Operating System
Problems on Introduction to Operating Systems

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Problem set #1

1. 1.1 What are the three main purposes of an operating system?
   1.2 List two advantages of batch processing os.
   1.3 List two advantages of multi-programming os.
   1.4 List advantages of time-sharing os.
   1.5 What is the main difficulty that a programmer must overcome in writing an operating system for a real-time environment?

2. Which of the following instructions should be privileged?
   2.1 Set value of timer.
   2.2 Read the clock.
   2.3 Clear memory.
   2.4 Issue a trap instruction.
   2.5 Turn off interrupts.
   2.6 Modify entries in device-status table.
   2.7 Switch from user to kernel mode.
   2.8 Access I/O device.

Problem set #2

1. Some early computers protected the operating system by placing it in a memory partition that could not be modified by either the user job or the operating system itself. Describe two difficulties that you think could arise with such a scheme.

2. In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems.
   2.1 What are two such problems?
   2.2 Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer.

3. Under what circumstances would a user be better off using a time- sharing system than a PC or a single-user workstation?

4. Describe a mechanism for enforcing memory protection in order to prevent a program from modifying the memory associated with other programs.

5. Describe some of the challenges of designing operating systems for mobile devices compared with designing operating systems for traditional PCs.