

Short Answer Questions:

1. What are the consequences if we let programs control resource sharing by themselves?
2. What are the consequences if we let hardware control resource sharing?
3. What are the four components of a computer system?
4. What is the major difference between interrupt and trap?
5. Please fill the blanks in the following statement. Interrupt transfers control to _____, through _____, which contains _____.
6. The accomplishment of an I/O request will trigger an interrupt or trap?
7. What is the major difference between caching and buffering?
8. Among cache, magnetic disk, main memory, electronic disk, registers, which is usually fastest in speed? Which is usually biggest in size?
9. _____ is logical extension in which CPU switches jobs so frequently that users can interact with each job while it is running, creating interactive computing.
10. _____ is the operation the CPU decides which process to run for the next cycle.
11. _____ allows execution of processes not completely in memory
12. What is the system call name to create a new process?
13. What is the system call to execute a program?
14. Please draw a graph to show the process's address space layout.
15. Through _____, user code can be dynamically loaded into kernel for execution.
16. What is the function of the program counter?
17. In a process's address space layout, which section contains dynamic data, which section contains temporary data, which sections contains global data?
18. In which state is the process waiting to be assigned to a processor?
19. _____ saves state for the old process (P0) into _____, and reload state for the new process (P1) from _____.
20. What is the major difference between process and thread?
21. What is the difference between ready queue and device queue?
22. What is the difference between CPU-bound processes and I/O-bound processes?
23. Among CPU scheduling, job scheduling and swapping, which is used to decrease the degree of multi-programming, and which is used to control the degree of multi-programming?
24. Why does fork() contain execution branches for both child process and parent process?
25. What is the major difference between message passing and shared memory for IPC?
26. Given pointer *in* and *out* (as defined in class), for a ring buffer with *n* elements, what are the conditions for producer process to stop producing and for the consumer process to stop consuming? At maximum how many elements may be occupied?
27. Among ordinary pipes and named pipes, which requires child-parent process?
28. Among code, data, files, stack, registers, which are shared by multiple threads?
29. Give three methods for implicit threading.
30. Why do we need implicit threading?
31. What is the difference between sigsetjmp and setjmp?
32. What is the return value for sigsetjmp?

33. When a process is resumed for execution, what is the first instruction to run? (Signal handler if any)
34. Is that possible one process changes its scheduling status from "ready" to "terminated"?
35. What is the difference between shortest job first and shortest remaining job first?
36. Which functions can be used to jump from one function to another function, and also ensure signals not blocked for future use?
37. Please give one example of work conservation scheduling algorithm?
38. What is the major difference between work conservation and non work conservation?
39. Is scheduling status on thread control block or process control block?

True or False Questions:

1. I/O moves data from/to main memory to/from local buffers. (F)
2. For a single processor machine, it executes programs sequentially even with the timesharing technology. (T)
3. System calls are executed in user mode. (F)
4. Graphical User Interface (GUI) is the gateway between user land and kernel land. (F)
5. Shell is a system call interface, as commands can be issued through shells. (F)
6. System call only needs a identification number to run. (F)
7. Fork() system call create a child process which has a totally different address space layout before running execve() system call. (F)
8. Micro kernel does not have any performance overhead of user space to kernel space communication. (F)
9. Program counter (PC) counts how many lines of code have been executed by a process. (F)
10. A process in ready state can be terminated directly. (F)
11. On a single-processor single-core system, we can achieve parallelism. (F)
12. For a process containing multiple threads, scheduling state is contained in Process Control Block. (F)
13. All the threads in the same process share one single program counter. (F)

Multiple Choice Questions:

1. Which of the following system calls is used to let the parent process create a child process?
 (a) abort();
 (b) wait();
 (c) fork();
 (d) exec().

2. Which is the implementation used to regain control or terminate program that exceeds allotted time?
 (a) System call;
 (b) Timer interrupt;
 (c) CPU scheduling;

- (d) swapping;
- (e) all of the above.

Long Answer Questions:

1. The slide code understandings for setjmp, sigsetjmp, signal handler, etc.
2. The code (especially conditions) for producer and consumer problem.
3. Explain what is done in step 1, 2, 3, 4?

