SISTEMAS OPERATIVOS-TEST.pdf
Test Sistemas Operativos. T1-2

2° Sistemas Operativos

Grado en Ingeniería Informática

Escuela Politécnica Superior
UC3M - Universidad Carlos III de Madrid

TOPIC 1

1. Which of the following is NOT one of the most common APIs?
   a) Win32 API
   b) Java API
   c) Mac OS API
   d) POSIX API

   Solution: c. Mac OS uses a POSIX API.

2. Which of the following is always included when purchasing an operating system?
   a) Kernel
   b) File system
   c) Hardware drivers
   d) All previous answers are correct

   Solution: a. The kernel is the core part of the operating system. All other programs can be included, but not compulsory.

3. The microkernel system structure is:
   a) Designed to make easier to port the operating system to new architectures
   b) Written to provide the most functionality in the least space
   c) A and B are correct
   d) A and B are correct

   Solution: a. With the microkernel system is easier to port the system to new architectures. Answer b is a specific characteristic for small (reduce memory) that is not general applicable.

4. Which of the following is NOT a good method to pass parameters to the Operating System?
   a) Using registers
   b) Using blocks of memory
   c) Using the Stack
   d) Using the disk

Solution: d.

5. Choose the correct statement related to the bootstrap program:
   a) Typically stored in the RAM, generally known as firmware
   b) It is loaded only in reboot
   c) Loads the operating system kernel and the user applications
   d) None of the above

   Solution: d. The main function of the bootstrap program is to load the operating system kernel and starts the execution; it is loaded at power-up or reboot. Due to this fact, the statements "c" and "b" are false. Besides, another reason why "c" is false is that the operative system is considered only the kernel, so the rest, like the web browser, is considered as a system program or an application program. Finally, the bootstrap program is known as firmware but is typically stored in the ROM or EPROM, so the statement "a" is also false. Consequently, the statement "d" is true.

6. Which one of the following can be considered part of the operating system?
   a) Kernel and file manager
   b) Kernel and web browser

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c) File manager without kernel

d) None of the above

Solution: a. A web browser does not belong to the OS. The kernel is part of the OS (the same as the file manager).

7. Which of th**ese is not a system goal for Operating Syste**m design and implementation?
   a) Should be easy to design
   b) Should be reliable
   c) Should be rigid
   d) Should be efficient

Solution: c. An Operating System should be flexible, not rigid.

8. Timesharing (or multitasking), is a logical operation done by the CPU that
   a) Synchronizes the time of the computer among processes that have real time functionalities
   b) Parallelizes the execution of several processes, overlapped the same time frame
   c) Switches the execution of the processes so fast that the user believes to be interacting with them as if it was in parallel.
   d) Performs various operations within a single clock cycle

Solution: c. D is an impossible answer, the CPU can only perform one operation per clock cycle. Timesharing has nothing to do with the synchronization of the time of the computer with the processes, discarding answer A. What timesharing does is to assign a tiny frame to each process, running them sequentially within its frame (not overlapping them in parallel, as answer B says), giving the user the illusion that they are being executed in the same time.

9. Which one of the following states (related to exec() call) is false?
   a) It allows executing commands with a generic number of arguments
   b) If it works successfully, it returns -1
   c) It can change the user ID
   d) Only returns a value if it works unsuccessfully

Solution: b. A successful exec replaces the current process image, so it cannot return anything to the program that made the call. If an exec function does return to the calling program, an error occurs, the return value is -1.

10. How can an I/O device exchange data with the memory?
    a) Using DMA
    b) Through the CPU
    c) It can never exchange data with the memory
    d) Both a) and b) are correct

Solution: d. We can move data with both DMA and through the CPU: the first one is used for bulk data, whereas the latter is better for small amount of data. When the CPU is in charge of the transfer, data is transferred by the controller from the device to the local buffer. This way, there is one interrupt every time a part of data has been sent until the block is finished. Using DMA, a whole block of data is transferred directly by the device controller to/from its own buffer storage to memory. Since the transfers is not carried out by the CPU, there is only one interrupt at the end.

