

Lab 3

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1 QUESTION 1

Explain the difference between internal and external fragmentation.

Internal fragmentation is caused when an allocated process takes up less space than the given partition, which leaves unused memory within the partition. The main solution for internal fragmentation is to break up memory into smaller chunks and allocate the minimum number of chunks needed to support the partition to minimize the amount of unused memory for a given process. External fragmentation occurs when all the free memory is not contiguous, which can be the difference between being able to partition a process or rejecting it. This is a problem for all dynamic storage allocation algorithms, but the severity varies by which algorithm is used and how memory is allocated within the given system. The main solutions to external fragmentation are compaction and shuffling the processes around to maximize the amount of contiguous free memory or allow the logical addresses to be translated to noncontiguous physical addresses, which is called paging.

2 QUESTION 2

Given Five (5) memory partitions of 100KB, 500KB, 200KB, 300KB, and 600KB (in that order), how would optimal, first-fit, best-fit, and worst-fit algorithms place processes of 212KB, 417KB, 112KB, and 426KB (in that order)?

The first-fit algorithm places each process in the first available memory partition that can hold the process. Thus, the process of size 212KB will be placed in the partition of 500KB, the process of size 417KB will be placed in the partition of 600KB, and the process of size 112KB will be placed in the partition of 200KB. For the process of size 426KB, the partitions that can hold it (500KB and 600KB) are both in use, so the process will either have to wait for one of these partitions to open up or it will be rejected, depending on the OS.

The best-fit algorithm will place each process in the smallest available partition that can support the size of the process. Therefore, the process of size 212KB will be placed in the partition of size 300KB, the process of size 417KB will be placed in the partition of size 500KB, the process of size 112KB will be placed in the

partition of size 200KB, and the process of size 426KB will be placed in the partition of size 600KB. In this scenario, no processes are rejected as they are all allocated a partition in memory without conflict.

The worst-fit algorithm places each process in the largest available partition. Thus, the process of size 212KB will be placed in the partition of size 600KB, the partition of size 417KB will be placed in the partition of size 500KB, and the process of size 112KB will be placed in the partition of size 300KB. Similar to the first-fit algorithm, the process of size 426KB does not have an available partition to be stored in, so it will be rejected.