.

CONDITIONS:

- Mutual Exclusion
- Hold and wait
- No preemption
- circular wait.



SOLUTION TO CRITICAL SECTION PROBLEM:

DEFINITION:

The critical problem section is used to design a set of protocols, which can ensure that the race condition among the processes will never arise. In order to synchronize the cooperative system, our main task is to solve the critical section problem.

REQUIREMENTS:

Any solution to critical section must satisfy the following three requirements:

Mutual Exclusion

Progress

Boundedly waiting

PETERSON'S SOLUTION:

In Peterson's solution we have two shared variables:

Boolean flag[i]: initialized to FALSE, initially no one is interested in entering the critical section.

• Int. turn: The process whose turn it is to enter the critical section.

Peterson's solution preserves all three conditions.

• Mutual process Exclusion is assured as only one process can access the critical section at any time.

• Progress is also assured, as a process outside the critical section does not block other processes from entering the critical section.

Bounded waiting is preserved as every process gets a fair chance.

do {

```

Flag[i] = TRUE;
turn = j;
while (Flag[j] & turn == j);
  [Critical Section]
Flag[i] = FALSE
  [REMAINDER SECTION]
} while (TRUE);

```

Q 5)

9

DIFFERENCE B/W DYNAMIC LOADING AND LINKING:

DYNAMIC LOADING:

Dynamic loading is a mechanism by which a computer system can, at run time, load a library into memory, retrieve the addresses of functions and variables contained in the library, execute those functions, or access those variables and unload the library from memory.

DYNAMIC LINKING:

In computing a dynamic linker is the part of an operating system that loads and links the shared libraries needed by an executable when it is executed, by copying the content of libraries from persistent storage to RAM, filling jump tables and relocating pointers.

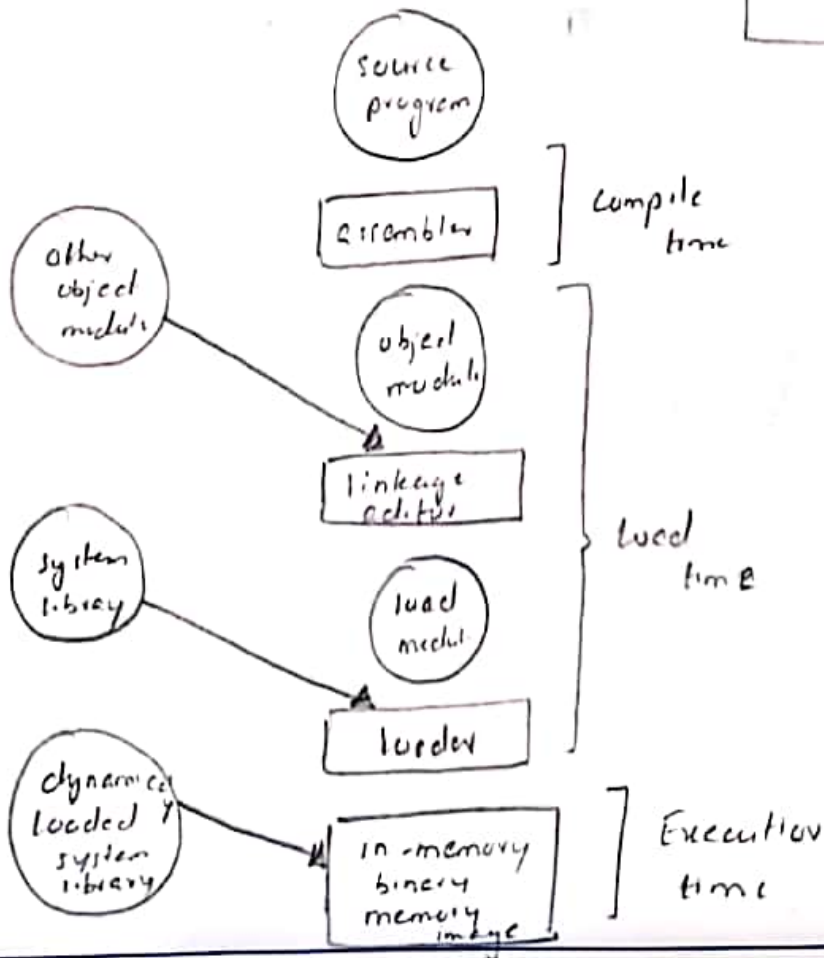
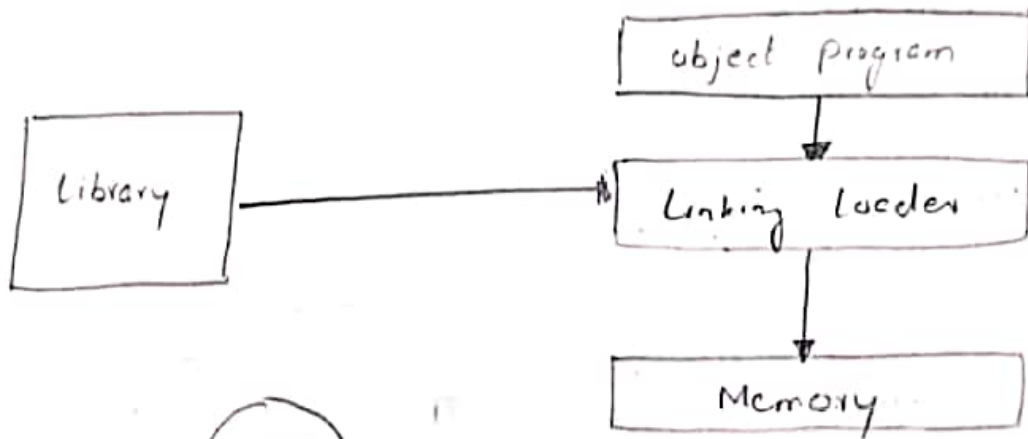
DIFFERENCE:

The key difference is that dynamic loading checks if the routine was loaded by the loader while

dynamic linking: checks if the routine is in the memory.

For dynamic linking there is only one copy of the library code in the memory, which may be not true for dynamic loading.

Dynamic linking ^{needs} support of OS to check the memory of other processes.



LOGICAL VS PHYSICAL ADDRESS SPACE:

UNDERSTANDING:

Logical address is generated by CPU while a program is running. The logical address is virtual address as it does not exist physically, therefore, it is also known as Virtual address.

This address is used to as a reference to access the physical memory location by CPU. The term logical address space is used to the set of all logical address generated by a perspective program.

Physical addresses identifies a physical location of required data in a memory. The user never directly deals with the physical address but can access by its corresponding logical address. and thinks that the program is running in this logical address but the program needs physical memory for its execution, therefore the logical address must be mapped to the physical address by MMU before they are used.

The term physical address space is used for all physical addresses corresponding to the logical addresses in a logical address space.

