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BS (SE) Section: A

Submitted To:
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Time Allowed: 6 hours   *Marks: 50*

Note: Attempt all questions. Copying from Internet and one another is strictly prohibited. Such answers will be marked zero.

Q1. In deadlock prevention strategy do you think it is necessary to check that either safe state exists or not? Give reason to support your answer.

Q2. Differentiate between Dynamic loading and Dynamic Linking with the help of examples.

Q3. Which component of an operating system is best suited to ensure fair, secure, orderly, and efficient use of memory? Also identify some more tasks managed by that component.

Q4. Differentiate between Symmetric and A-Symmetric encryption with the help of example.

Q5. Describe the difference between external and internal fragmentation. Why should they be avoided?

Q6. List and describe the four memory allocation algorithms covered in lectures. Which two of the four are more commonly used in practice?

Q7. Why is the context switch overhead of a user-level threading as compared to the overhead for processes? Explain.

<u>Answer no 1:</u> In deadlock prevention strategy safe state exists If a safe sequence does not exist, then the system is in an unsafe state, which MAY lead to deadlock.

<u>Answer no 2:</u> Dynamic Loading: Dynamic loading means to loading the library into the memory during load or run time. Dynamic loading is

same as plugins that is an exe and can be executed before the dynamic loading.
Example: To load a library call in C++.

Dynamic linking: Dynamic linking means that the linking that is done during run time and not when the exe is created.

Answer no 3: The most suitable component of operating system that suited to ensure fair, secure, orderly and efficient use of memory is memory management system.
It is responsible for swapping process in and out of main memory.

Answer no 4: Symmetric Encryption: Symmetric encryption is that which uses a single key and needs to be shared among people who need to receive the message.

A Symmetric Encryption: A symmetric encryption is that which uses a pair of public and private key to encrypt and decrypt message when communicating.
Symmetric is old technique while A symmetric is a new technique

Answer no 5: The difference between the required memory for a program and the memory assigned for it is known as internal fragmentation whereas, the unused space that arises between memory is known as external fragmentation.
Internal fragmentation refers to the space that remains unused between the blocks in an allocated region, on the other hand, external fragmentation refers to the space that remains unused because it is too short to store a request.

Conversely, external fragmentation takes place when memory or storage is composed or divided into the blocks of variable size according to the size of different programs.

Internal Fragmentation created when more space is assigned to a program than the required one. On the flip side, external fragmentation occurs when a program is removed from a memory leaving behind free space in the system storage that causes external fragmentation.

Answer no 6: The four memory allocation algorithms are:
- First fit
- Next fit
- Best fit
- Worst fit

1) First fit: First fit means to scan memory region list from start for first list. Must always skip over potentially many regions at the start of the list.

2) Next fit: Next fit means to scan memory region from point of last allocation next fit.

3) Best fit: Best fit means that to pick the closest free region in the entire list. Leaves small unusable region and slower due to searching of entire list.

4) Worst fit: Worst fit means to finds the worst fit in entire list, and it is slower as it searches entire list fragmentation.

First and next fit are most commonly used.

Answer no 7:
 Thread switching do not require Kernel mode privileges.
User level threads are fast to create.
User threads are created and managed fastly as compared to kernel threads.
Sending a thread from one thread to another within the same process requires a mode switch to the Kernel.