11. A modular Operating System…

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a) Is divided in many layers which only communicate with the inferior layer
b) Is designed with one big module that manages all the system
c) Is designed for running inside the Virtual Machine
d) Has all his core components separated into modules

Solution: d. It is the main feature of a modular system, "a" would be a layered system, "b" would be a simple structure and "c" is also false since it could run on a virtual machine, but is not necessarily the only goal for it.

12. When a process is a zombie state?
a) When it is running and its parent dies
b) When its parent dies without executing wait()
c) When it dies and its parent doesn't execute wait()
d) When it dies and its parent is still executing

Solution: c. A zombie process and its parent doesn't execute wait(). It is kept because it is necessary to maintain the state returned by the exit functions just in case of being necessary by any parent.

13. Which of the following is a characteristic of Virtual Machines?
a) It treats hardware like software resources
b) Provides a direct interface to the underlying bare hardware
c) The host creates the illusion that a process has its hardware resources
d) Always need lots of memory for being used

Solution: c. Hardware is seen as (virtualized) hardware, there is not an interface to the platform hardware and it may not need much more memory that an unvirtualized host. However, the host creates the illusion that a process has its hardware resources.

14. Where does the OS load a program before executing it?
a) EPROM
b) ROM
c) RAM
d) Any Storage Device

Solution: c. The programs are loaded and initialized in the RAM memory

15. Main memory is _____, and provides _____ access than caches.
a) Volatile, faster
b) Non-volatile, faster
c) Volatile, slower
d) Non-volatile, slower

Solution: c. Main memory is a volatile storage element because its contents disappear when power is turned off. Caches are faster than main memory and are designed to provide access to information that is routinely used.

16. Which one of the following calls allow sending a signal to a process?
a) IOCTL
b) PIPE
c) KILL
d) SIGNAL

Solution: c. The kill call is used to send (generic) signals to a given process

17. Which of the following is NOT a memory management activity?
a) Keep track of which parts of the memory are currently being used and by whom

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b) Decide which of the process to move into and out memory
c) Allocate and deallocate memory space as needed
d) Decide which process to run next

Solution d. The first are false because those are characteristics of memory management, the last one is the one that is not a memory management, since that is the scheduler's job.

18. The bit of user/kernel modes:
    a) Is provided by the operating system
    b) Provides the ability to distinguish when a process can run privileged instructions
    c) Is changed only at the startup of the system
    d) None of the previous answers are correct

Solution: c. It is necessary to store the execution mode for each process. Is case of only two execution modes a single bit is enough to distinguish them. This information is provided by the hardware.

19. Choose the correct statement related to the bootstrap program:
    a) Typically stored in the RAM, generally known as firmware
    b) It is loaded only in reboot
    c) Loads the operating system kernel and the user applications
    d) None of the above

Solution: d. The main function of the bootstrap program is to load the operating system kernel and starts the execution; it is loaded at power-up or reboot. Due to this fact, the statements are "c" and "b" are false. Besides, another reason why "c" is false is that the operative system is considered only the kernel, so the rest, like the web browser, is considered as a system program or an application program. Finally, the bootstrap program is known as a firmware but it is typically stored in the ROM or EPROM, so the statement "a" is also false.

20. Which one of the following system calls does not consume one file descriptors?
    a) CREAT
    b) OPEN
    c) DUP2
    d) PIPE

Solution: d. PIPE uses two file descriptors.

21. Which statement is false?
    a) Command interpreter can be implemented in kernel
    b) Command interpreter can be implemented by a program
    c) Shells are multiple command interpreters
    d) Adding new commands requires shell modification

Solution: d. It is exactly the opposite to the correct solution. This one of the advantages of using names of programs rather than built-in commands. That is adding new commands does not require shell modification.

22. The layered operating system:
    a) Is a type of system in which the lower layers can be invoked by the immediate higher layer.
    b) It is a type of system in which the layer 0 is the user interface and the layer N is the hardware.
    c) It is more efficient than the microkernel operating system

d)   Uses object-oriented approach

Solution: a. A layered operating system is a type of operating system divided in different layer (from 0, which corresponds to the hardware N, which corresponds, to the user interface). The higher layers can invoke the lower layers, and also each layer is depurated independently. This means that statement "b" is false. This type of operating system is less efficient than the microkernel one, so "c" is false as well. The statement "d" corresponds to a characteristic of the module operating system, so it is also false.

