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1) Consider a system in which two processes P_1 and P_2 are in memory and in ready-to-run state. A use starts a third process P_3 and the system needs to find space in memory to store it. There are currently two unoccupied regions in memory: **A (size 5MB)** and **B (size 2MB)**, as illustrated on the right. Assume that the user may start other processes in the future and that you don't know how much memory they will possibly need.

Say P_3 requires 1MB of space to run. Explain how you would determine which of the two regions A and B is **the best** home for this new process.
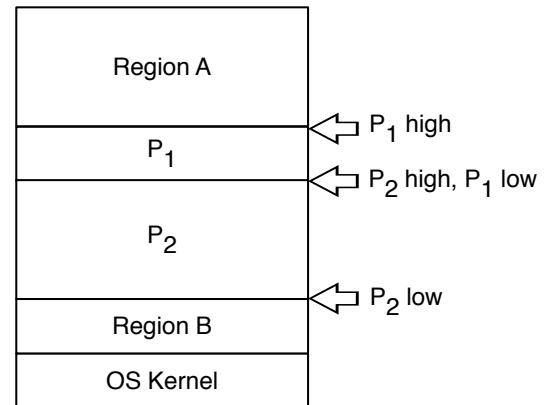
2) As processes continuously start and terminate, the OS must look through memory to identify regions that are free or occupied. When a new process is started, the OS will look through memory to find a free region in which to load it. When a process terminates, the OS will need to free the memory it occupied, so that it can be used by other processes in the future. Propose a data structure that the OS can use in order to be able to keep track of the memory that is free or allocated. Consider that: (a) **it needs to be quick** to allocate and deallocate memory, and (b) it should **use minimal memory space** to keep track of allocation.