CS222 Fianl 472

Q1- Choose the correct answer for the following questions: [5 marks]

1- If process Pi is executing in its critical section, then no other processes can be executing in their critical sections.

a) Mutual Exclusion b) Bounded Waiting c) Access matrix d) Paravirtualization

2- Every host has a unique IP address and a corresponding:

a) DNS name b) port number c) MAC d) gateway

3- A reason for Distributed Systems:

a) Compilation b) Resource sharing c) Memory paging d) Context switching

4- Allow applications written for one hardware environment to run on a very different hardware environment, such as a different type of CPU.

a) Emulators b) Streams c) Spooling d) Containment

5- Store data in memory while transferring between devices.

a) Buffering b) Caching c) Block Devices d) Swapping

Q2- True or False : [5 marks]

6- Fault tolerance means a system continues functioning despite failures.

a) True b) False

7- Multilevel page tables increase memory usage.

a) True b) False

8- Personal firewall is a hardware device.

a) True b) False

9- Revocation of Access Rights means to remove access rights from a domain after they were granted.

a) True b) False

10- Distributed File System (DFS) is where all files are stored in a single centralized storage area.

a) True b) False

Q3- Short Answer : [28 marks]

1- Explain cache consistency problem in distributed file systems and why is it important to maintain it. **[3 Marks]**

2- Differentiate Blocking & Non-Blocking I/O. **[2 Marks]**

3- List 5 reasons for process migration. **[5 Marks]**

4- List and briefly describe 5 reasons for Distributed System. **[5 Marks]**

5- List and briefly describe 5 basic Directory operations. **[5 Marks]**

6- What are the methods used to implement the Access Matrix? **[4 Marks]**

7- List and briefly describe 4 Security violation categories. **[4 Marks]**

Q4- Numerical & Calculating Questions [12 marks]

1- Consider the following Table, assume that all processes arrive at time 0. Using Non-Primitive Priority Secluding Draw the Gantt Chart, and calculate the average waiting time.

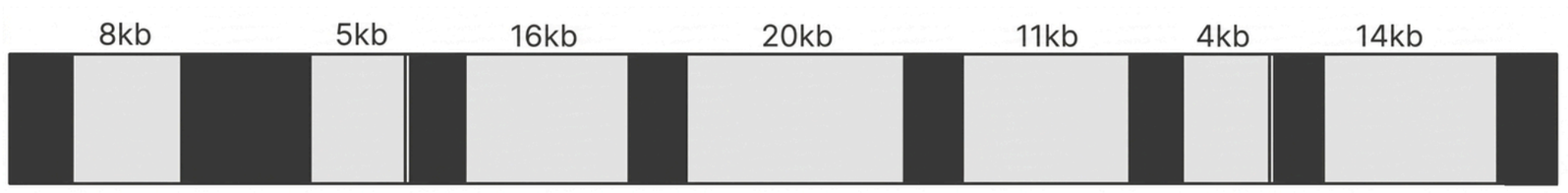
Process	Burst Time	Priority
P1	21	2
P2	3	1
P3	6	4
P4	2	3

2- Apply the Dynamic Storage-Allocation method to allocate a suitable hole for the following process P1 of size 7 Kb. Determine the location of P1 using first-fit, Best-fit, and worst-fit.

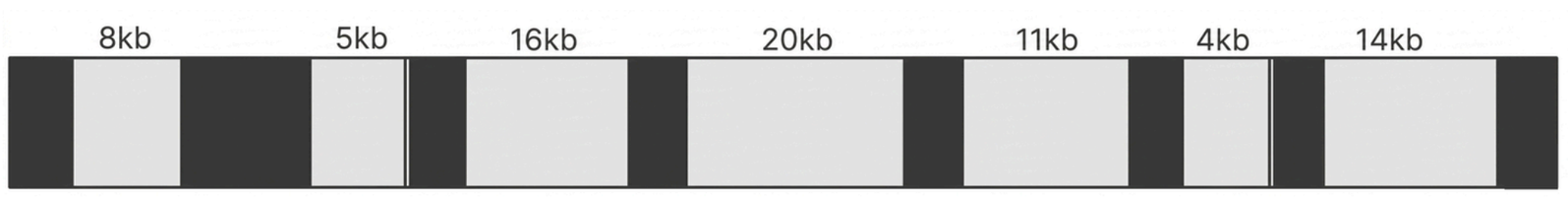
First fit:



Best fit:



Worst fit:



Answers are on the next page

Answers

Question 1&2 answers:

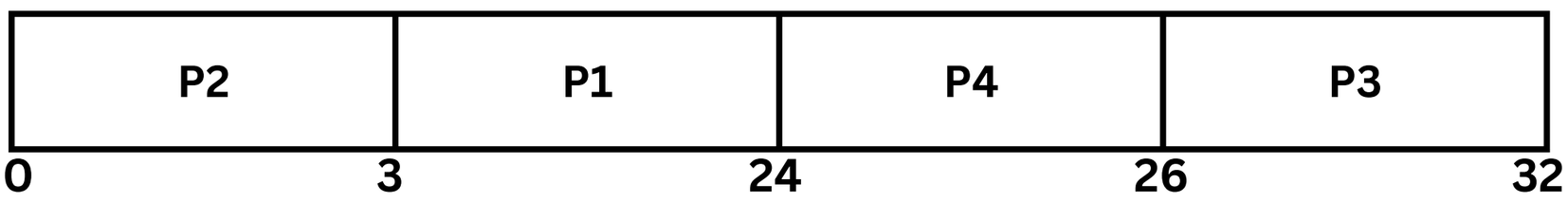
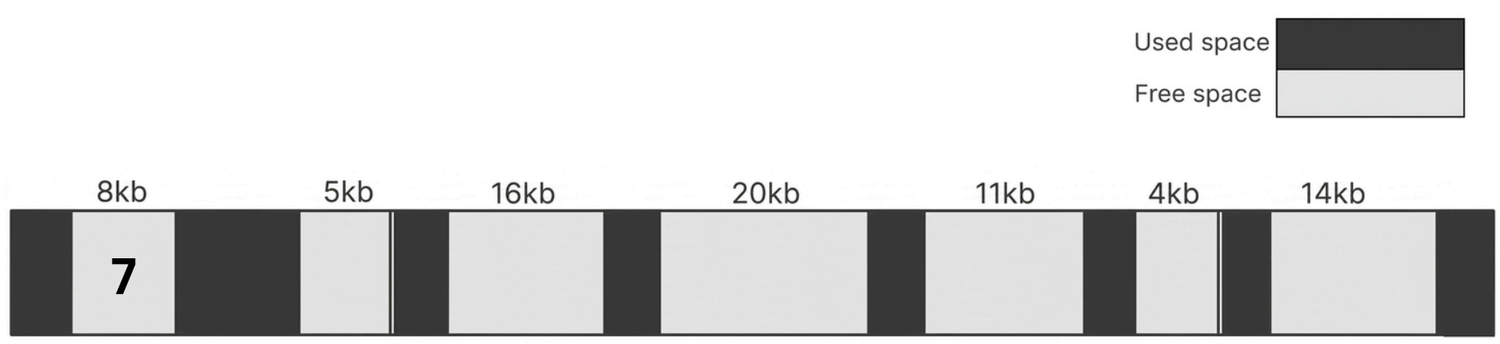
1	**a**	**6**	**a**
2	**c**	**7**	**b**
3	**b**	**8**	**b**
4	a	**9**	**a**
5	**a**	**10**	**b**

Question 3 answer:

1	**Cache consistency problem:** It is the problem of keeping the cached copies consistent with the master file in a distributed file system. **Importance:** Maintaining cache consistency ensures that clients access the most up-to-date data and prevents inconsistencies between cached copies and the master copy.
2	**Blocking:** process suspended until I/O completed • Easy to use and understand • Insufficient for some needs **Nonblocking:** I/O call returns as much as available • User interface, data copy (buffered I/O) • Implemented via multi-threading • Returns quickly with count of bytes read or written
3	1- Load balancing 2- Computation speedup 3- Hardware preference 4- Software preference 5- Data access
4	**1- Resource sharing:** Sharing and printing files at remote sites and using remote hardware devices. **2- Computation speedup:** Improving performance through load sharing and job migration. **3- Reliability:** Detecting and recovering from site failures and reintegrating failed sites. **4- Communication:** Supporting communication through message passing between systems. **5- More flexibility:** Using multiple smaller systems instead of one large system for easier maintenance and greater flexibility.

5	**1- Search for a file:** Find a file in the directory. **2- Create a file:** Add a new file to the directory. **3- Delete a file:** Remove a file from the directory. **4- List a directory:** Show all files in the directory. **5- Rename a file:** Change the file's name. **6- Traverse the file system (tree search):** Move through folders to find files.
6	**Option 1 –** Global table **Option 2 –** Access lists for objects **Option 3 –** Capability list for domains **Option 4 –** Lock-key
7	**1- Breach of Confidentiality:** Unauthorized reading of data. **2- Breach of Integrity:** Unauthorized modification of data. **3- Breach of Availability:** Unauthorized destruction of data or making resources unavailable. **4- Theft of Service:** Unauthorized use of system resources.

Question 4 answer:

1	**Gantt chart:**  **The average:** P1 = 24 - 21 = 3 P2 = 3 - 3 = 0 P3 = 32 - 6 = 26 P4 = 26 - 2 = 24 $\frac{3+0+26+24}{4} = 13.25$
2	**First fit:**  **Best fit:**  **Worst fit:** 