23. Choose the wrong answer for an operating system
    a)   Is interrupt driven
    b)   Is a resource allocator
    c)   Always requires of a Graphical User interface
    d)   Controls execution of programs

Solution: c. Graphical User interface is not required in an OS.

24. Which one is the correct order for computer structure?
    a)   Hardware-services-kernel-system calls-system software
    b)   Hardware-kernel-services-system calls-system software
    c)   Hardware-kernel- system calls-services-system software
    d)   Hardware-kernel- system calls- system software-services

Solution: b. In computers, hardware is the bottom level. Then kernel is higher level as a core of computer. Some services follow kernel. Systems calls is associated with the services. Services cause the system calls. And the higher level is software.

25. When the CPU needs a piece of information (issues a load instruction), where does it first look for?
    a)   In main memory (RAM)
    b)   On disk storage (hard disk)
    c)   On CPU cache
    d)   On an I/O device

Solution: c. According to the memory hierarchy order. The first memory location that is acceded is the lowest level, i.e. the cache memory.

26. What is the biggest disadvantage of passing parameters (to the operating system) by means of registers?
    a)   Registers are very slow and they require lots of memory for being able to operate efficiently
    b)   The number of registers is limited. There may not be enough registers for all the passed parameters
    c)   Registers have to be handled directly by the user (in User Mode). A bad use of the registers can cause the breakdown of the whole operative system.
    d)   All the previous answers are correct

Solution: b. The simplest way for passing parameters to the operative system is (passing them) in registers. However, as it is stated on the "b" answer, the number of registers is limited and there may be more parameters than registers. For that reason (to avoid that situation), the two most used methods for passing parameters are: storing the parameters in a block (or table) or pushing the parameters onto the stack.

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27. In order to pass parameters to the OS:
    a) Use registers directly is always the simplest and best option
    b) The block method limits the number of parameters being passed
    c) The block method does not limit the number of parameters being passed
    d) The stack method limits the length of parameters being passed

    Solution: c. The stack and block methods do not limit the number or length of parameters being passed and that is why some OS prefer them. In some cases there may be more parameters than registers, making the registers method not a good option and, regarding the stack method, the program pushes the parameters in the stack and the OS pops them.

28. Which of the following OS have a simple structure?
    a) MS-DOS and Ubuntu
    b) (early) UNIX and Solaris
    c) MS_ODS and (early) UNIX
    d) Android and Windows 8

    Solution: c. MS-DOS and versions of UNIX were implemented with a simple structure given that they were implemented by few people and the goal of those OS was to provide the most functionality in the least space1.

29. Which of the following tasks is performed by the kernel?
    a) Memory management
    b) Scheduling tasks for the CPU to run
    c) File management
    d) All previous answers are correct

    Solution: d.

30. Which of the following approaches limits the parameters that can be passed to operating systems?
    a) Passing parameters in the registers
    b) Passing parameters as a block and passing the address of the block in registers
    c) Pushing parameters onto the stack
    d) All the above

    Solution: a. Since we have a limited amount of registers in a CPU if we have a lot of parameters we might not have enough registers to pass all the parameters

31. Which one of the following can be considered part of the operating system?
    a) Kernel and file manager
    b) Kernel and web browser
    c) File manager without kernel
    d) None of the above

    Solution: a. A web browser does not belong to the OS. The kernel is part of the OS (the same as the file manager).

32. What is a Secondary Storage?
    a) An extension of main memory that provides large non-volatile storage capacity
    b) An extension of main memory that provides small non-volatile storage capacity
    c) Always a flash memory

d) An extension of main memory that provides large volatile storage capacity

Solution: a. The main memory is a large storage media that the CPU can access directly, and the secondary storage is a large extension of the main memory, that provides permanent storage. A hard disk or a flash memory can be used as a Secondary Storage.

33. Which is the goal of POSIX standard?
    a) Transfer control to service routine
    b) Applications portability for different platforms and operating systems
    c) Implement code
    d) Include the execution of a trap instruction

Solution: b. The goal of the use of the POSIX standard is a common access interface across different platforms and programming languages.

