Tasks:

6.1.1 - 6.1.4 Identifying and evaluating resources

* This will be a direct question, so be able to list off the types of resources in a computer system:
  + secondary storage, processor/speed/cache, bus bandwidth,peripheral bandwidth, screen resolution, disk storage, sound processor, graphics processor, cache,network bandwidth and connectivity.
* Supercomputers/mainframes have the most available resources with lots of primary and secondary memory as well as thousands of processing cores. This makes supercomputers the most powerful system in comparison to the other ones detailed within the list. Despite these many advantages, supercomputers are often really expensive and are primarily used by large corporations to conduct certain elements of business. Spectrums are quite limited in their application but still have many important functionalities. Despite this, they specialize in performing specific tasks which could be relatively cheap.
* Roles of operating system:
  + Ease of use for user to manage files
  + The OS has to ensure that each process (program) runs in its own allocated memory space.
  + If programs interfere with each other’s memory space it could cause many problems including corruption and security issues
  + Hides complexity of code
  + Can perform virtual machine tasks
* Managing memory
  + Constantly shifts between main memory and disk during execution
    - Handles and manages primary memory
  + Processes can be moved around to different types of memory such as cache, primary, and secondary memory
  + OS is loaded onto RAM
    - The app selected by the user is also loaded onto RAM
  + To run processes, apps constantly request for memory
    - All apps go back to main memory when not in use
* Computer multitasking is the concurrent execution of multiple tasks over a certain period of time
  + Multiple cores allow for simultaneous calculations within the system
  + Time slicing prioritizes certain tasks and executes them first
  + Paging:
    - When using virtual memory, the OS needs to retrieve the data that was moved to temporarily to disk storage; the only reason the OS moved pages of data from RAM to disk storage to begin with was because it was running out of RAM
    - To solve the problem, the operation system will need to move other pages to hard disk so it has room to bring back the pages it needs right away from temporary disk storage.
    - This process is known as paging or swapping and the temporary storage space on the hard disk is called a pagefile or a swap file.
    - Swapping, which happens so quickly that the end user doesn’t know it’s happening, is carried out by the computer’s memory manager unit (MMU).
    - The memory manager unit may use one of several algorithms to choose which page should be swapped out, including Least Recently Used (LRU) Least Frequently Used (LFU) or Most Recently Used (MRU).
  + Interrupt:
    - An interrupt is a signal to the processor emitted by hardware or software indicating an event that needs immediate attention.
    - An interrupt alerts the OS to a high-priority condition requiring the interruption of the current code the processor is executing.
    - The OS responds the suspending its current activities, saving its state, and executing a function called an interrupt handler to deal with the event.
    - This interruption is temporary, and, after the interrupt handler finishes, the processor resumes normal activities.
    - There are two types of interrupts:
      * Hardware interrupts
      * Software interrupts
* Hardware Abstraction
  + Sets of routines in software that emulate some platform-specific details, giving programs direct access to the hardware resources
  + Hides differences between hardware and software functions
* Scheduling
  + Activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy
    - Essential part of a Multiprogramming operating systems
  + Such operating systems allow more than one process to be loaded into the executable memory at a time and the loaded process shares the CPU using time multiplexing
  + Admins create strategies to run the scheduling
* I would not chose to create a dedicated operating system for one device. Developing a specific operating system for just one set of devices is a rather intricate and potentially expensive option. Some advantages to creating a dedicated operating system for one device is that it could be personalized and perfected on that specific device without having to share across a mass quantity. Despite these advantages, the drawbacks in my opinion still make it more viable to not create/use a dedicated operating system for one device. The software can be easily accessed and edited across multiple devices and it would be easier to transfer data from an old device to a new one.
* Abstraction
  + Applications are not viewed directly but rather from the OS
  + Certain hardware details are hidden from the user
    - This is basically abstraction
  + User cannot see changes within the hardware as a result
    - Can be used is to make related devices appear the same from the user’s point of view.
  + hard disks, floppy disks, CD-ROMs, and USB keys are all very different media, but in many operating systems they appear the same to the user
* Drive Letters
  + A single alphabetic character assigned to a physical drive or drive partition in the computer
  + For example, a computer with a floppy drive has a drive letter of A: assigned to the drive.
  + All computers with a hard drive will always have that default hard drive assigned to a C: drive letter
  + CD-ROM or other drive is the next drive letter (e.g. D:) etc.
* Java Virtual Machine
  + A Java virtual machine (JVM interprets compiled Java binary code (called bytecode) for a computer's processor (or "hardware platform") so that it can perform a Java program's instructions.
  + Each platform gets its own JVM so that Java code can run on any platform