
# Operating Systems

## Assignment 1

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**T-Q1.1**

A. Without applications to run an operating system is not needed. The applications are therefore more important. Without an operating system though the applications can only run one at a time as was the case with early computers.

B. Operating systems abstraction makes it possible to develop software using high level programming languages, removing the need to write them with assembly code. This makes software development much easier.

C. Even though today most devices are running an operating system used by a single user, that user is likely using multiple programs at once. Issues such as memory protection are very important as one running program should not be able to access the memory of another. Poorly designed or malicious applications should not be able to scribble all over memory as was the case with early DOS. Protection is also important for preventing concurrency issues. Today many programs are also receiving information through online

connections and it's therefore very important to prevent them from being able to do malicious operations.

**T-Q1.2**

A. The operating system kernel always runs in the background - False
The trap instruction should be privileged - False
Turning off interrupts should be privileged - True
Interrupts are synchronous to code - False
System call parameters may be passed via the kernel stack - False
System call parameters may be passed in registers - True
A system call is a voluntary kernel entry - True
Interrupts may only happen in the context of the kernel - True

B. The kernel must carefully check system call parameters to make sure that what the user passes in is properly specified, otherwise it should reject the call. If the user passes in a bad address, the system must detect this and reject the call. A secure system must treat user inputs with great suspicion to prevent hacking and erroneous behavior.

C. When receiving the address of a buffer as a system parameter the kernell tests to make sure it is not one of the addresses inside the kernel's portion of the address space.

D. NtCreateProcess is a system call that creates a new process object. The number marked in bold is the system-call number that is used to specify the exact system call.