34. The device driver is:
    a) A register in the I/O device used to represent the status of the device
    b) A program that provides a uniform interface between the I/O device and the operating system
    c) The same as the device controller
    d) The local buffer of the I/O device

Solution: b. Operating systems have a device driver for each device controller. This device driver understands the device controller and it is the interface between the device and the operating system. Meanwhile, the device controller, the registers and the local buffer of the device are different things that the device has.

35. Which of the following is not managed by the Operative System?
    a) CPU Registers
    b) I/O devices
    c) Main memory
    d) Disk storage

Solution: a. The CPU Registers are managed both for the CPU and compiler.

36. Which are three examples of system programs which tend to be sold as the operating system but are not really part of it?
    a) Kernel, file manager and web browser
    b) File manager, web browser and text editors
    c) Kernel, user interface and user programs
    d) All of the above are correct

Solution: d. The kernel is part of the operating system unlike the file manager, web browser (for example internet explorer on windows) and text editors which are user application which are not part of the operating system but when buying one people tend to associate them to it.

37. Which one of the following definition describes a program correctly:
    a) A program is the same as a process
    b) A program is an active entity being executed in the CPU
    c) A program is a passive entity stored in files
    d) A program contains only one process

Solution: c. It is stored in a file as data. A program is different than a process, it is not active (the active ones are the process) and can contain several processes or threads.

38. Which devices can use a bus to connect with memory simultaneously?
    a) CPU and one other devices can access at the same time
    b) Only CPU and disk controller can access at the same time
    c) Any, CPU or DMA devices, but only one device at the same time
    d) The bus is not connected with the memory

Solution: c. Every device is connected with memory by common bus, so if any of this devices want communicate with memory by this bus, only one of them can do it in the same time.

39. Which of the following activities is not a responsibility of the operating system?
    a) Creating and deleting both user and system processes
    b) Providing mechanisms for process synchronization
    c) Running the bootstrap program
    d) Suspending and resuming processes

Solution: c. Initializing the system is a responsibility of the bootstrap program and the operating system is in charge of the rest of options.

40. Which one of these sentences is true regarding the Operating System?
    a) Multiprogramming consists of executing different processes at the same time and it can lead to reduce the execution time of each process.
    b) Time sharing consists of having programs stored in memory and executing them sequentially, one after the completion of the other.
    c) With multiprogramming and time-sharing the computer allows the simultaneously use of the computer by different users
    d) Multiprogramming can only be implemented if the computer has a minimum of 4 cores.

Solution: c. Multiprogramming and time sharing are mechanisms that improve the performance of the computer. With the multiprogramming, the CPU has always a program to execute and with multitasking it executes several tasks by switching between them. With the combination of both techniques several users can access the computer, and every user has a correct experience as the CPU times of execution are short. Each user has at least one separate program in memory. There is not a minimum number of cores as these are characteristics of the operating-system.

41. When connecting an I/O device to the computer:
    a) It cannot execute concurrently with the processor.
    b) In direct memory access structure the processor does not take part in transferring data.
    c) In order to transmit data from an I/O device to memory, interrupts are not required.
    d) I/O device moves data from/to I/O device to/from the registers of the CPU.

Solution: b. With DMA the device is able to transmit data directly from the buffer to the main memory being the I/O module the responsible for this action and sending only one interrupt to the processor at the end of the transition.

42. Which of the following statements about POSIX is FALSE?

a) The POSIX standard is based in C, so you cannot use it to throw exceptions.
b) It is a way to implement code.
c) It references resources using numeric descriptors.
d) It allows portability across platforms.

Solution: b. POSIX defines a standard user interface across systems. It is not define how to implement code on a specific platform. Therefore, B is FALSE and the correct answer. A is TRUE because C uses numeric error numbers to identify problems and does not throw exceptions. C is TRUE because POSIX uses numeric descriptors. D is TRUE because the intention of POSIX is to provide a family of standards for many different computer systems.

43. Which one of the following system calls redirects the standard output to a file?
a) close(1); creat(file, 0)
b) fd = creat(file, 0666); close(0); dup(0);
c) fd = creat(file, 0); close(1); dup(1); close(fd);
d) close(1); fd = creat(file, 0); dup(fd); close(fd);

Solution: a. close(1) closes the standard output and creat associates a new one to a given file.

