b) How is paging efficiently used in main memory to increase throughput? Justify with necessary examples.

[3] c) Compare the following systems in terms of performance:

1. A system with a hit ratio of 93%, associative lookup time of 32ns, and memory access time of 72ns.

2. A system with a hit ratio of 62%, associative lookup time of 9ns, and memory access time of 133ns.

b) How cache memory can be used to design an efficient paging hardware. Your answer should have the required diagram with the necessary justification.

[3] c) Compare the following systems in terms of performance:

1. A system with a hit ratio of 72%, associative lookup time of 24ns, and memory access time of 56ns.

2. A system with a hit ratio of 65%, associative lookup time of 6ns, and memory access time of 133ns.

a) Arrays are stored in contiguous memory locations to optimize access to array elements, yet allocating processes in contiguous memory locations is discouraged. Explain why this is not recommended in terms of space complexity.

i. How can the user's view of memory be mapped into the main memory?

d) What are the differences between static and dynamic techniques for partitioning main memory?

d) Discuss the purpose of MMU.

a) Explain how Banker's algorithm can help to find the processes that are causing a deadlock in a system.

b) Describe some strategies for deadlock prevention that can break the hold-and-wait condition.

a) Explain the disadvantage of using Contiguous allocation and how Paging is more beneficial than Contiguous allocation.

b) Explain how the operating system’s behavior and hardware mechanism for logical to physical address translation ensure that one process cannot access the memory allocated for another process.

a) Explain in which term Paging is more beneficial than Contiguous allocation. Illustrate page fault steps and describe briefly.

b) List disadvantage of Static and Dynamic memory allocation.

c) Define demand paging

a) Write five major activities of an operating system in regard to process management.

b) Write what is the main advantage for an operating system designer of using virtual machine architecture? How does the guest operating system function on the host operating system? [Hint: VMWare].

a) Can a process make a transition from the running to the ready and waiting state? Explain why or why not?

b) Define IPC? Discuss two models of IPC