1. Processor, Main Memory, I/O Modules, System Bus
   1. Processor
      1. Controls the operation of the computer
      2. Performs the data processing functions
      3. referred to as the Central Processing Unit (CPU)
   2. Main Memory
      1. Stores data and programs
      2. Typically, volatile
         1. Contents of the memory is lost when the computer is shut down
      3. Referred to as real memory or primary memory
   3. I/O Modules
      1. Move data between the computer and its external environment
         1. Secondary memory devices (e.g., disks)
         2. Communications equipment
         3. Terminals
   4. System Bus
      1. Provides for communication among processors, main memory, and I/O modules
2. MAR, MBR
   1. Memory address register (MAR), which specifies the address in memory for the next read or write
   2. Memory buffer register (MBR), which contains the data to be written into memory or which receives the data read from memory
3. An interrupt is a mechanism by which other modules (I/O memory) may interrupt the normal sequencing of the processor. Interrupts are given priorities and those with higher priorities are executed even during the handling of interrupts of a lower priority.
4. The elements of capacity, access time and cost.
5. Cache memory is random access memory (RAM) that a computer microprocessor can access more quickly than it can access regular RAM. This memory is typically integrated directly with the CPU chip or placed on a separate chip that has a separate bus interconnect with the CPU.
6. Multicore Computers: A multicore computer, also known as a chip multiprocessor, combines two or more processors (called cores) on a single piece of silicon (called a die). Typically, each core consists of all the components of an independent processor, such as registers, ALU, pipeline hardware, and control unit, plus L1 instruction and data caches. In addition to the multiple cores, contemporary multicore chips also include L2 cache and, in some cases, L3 cache.

Multiprocessor Computers: An SMP can be defined as a stand-alone computer system with the following characteristics:  
1. There are two or more similar processors of comparable capability.  
2. These processors share the same main memory and I/O facilities and are interconnected by a bus or other internal connection scheme, such that memory access time is approximately the same for each processor.  
3. All processors share access to I/O devices, either through the same channels or through different channels that provide paths to the same device.  
4. All processors can perform the same functions (hence the term symmetric).  
5. The system is controlled by an integrated operating system that provides interaction between processors and their programs at the job, task, file, and data element levels.

1. No. The program counter must be stored in a dedicated register. The stack is in working memory and you cannot operate on working memory; all values must be moved into a register to operate upon them. It makes no sense to move a program counter in and out of memory unless performing a context switch and you can't use a stack for context switching; a priority queue must be used for this. Keep in mind that the address of the top of the stack must be moved in and out of its register during a context switch. It doesn't make sense to load the stack register from a priority queue before you can determine where the program counter value is. It's easier to keep all state information in the same place in the priority queue where it belongs.