

Operating Systems

Practice 3

Memory management
2024/2025

One of the most important functions of the operating system is to manage and organize the system memory, both physical memory of the computer and the information stored in secondary memory through the file system. In this regard, some of the common problems are addressed.

One mechanism that organizes physical memory is called contiguous allocation, and related to this technique we have been studied in theory class two different approaches: fixed or static partitions and dynamic or variables partitions or. Furthermore, we have analysed four different partition finding algorithms.

Regarding to the problem that occurs in both file systems like memory management is managing memory occupation. In this sense, it is necessary to know every time whether different allocation units are free or used. To solve this problem it has been discussed in theory two different mechanisms: bitmap and linked list.

STATEMENT

The goal is to simulate memory management with dynamic partitions. It will offer a menu with the option to do partition assignment using **Worst fit and Best fit algorithms**.

The program will receive as input a file that contains a line for each process to be loaded with the following format:

<process> <Instant arrival> <Memory required> <Runtime>

The total amount of memory is 2000. The result will be saved in a file partitions.txt which contains lines of text, representing memory status with each input or output processes, in the form:

Time 1 [Initial_address_1 state_1 size_1>
...
...
Time n [Initial_address_n state_n size_n>...

For example:

1 [0 P1 300] [300 P2 200] [500 Hold 1500] Return

The previous line indicates that at moment 1 we have two assigned partitions and one hole/fit. The first partition starts at address 0, it is occupied by process P1 and it occupies 300. The second partition starts at address 300, it is occupied by process P2 and its size is 200. Finally, we have a hole that starts at address 500 and its size is 1500. Obviously, the sum of 300, 200 and 1500 is 2000 (total memory).

Alternatively, the result can be shown **graphically**, an aspect that will have an extra value (**2 points**).

The name of program will be **managementmemory** and it will implement the necessary structures for managing partitions.

The practice can be done in any programming language and on any operating.

RULES FOR DELIVERY

- The delivery of the practice will be during the week from **16th to 20th December**.
- A report will be handed in indicating how the different exercises have been solved.
- The source codes of the different exercises will be handed in.