

Operating Systems

(Memory management: Segmentation)
Slides Set #15

By Prof K R Chowdhary

JNV University

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Memory Allocation

- ▶ One of the simplest methods for allocating memory is to divide memory into several **fixed-sized** partitions.
- ▶ In the **variable-partition** scheme, the operating system keeps a table indicating which parts of memory are available and which are occupied.
- ▶ At any given time, then, we have a list of available block sizes and an input queue.
- ▶ In general, the memory blocks available comprise a set of holes of various sizes scattered throughout memory.
- ▶ There are many solutions to this problem. The **first-fit**, **best-fit**, and **worst-fit** strategies

Fragmentation

- ▶ Both the first-fit and best-fit strategies for memory allocation suffer from **external fragmentation**.
- ▶ Depending on the total amount of memory storage and the average process size, external fragmentation may be a minor or a major problem.
- ▶ Memory fragmentation can be **internal** as well as **external**.
- ▶ One solution to the problem of external fragmentation is **compaction**.

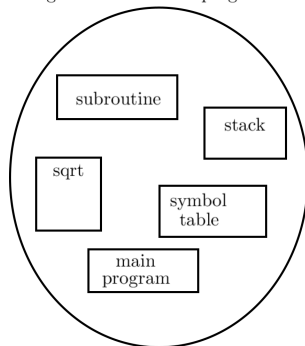
Segmentation

Another possible solution to the external-fragmentation problem is to permit the logical address space of the processes to be **noncontiguous**.

Important: **User's view** of memory is not the same as the actual physical memory.

- ▶ **Basic Method:** Do programmers think of memory as a linear array of bytes?
- ▶ Programmer thinks of it as a main program with a set of methods, procedures, or functions.

Programmer's view of program



- ▶ Segmentation scheme supports programmer view of memory.