First-in-first-out (FIFO) approach to memory management

In order for us to better understand FIFO (First In, First Out) we must also have a look at LIFO (Last In, First Out). Both of these are methods that relate to the organisation and manipulation of data according to time and prioritisation. And are coincidentally opposites of each other.

First In, First Out is a method for organising and manipulating a data buffer (physical memory storage used to temporarily store data as it’s moved from one place to another), or data stack, where the oldest entry, or in simple terms 'bottom' of the stack, is processed first before anything else. In essence it's a queueing technique where it uses a first come first serve behaviour. The algorithm of the operating system used in scheduling gives every process CPU time according to the order it originally comes. Each item is stored in a queue data structure. The first data which is added to the queue will be the first data to be removed. Processing continues to proceed sequentially in this same order. FIFO is used for synchronisation purposes in computer and CPU hardware. FIFO is generally implemented as a circular queue, and therefore has a read pointer and a write pointer. The FIFO page replacement algorithm is a low-overhead algorithm that requires very little book-keeping on the part of the operating system. While FIFO is cheap and intuitive, it performs poorly in practical application. Thus, it is rarely used in its unmodified form. A downside to FIFO is that if a processes takes a long time it can make other processes wait for longer as well and processes only swap out when they are finished with their current task.

Last In, First Out refers to the way items stored in some types of data structures are processed. It is the abstract principle of list processing and temporary storage, especially when there is a need to access limited amounts of data, in a particular given order. By definition it is the exact opposite of FIFO, elements can only be added or removed from one end usually referred to as the 'top'. An easy way to illustrate a LIFO structure is to imagine a stack of trays, books or what ever you wish to visualise. A simple way of thinking of this is, you stack one book on top of another and you keep doing this when you’re given a book. And when you want to then give the books back, you take them off in reverse order i.e. starting from the top of the pile, so that the last one is the first one off.

So in conclusion you have FIFO and LIFO, which are two different approaches to memory management. Each has their own characteristics and each is useful in their own given situation. When a program needs to access the most recent information entered, it will use the LIFO method. On the other hand when information needs to be retrieved in the order it was entered, the FIFO method is used instead.