Summary - CSC3150 Final Exam

1. What is an operating system? What are the four major tasks performed by an operating system? Please explain them briefly. (10%)
2. How could a system be designed to allow a choice of operating system from which to boot? What would the bootstrap program need to do? (10%)
3. What is the main advantage of the microkernel approach to system design? How do user programs and system services interact in a microkernel architecture? What are the disadvantages of using the microkernel approach? (10%)
4. Why does an operating system design, in general, use layered approach? Please state its advantages and disadvantages. (10%)
5. What is a process? What is a thread? Please compare them. (10%)
6. What resources are used when a thread is created? (10%)
7. What are the five states of a process in a computer system? Please describe the relationships of these five process states. (10%)
8. Describe the actions taken by a kernel to context-switch between processes. (10%)
9. Why does an operating system have both the user mode and the kernel mode for processes? What are the advantages and disadvantages of the design? (10%)
10. Please list and describe three major activities of the operating system with regard to memory management, and three major activities of the operating system with regard to secondary storage management. (10%)
11. Can the segmentation and paging mechanisms cooperate with each other? Please give your reasons. (10%)
12. What is a Thrashing? How to resolve this problem? (10%)
13. What is Table Lookaside Buffer (TLB)? How it works? (10%)
14. What are the major purposes of Table Lookaside Buffer (TLB)? How it works if the memory hierarchy includes L1, L2 and L3 caches? (10%)
15. What is Interrupt? What are its usages? (10%)
16. How to use interrupt and polling mechanisms to do process manipulation? (10%)
17. Why do we need Direct Memory Access (DMA) mechanism? How does DMA mechanism perform data transfer among memory and I/O devices? (10%)
18. How to use Memory Mapped I/O mechanism to perform file access operations? (10%)
19. Some file systems are good for small file manipulations while others are good for large file operations. How to design a file system that is good for both small and large file manipulations. (10%)
20. What are the advantages of the variant of linked allocation that uses a FAT to chain together the blocks of a file? (10%)
21. Explain the role of mmap mechanism. What’s the difference between MAP\_SHARED and MAP\_PRIVATE? When should the mechanism increase and decrease the reference counter of a file? (10%)
22. Discuss situations in which the least frequently used (LFU) page replacement algorithm generates fewer page faults than the least recently used (LRU) page-replacement algorithm. Also discuss under what circumstances the opposite holds. (10%)
23. Describe the Life Cycle of an I/O request. (10%)