44. Which of the following statements is true?
a) You can`t run more than one virtual machine on the same host operating system.
b) It`s impossible to run a virtual machine inside of a virtual machine.
c) Guest operating systems are aware of the fact that they are running on a virtual platform.
d) The virtual machine's guest operating system can't access to the physical hard disk without the supervision of the hypervisor.

Solution: d. Guest operating systems I/O requests are supervised by the hypervisor.

45. An example of a file system OS is not:
a) Delete a file
b) Copy a file
c) Rename a file
d) Transfer a file from one machine to another

Solution: Transferring data between machines is performed by communication operations and it is not responsibility of the file system.

46. What is a micro kernel:
a) It is a smaller kernel that conserves all its functionalities.
b) It is a smaller copy of the kernel.
c) It is a kernel that only provides core services.
d) It is a kernel in user space.

Solution: c. The micro kernel for operating system structures has had removed the nonessential components, thus has been kept with the core services. Therefore, it is not a) nor a copy b). Finally the removed functionalities are implemented as system and user level, not the kernel, as says d).

47. Who sends the interrupt and who receives it?
a) Sender: CPU - Receiver: I/O devices
b) Sender: CPU - Receiver: Memory

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c) Sender: Memory - Receiver: CPU

d) Sender: I/O devices - Receiver: CPU

Solution: d. Device controller informs CPU that it has finished its operation by causing an interrupt on the CPU.

48. Which of these is not a generic method to pass parameters for system calls?
    a) In registers
    b) In a table in memory
    c) In program stack
    d) In the firmware

Solution: d. The firmware or bootstrap program is loaded in the ROM / EPROM and is in charge of loading the operating system, it has nothing to do with passing parameters for system calls.

49. What is the goal of an Operating System?
    a) Execute user programs and make solving user problems easier
    b) Make the computer system convenient to use
    c) Use the computer hardware in an efficient manner
    d) All options are correct

Solution: d. All of the functions mentioned above are key to a good OS, as they must ensure the maximum performance and the best user experience.

50. Which are the steps followed to communicate with an I/O device?
    a) 1:Drivers initialize the I/O device 2:I/O controller reads the values of the driver 3: I/O controller transfers the data to the local buffer 4: An interruption is generated 5: Driver transfers the data from the buffer to the system memory
    b) 1: An interruption is generated 2: Driver transfers the data from the buffer to the system memory 3: I/O controller reads the information of the drivers 4: Drivers initialize the I/O device
    c) Drivers are transferred directly between the I/O devices and memory.
    d) There are no steps. There is a straight communication between an I/O device and a computer by means of buses

Solution: c. The operating system is responsible for managing the I/O devices (a scanner, a printer). The generation of the interruption (that goes to the CPU) is necessary since ,this way, we know that the I/O device process is finished. Finally, the data from the buffer is loaded into the system memory.

51. Select the correct statement about the bootstrap:
    a) It is the program loaded at the start up of the computer that initializes the operating system.
    b) It is located in a random address in the main memory of the computer.
    c) It is a program that determines the type of interrupt in the interrupt handling proccess.
    d) It is always saved in a SRAM

Solution: a. It is stored in ROM or EPROM and when powering up the computer loaded in the 0 address in memory to take the kernel from the hard disk and initialize the operating system, which is the one that identifies each type of interrupt.

52. At a low level, how many processes can a basic single-core multitasking computer execute in one clock cycle?
    a) A lot of processes, that is the reason it is called multitasking

b) None. One clock cycle period is too short for carrying out any kind of process
c) Just one single process
d) None of the previous answers are correct

Solution: c. At a low level (miliseconds) a computer can only execute one single process per a given clock cycle. However, we have the impression/illusion that several processes are being run at the same time. This is due to the fact that the execution process is switching all the time so once a process has finished, it switches to another so (another new process) can be carried out.

53. What contains an entry of the interruption table?
a) The name of the routine related to the interruption
b) The address of the routine related to the interruption
c) The interruption number
d) The name of the OS task that handles the interruption

Solution: b. The interruption table is indexed by the interruption number and contains the address of the routine related to the interruption which is subsequently executed

54. Which one of the following definition describes a program correctly:
a) A program is the same as a process
b) A program is an active entity being executed in the CPU
c) A program is a passive entity stored in files
d) A program contains only one process

Solution: c. Because it is stored in a file as data. A program is different than a process, it is not active (the active ones are the processes) and can contain several processes or threads

55. When we perform a system call…
a) We need to change from user mode to kernel mode via an interrupt.
b) We can pass the parameters using registers, a block/table in memory or the stack.
c) We invoke actual system calls.
d) Both a) and b) are correct.

