

Operating Systems Exercises week 1.

- 1 What is the main advantage of multiprogramming?
2. In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation leads to problems with security.
 - a) Give 2 examples of the type of security problem you could find?
 - b) Can we ensure the same degree of security in a time-shared machine as we have in a dedicated machine? Explain your answer.
3. Define the essential properties of the following types of operating system:
 - a) Batch
 - b) Interactive
 - c) Time-sharing
4. We have stressed the need for an operating system to make efficient use of the computing hardware. When is it appropriate for the operating system to forsake this principle and to “waste” resources? Why is such a system not really wasteful?
5. Under what circumstances would a user be better off using a time-sharing system, rather than a personal computer?
6. How does the distinction between supervisor mode and user mode function as a rudimentary form of protection (security) system?
7. What are the differences between a software interrupt (trap) and a hardware interrupt? What is the use of each?
8. For what types of operations is DMA useful? Explain your answer.
9. Some early computers protected the operating system by placing it in a memory partition that could not be modified by either a user job or the operating system itself. Describe two difficulties that you think could arise with such a scheme.
10. Protecting the operating system is crucial to ensuring that the computer operates correctly. Provision of this protection is the reason behind dual-mode operation, memory protection and the timer. To allow maximum flexibility, however, we would also like to place minimal constraints on the user. The

following is a list of operations that are normally protected. What is the minimal set of instructions that must be protected?

- a) Change to user mode.
- b) Change to supervisor mode
- c) Read from OS memory
- d) Write into OS memory
- e) Fetch an instruction from OS memory
- f) Turn on timer interrupts
- g) Turn off timer interrupts.