

### Self Assessment Sheet1: Operating System

1. When a computer is first turned on or restarted, a special type of absolute loader is executed, called a :

- a) "Compiler and Go" Loader   b) Boot Loader   c) Bootstrap Loader   d) Relating Loader

2. In operating system, each process has its own:

- a) address space and global variables                      b) open files  
c) pending alarms, signals and signal handlers              d) all of the mentioned

3. A process can be terminated due to:

- a) normal exit    b) fatal error    c) killed by another process    d) all of the mentioned

4. A process stack does not contain:

- a) function parameters   b) local variables   c) return addresses   d) PID of child process

5. Which system call returns the process identifier of a terminated child?

- a) wait                      b) exit                      c) fork                      d) get

6. A parent process calling \_\_\_\_ system call will be suspended until children processes terminate.

- a) wait                      b) fork                      c) exit                      d) exec

7. The child process completes execution, but the parent keeps executing, then the child process is known as:

- a) Orphan                      b) Zombie                      c) Body                      d) Dead

8. Inter process communication:

- a) allows processes to communicate and synchronize their actions when using the same address space.  
b) allows processes to communicate and synchronize their actions without using the same address space.  
c) allows the processes to only synchronize their actions without communication.  
d) None of these

9. Concurrent access to shared data may result in:

- a) data consistency    b) data insecurity    c) data inconsistency    d) None of these

10. When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place, is called:

- a) dynamic condition   b) race condition   c) essential condition   d) critical condition

11. The segment of code in which the process may change common variables, update tables, write into files is known as:

- a) program    b) critical section    c) non – critical section    d) synchronizing

12. Part of a program where the shared memory is accessed and which should be executed invisibly, is called:

- a) semaphore              b) directory    c) critical section              d) mutual exclusion

13 Which of the following conditions must be satisfied to solve the critical section problem

I. Aging   II. Mutual Exclusion   III. Deadlock   IV. Progress Requirement   V. Bounded Waiting

- a) I, IV, V                      b) II, III, V                      c) I, III, V                      d) II, IV, V

14. To avoid the race condition, the number of processes that may be simultaneously inside their critical section is:

- a) 8                      b) 1                      c) 16                      d) 0

15. If a process is executing in its critical section, then no other processes can be executing in their critical section. This condition is called:

- a) mutual exclusion                      b) critical exclusion  
c) synchronous exclusion                      d) asynchronous exclusion

16. Bounded waiting implies that there exists a bound on the number of times a process is allowed to enter its critical section:

- a) after a process has made a request to enter its critical section and before the request is granted  
b) when another process is in its critical section  
c) before a process has made a request to enter its critical section  
d) None of these

17. Which one of the following is a synchronization tool?

- a) thread                      b) pipe                      c) semaphore                      d) socket

18. A semaphore is a shared integer variable:

- a) that can not drop below zero                      b) that can not be more than zero  
c) that can not drop below one                      d) that can not be more than one

19. A semaphore:

- a) must be accessed from only one process .                      b) is a binary mutex.  
c) can be accessed from multiple processes                      d) None of these

20. The two kinds of semaphores are : (choose two)

- a) mutex                      b) binary                      c) counting                      d) decimal

21. A mutex:

- a) must be accessed from only one process                      b) is a binary mutex  
c) can be accessed from multiple processes                      d) None of these

22. Mutual exclusion can be provided by the:

- a) mutex locks                      b) binary semaphores                      c) both (a) and (b)                      d) none

23. The dining – philosophers problem will occur in case of:

- a) 5 philosophers and 5 chopsticks                      b) 4 philosophers and 5 chopsticks  
c) 3 philosophers and 5 chopsticks                      d) 6 philosophers and 5 chopsticks

24. The bounded buffer problem is also known as:

- a) Readers – Writers problem                      b) Dining – Philosophers problem  
c) Producer – Consumer problem                      d) None of these

25. If the semaphore value is negative:

- a) its magnitude is the number of processes waiting on that semaphore  
b) it is invalid  
c) no operation can be further performed on it until the signal operation is performed on it  
d) None of these

26. The TestAndSet instruction is executed:

- a) after a particular process                      b) periodically                      c) atomically                      d) None of these

