CSE321 Take-Home Quiz 3

Marks: 15

Deadline: 24/9/24

1.

Page no	Frame no
0	6
1	11
2	4
3	10
4	8
5	9

Given the page table for a process, Find out the physical addresses of the following logical addresses. If the address is invalid, write “Invalid”.

i. 22 ((10110) b)
ii. 29 ((11101) b)
iii.27((11011) b)

The system you are using has 48 bytes of main memory and the memory is of the following structure(horizontal).

0	1	2	3	4	5	6	7	8	9	10	11

Marks: 6

2. An array is stored in the main memory in such a location where it has available continuous address spaces equivalent to the size of the array.
Explain logically which allocation method of allocating processes in RAM is similar to the allocation of arrays in RAM and what problem arises in this allocation method.
What is the possible solution to the problem?

Marks: 2+1+2=5

3. Alice went to an office where she had to face a certain rule while using the lift. According to the rule no matter what the weight capacity is at a time maximum 3 persons can enter in the lift. For that reason not more than 3 persons can use the lift at the same time although the lift has the capacity to carry more weight.
   Explain logically what type of partition allocation mechanism is similar to the scenario.
   Marks: 2

4. Bob wants to keep the back up data of a hard drive in another hard drive of a different device. In the hard drive he intended to keep back up, there are multiple disk drives of multiple sizes. He decided to copy data in such a way that after copying data a particular disk drive will consist of a minimal amount of free space. Then he will continue copying to another such disk drive and this flow will continue until the copying completes.
   Logically explain what type of dynamic allocation method is similar to the scenario.
   Marks: 2

Ans 1

i) Physical Address for this is 38. Because the given page limits 0-5. Binary of 5 needs 3 bits. For 10110, Page no is 101 and offset is 10. As 101= 5 and frame for page 5 is 9 (given). Binary of 9= 1001 and after adding offset, it will be 100110. That means 38.

ii) Invalid. page no 7 doesn't exist in the given table.

iii) Invalid. page no 7 doesn't exist in the given table.

Ans 2

Allocation method similar to array storage in RAM is Contiguous memory allocation. Because it requires a single, continuous block of memory to store data elements sequentially.

Problem: Fragmentation. Because it occurs when free memory is split into non-contiguous blocks, preventing new processes from being allocated despite sufficient total memory and Contiguous memory allocation creates this issue.

Solution: Compaction in dynamic allocation, which rearranges memory to consolidate free space into larger contiguous blocks. Alternatively, paging can be used to allocate non-contiguous memory, effectively reducing fragmentation issues.

Ans 3

The scenario resembles fixed partition allocation in memory management, where memory is divided into fixed-size partitions. Just as the lift allows a maximum of three persons regardless of its weight capacity, fixed partition allocation limits the number of processes per partition, which can lead to inefficiencies. This setup ensures that no partition is overfilled, mirroring the lift's restriction.

Ans 4

It resembles the best-fit allocation used in memory management. As he aims to store data in the smallest available disk drive that can accommodate it, minimizing leftover free space. This approach efficiently utilizes disk space by ensuring that each drive is filled as much as possible before moving on to the next one, similar to how best-fit seeks to optimize memory usage by minimizing wasted space.