# Importance of memory management flashcard

From simple computers that can do one thing to complex interconnected systems that can do so much they are able to truly multicast. This multitasking requires proper memory management and for that we have software called an Operating System, whose Job is to manage the environment In which automated tasks will be conducted. Keywords: operating systems, memory, random access memory, memory management Importance of Memory Management in Operating Systems The Operating System (SO) is a complex program designed to provide functionality and boundaries for programs that will perform tasks.

Their Job is to do many things from schedule, to protection to allocation. Overall the SO is a form of general manager that enhances the productivity of the programs meant to run in it. Although not all computers need an operating system, complex computers will need some form of memory management agent. Handling memory is a key part of this process and thus a very Important part of the overall goal of whatever program runs on it.

Managing Memory When building an SO a designer has to be able to perform several steps before, during and after. First there must be a discovery phase.

The SO must know what hardware it Is dealing with. With this knowledge It can move to allocate the area It will use for its own processes and thus protect it from accidentally being used by other non-operation processes. Once It knows this It Is ready to run programs.

In a way the same rules apply. The program will ask for resources and the SO will give it some. Eventually multiple programs will require resources and the SO must then begin allocating, protecting, sharing and overall managing

those resources to give every program, including itself, ample and relatively fair access to the available resources.

Because of this memory management is a key factor when building an Joss. There are several memory types the SO might work with. There is physical memory, Random Access Memory (RAM), Read only Memory (ROOM).

There might be others but these are the ones we will talk about. Physical memory is your hard drive. It Is cheap and readily available but usually has the slowest read,’write speed. RAM is fast, but can be expensive and is quite finite. Memory classified as ROOM is usually used to establish parameters and probably better known as firmware.

In a way It could be considered a form of inactive SO more worried about carrying useful variable values than managing anything. These are used by the SO to handle Its 1 OFF Programs Programs are hungry bunch and they will attempt to gobble up as much memory as oh can give them. This is where the SO shines. One of its primary Jobs is to make sure memory is not only shared but protected. An important part of memory management in high scale computing is loading a program into memory.

“ A program loaded into memory is called a process. (Subscribers, Galvan & Eagan 2013, pig. 20) A process is therefore placed in memory and protected so that it can work without interruption unless it needs it. While this happens other programs are constantly being allocated, protected, using shared space and overall demanding the attention of the processor. Because of this when a programmer is building an SO it is highly important that he creates a

successfully symbiosis between the hardware available and the requirements for the SO.

Some systems are built to handle a specific kind of input, like a calculator.

Other systems need to handle multiple scenarios like Microsoft Windows or Apple’s ISO. Managing the processes requires a combination of physical memory, active memory (usually on RAM) and a cache that ties it together as it is used. “ Effective memory management is vital in a multiprogramming system. ” (Stallings, 2012, pig. 306) This starts with five requirements that are well commented in many text books: relocation, protection, sharing, logical organization, and physical organization.

These requirements are key to developing multiprogramming systems.

Programming for the Future In the end as technology moves faster and follows the well-known Moor’s Law programmers will find themselves dealing with an increasing number of demands for multiple processor, memory types and access control. These demands will create innovation and new ways to handle memory for a program’s needs. It is thus highly important that programmers continue developing Operating Systems that can reform the complex tasks mentioned in this paper but continue innovating as technologies develop.