27. Which one of the following is the address generated by CPU?  
a) physical address   b) absolute address   c) logical address   d) none of the mentioned
28. The principle of locality of reference justifies the use of:  
a) harddisk                b) virtual memory        c) ROM                    d) cache memory
29. Physical memory is broken into fixed-sized blocks called \_\_\_\_\_.  
a) frames        b) pages        c) backing store        d) None of these
30. Logical memory is broken into blocks of the same size called \_\_\_\_\_.  
a) frames        b) pages        c) backing store        d) None of these
31. Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called:  
a) fragmentation        b) paging        c) mapping        d) none of the mentioned
32. The \_\_\_\_\_ table contains the base address of each page in physical memory.  
a) process        b) memory        c) page        d) frame
33. For every process there is a \_\_\_\_\_.  
a) page table        b) copy of page table        c) pointer to page table        d) All of these
34. The Memory Buffer Register (MBR):  
a) is a hardware memory device which denotes the location of the current instruction being executed.  
b) is a group of electrical circuits (hardware), that performs the intent of instructions fetched from memory.  
c) contains the address of the memory location that is to be read from or stored into.  
d) contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write".
35. The Memory Address Register:  
a) is a hardware memory device which denotes the location of the current instruction being executed.  
b) is a group of electrical circuits (hardware), that performs the intent of instructions fetched from memory.  
c) contains the address of the memory location that is to be read from or stored into.  
d) contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write".
36. A page fault:  
a) is an error in a specific page.  
b) occurs when a program accesses a page of memory.  
c) is an access to a page not currently in memory.  
d) is a reference to a page belonging to another program.
37. Contiguous allocation has two problems \_\_\_\_\_ and \_\_\_\_\_ that linked allocation solves.  
a) external fragmentation   b) internal fragmentation   c) size declaration   d) memory allocation
38. In the linked allocation, the directory contains a pointer to the : I. first block II. last block  
a) I only        b) II only        c) Both I and II        d) Neither I nor II
39. There is no \_\_\_\_\_ with linked allocation.

a) internal fragmentation      b) external fragmentation      c) starvation      d) All of these

40. In internal fragmentation, memory is internal to a partition and :

a) is being used      b) is not being use      c) is always used      d) None of these

41. External fragmentation exists when :

a) enough total memory exists to satisfy a request but it is not contiguous  
b) the total memory is insufficient to satisfy a request  
c) a request cannot be satisfied even when the total memory is free  
d) None of these

42. A solution to the problem of external fragmentation is :

a) compaction      b) larger memory space      c) smaller memory space      d) None of these

43. External fragmentation will not occur when :

a) first fit is used      b) best fit is used      c) worst fit is used  
d) no matter which algorithm is used, it will always occur

44. The memory allocation scheme subject to "external" fragmentation is:

a) segmentation      b) swapping      c) pure demand paging      d) paging

45. With paging there is no \_\_\_\_\_ fragmentation.

a) internal      b) external      c) either type of      d) None of these

46. Fragmentation of the file system:

a) occurs only if the file system is used improperly      b) can always be prevented  
c) can be temporarily removed by compaction      d) is a characteristic of all file systems

47. Which of the following is false about disk when compared to main memory?

a) non-volatile      b) larger storage capacity      c) lower price per bit      d) faster

48. The three major methods of allocating disk space that are in wide use are :

a) contiguous      b) linked      c) indexed      d) hashed

49. In contiguous allocation :

a) each file must occupy a set of contiguous blocks on the disk  
b) each file is a linked list of disk blocks  
c) all the pointers to scattered blocks are placed together in one location  
d) None of these

50. In linked allocation :

a) each file must occupy a set of contiguous blocks on the disk  
b) each file is a linked list of disk blocks  
c) all the pointers to scattered blocks are placed together in one location  
d) None of these

51. In indexed allocation :

a) each file must occupy a set of contiguous blocks on the disk  
b) each file is a linked list of disk blocks  
c) all the pointers to scattered blocks are placed together in one location  
d) None of these

52. The first fit and best fit algorithms suffer from : (choose all that apply)

a) internal fragmentation   b) external fragmentation   c) starvation   d) All of these

53. In which of the storage placement strategies a program is placed in the largest available hole in the main memory?

a) best fit      b) first fit      c) worst fit      d) none of the above

54. The CPU, after receiving an interrupt from an I/O device:

a) halts for a predetermined time  
b) hands over control of address bus and data bus to the interrupting device  
c) branches off to the interrupt service routine immediately  
d) branches off to the interrupt service routine after completion of the current instruction

55. Whenever a process needs I/O to or from a disk it issues a \_\_\_\_\_.

a) system call to the CPU                      b) system call to the operating system  
c) a special procedure                          d) All of these

56. To create a file:

a) allocate the space in file system      b) make an entry for new file in directory  
c) both (a) and (b)                          d) none of the mentioned

