

1. Consider a logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 256 frames.
 - a) How many bits are there in the logical address?
 - b) How many bits are there in the physical address?
2. Consider a byte-addressable (addresses are memory byte addresses) memory-management system using **paging** and a logical address consists of 16-bit page number and 10-bit offset.
 - a) What is the frame size in this system?
 - b) What is the maximum number of entries in a page table?
 - c) What is the maximum size of the logical address space?
 - d) How many frames are needed to store the largest page table if the size of a page table entry is 4 bytes?
3. Consider a segmentation system with the following segment table.

Segment number	Base	Limit
0	660	248
1	1752	422
2	222	198
3	996	604

For each of the following logical addresses, determine the physical address or indicate if the address is invalid (out of bound).

- a) 0, 198
 - b) 2, 156
 - c) 1, 530
4. Most systems allow programs to allocate more memory to its address space during execution. Is **relocation** required to support dynamic memory allocation in segmentation and paging?
 5. Describe how **sharing** can be done in segmentation and paging.

Self-test

1. The concept of Memory Management satisfies certain system requirements including:
 - A) relocation
 - B) protection
 - C) physical organization
 - D) all of the above

2. _____ is transparent to the programmer and eliminates external fragmentation providing efficient use of main memory.
 - A. Hashing
 - B. Paging
 - C. Segmentation
 - D. Thrashing

3. In a system employing a paging scheme for memory management, wasted space is due to _____.
 - A. external fragmentation
 - B. internal fragmentation
 - C. pages and frames of different specified sizes
 - D. none of the above

4. The page table for each process maintains _____.
 - A. the physical memory location of the process
 - B. the frame number for each page of the process
 - C. the page number for each frame of the process
 - D. the logical memory location of the process

5. In a system employing a segmentation scheme for memory management, a process is divided into _____.
 - A. one segment per thread
 - B. a number of threads
 - C. a number of segments which need not be of equal size
 - D. a number of segments which must be of equal size

6. In a system employing a segmentation scheme for memory management, wasted space is due to _____.
 - A. external fragmentation
 - B. frames of different sizes
 - C. internal fragmentation
 - D. segments of different sizes