# CSE 4501 Operating Systems
# Chapter 1: Introduction

## Practice Exercises *(Will help to understand questions those may come in the quiz, mid and final examinations)*

1. What are the three main purposes of an operating system?
2. Consider the various definitions of operating system. Consider whether the operating system should include applications such as Web browsers and mail programs. Argue both that it should and that it should not, and support your answers.
3. How does the distinction between kernel mode and user mode function as a rudimentary form of protection (security) system?
4. 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.
5. Some CPUs provide for more than two modes of operation. What are two possible uses of these multiple modes?
6. In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems.
   a. What are two such problems?
   b. Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer.
7. Under what circumstances would a user be better off using a timesharing system rather than a PC or a single-user workstation?
8. Identify which of the functionalities listed below need to be supported by the operating system for (a) Handheld devices and (b) real-time systems.
   a. Batch programming
   b. Virtual memory
   c. Time sharing
9. What are three advantages and one disadvantage of multiprocessor systems?
10. How are network computers different from traditional personal computers? Describe some usage scenarios in which it is advantageous to use network computers.
11. Some computer systems do not provide a privileged mode of operation in hardware. Is it possible to construct a secure operating system for these computer systems? Give arguments both that it is and that it is not possible.
12. Give two reasons why caches are useful. What problems do they solve? What problems do they cause? If a cache can be made as large as the device for which it is caching (for instance, a cache as large as a disk), why not make it that large and eliminate the devices?
13. Define the essential properties of the following types of operating systems:
    a. Batch
    b. Interactive
    c. Time sharing
    d. Real time

e. Network
f. Parallel
g. Distributed
h. Clustered
i. Handheld

14. Identify several advantages and several disadvantages of open-source operating systems. Include the types of users who would find each aspect to be an advantage or a disadvantage.
15. Write down the features of existing Operating systems.