57. Consider a disk queue with requests for I/O to blocks on cylinders : 98 183 37 122 14 124 65 67

i) Considering FCFS (first cum first served) scheduling, the total number of head movements is, if the disk head is initially at 53 :

a) 600              b) 620              c) 630              d) 640

ii) Considering SSTF (shortest seek time first) scheduling, the total number of head movements is, if the disk head is initially at 53 :

a) 224              b) 236              c) 245              d) 240

58. A disk scheduling algorithm in an operating system causes the disk arm to move back and forth across the disk surface in order to service all requests in its path. This is a:

a) FCFS      b) SCAN      c) C-SCAN      d) C-LOOK

59. In the \_\_\_\_\_ algorithm, the disk arm goes as far as the final request in each direction, then reverses direction immediately without going to the end of the disk.

a) LOOK      b) SCAN      c) C-SCAN      d) C-LOOK

60. FAT stands for :

a) File Attribute Transport   b) File Allocation Table   c) Fork At Time   d) None of these

61. An OS uses a paging system with 1Kbyte pages. A given process uses a virtual address space of 128K and is assigned 16K of physical memory. How many entries does its page table contain?

a) 16              b) 1024              c) 128              d) 512

62. An OS has 64MB physical memory and generates 32 bit logical address. Number of physical pages and virtual pages for page size 4KB is:

a) 16K, 1M      b) 16M, 1M      c) 4K, 16M      d) 4M, 16M

63. Suppose a logical address space of 32 pages of 2048 words. There are 64 frames in the main memory. According to the given information, calculate size of physical address and virtual address. (Hint: by default 1 word = 1 byte)

a) 16 bits, 17 bits      b) 16 bits, 32 bits      c) 32 bits, 16 bits      d) 17 bits, 16 bits

64. A program is executing in a pure demand paging system with 100 records per page with 1 free main memory frame. The address sequence that is generated by tracing this program is recorded as follows: 0100, 0200, 0430, 0499, 0510, 0530, 0560, 0120, 0220, 0240, 0260, 0320, 0370. What are the number of page faults?

a) 8                      b) 11                      c) 7                      d) 12

65. Consider main memory of 2MB and page size has 256B. How many pages are allocated to a process of size 5000B?

a) 20                      b) 19                      c) 10                      d) 11

66. Consider one-level paging system having TLB lookup time of 5 nsec. Memory access time is 100 nsec. Find effective memory access time for TLB hit ratio of 98%.

a) 125 nsec                      b) 107 nsec                      c) 105 nsec                      d) 121 nsec

67. Suppose TLB used in one level paging system with each look-up time of TLB 40 msec. Memory reference takes 120 msec. If the effective memory reference time is 180 msec then page table references are found in TLB is \_\_\_\_.

a) 0.85                      b) 0.87                      c) 0.76                      d) 0.833

68. Consider a system with 2-levels of paging and a TLB with hit rate of 95% and TLB access time of 1ns. Find the effective memory access time if there's a data cache whose hit rate is 85% and cache access time is 1ns, and main memory access time is 100ns.

a) 27 ns                      b) 25 ns                      c) 30 ns                      d) 20ns

69. A processor uses 2 level paging for virtual address to physical address translation. page tables for both levels are stored in physical memory. There is physically addressed cache. TLB hit ratio = 96%, TLB Access Time=1ns, Cache hit ratio=90%, Cache Access Time= 1ns, Physical M/M Access Time: 10 ns. What is effective memory access time?

a) 2.88 ns                      b) 3.4 ns                      c) 3.8 ns                      d) 2.84 ns

70. Consider a 32-bit virtual address is used for paging with page size of 1024 bytes. Two-level paging is implemented with equal number of entries in every page table of the system. If page table entry size is 2 bytes. The maximum size (in MB) of main memory supported by the above system is \_\_\_\_.

a) 512MB                      b) 128MB                      c) 64MB                      d) 256MB

Answers: 1) b. 2) d. 3) d. 4) d. 5) a. 6) a. 7) b. 8) b. 9) c. 10) b. 11) b. 12) c. 13) d. 14) b. 15) a. 16) a. 17) c. 18) a. 19) c. 20) b,c. 21) a. 22) c. 23) a. 24) c. 25) a. 26) c. 27) c. 28) d. 29) a. 30) b. 31) b. 32) c. 33) a. 34) d. 35) c. 36) c. 37) a,c. 38) c. 39) b. 40) b. 41) a. 42) a. 43) d. 44) a. 45) b. 46) c. 47) d. 48) a,b,c. 49) a. 50) b. 51) c. 52) b. 53) c. 54) d. 55) b. 56) c. 57) i.d. ii.b. 58) b. 59) a. 60) b. 61) c. 62) a. 63) d. 64) c. 65) a. 66) b. 67) d. 68) a. 69) c. 70) d.