Solution: d. The system calls are part of the privileged instructions that can only be performed by the OS, therefore they can only be performed in the kernel mode. Moreover, the parameter passing can be done in three ways: using registers, a block/table in memory or the stack; though the registers are not often used as they limit the number of parameters. Finally, application developers design programs according to an API because it is easier to work with them than with actual system calls; thus, c) is not right.

56. The operating system goals do not include:
a) Manages the execution of system programs
b) Control the correct order of execution of instructions
c) Make the computer system convenient to use
d) Use the computer hardware in an efficient manner

Solution: b. The Operating System is a program that acts as an intermediary between a user of a computer and the computer hardware. We can clearly see that answers a, c

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and d summarize this functionality, meanwhile, answer b is the incorrect one. B is related to the hardware control of instruction execution.

57. Choose the INCORRECT answer. The bootstrap program:
    a) Is typically stored in RAM
    b) Initializes the system
    c) Is in charge of loading and executing kernel
    d) Is usually quite simple.

Solution: a. Bootstrap program usually is in Rom or EPROM, not in RAM Because data stored in ROM is non-volatile while in RAM is quite easy to delete.

58. What are the main downsides of a Layered OS compared to a Monolitic OS?
    a) Data Hiding
    b) Less Efficiency
    c) Harder debugging
    d) Interfaces not clearly distinguished

Solution: b. Less efficiency, as to perform an operation it is needed to cross many different layers, the efficiency drops compared to a monolitic OS. Data hiding is an advantage, interfaces are clearly distinguished in a layered OS and debugging is easier than in a monolitic OS.

59. Which is a generic method to pass parameters for system calls?
    a) Registers.
    b) Table in memory.
    c) Both are correct.
    d) Both are incorrect.

Solution: c. Both are correct since registers are the basic method for passing parameters, but a table in memory is as well, since the address is passed to the OS through a register.

60. Which type of operating system uses different levels to separate parts of the system and what is a disadvantage of this system?
    a) Layered approach; it is inefficient since calls must be made through all layers
    b) Layered approach; it is difficult to debug since the layers depend on each other.
    c) Simple structure; it is easily susceptible to malicious software since the hardware layer is exposed.
    d) Simple structure; many different functions are packed into single layers, making it difficult to maintain.

Solution: a. The layered approach uses layers to implement the operating system and separate it into different sections such as hardware and user interface. However, this system is inefficient because any calls must go through all layers, which can introduce a significant overhead.

61. In order to allocate data structures with a size determined at run-time, what do we need?
    a) We only need to define them in our program.
    b) We need to put them in the stack.
    c) We need dynamic allocation.
    d) We need to allocate them statically.

Solution: c. By defining a variable in a program, we are allocating it statically, which means we are allocating them in the stack. However, in order to allocate variables based on dynamic inputs at run time we need dynamic memory location.

62. What is an API?

    a) A graphical library.
    b) Name of the command interpreter program.
    c) A well-defined interface to a set of functions
    d) Name of one of the system calls.

Solution: c. Typically the programmer cannot see details of opening files, create new files etc. (everything connected with system calls). An API (Application Programming Interface) is a set of all functions which programmer can use to work with system calls, so API cannot be a name of one of system calls and cannot be one library (like graphical library).

63. Select the correct statement about the bootstrap:
    a) It is the program loaded at the start up of the computer that initializes the operating system.
    b) It is located in a random address in the main memory of the computer.
    c) It is a program that determines the type of interrupt in the interrupt handling process.
    d) It is always saved in a SRAM

Solution: a. Since it is stored in ROM or EPROM and when powering up the computer loaded in the 0 address in memory to take the kernel from the hard disk and initialize the operating system, which is the one that identifies each type of interrupt.

64. How can we pass a parameter to select the service we want to execute?
    a) Using registers.
    b) Using a table in memory.
    c) Using the program stack.
    d) All of the above are correct.

Solution: d. The parameter used to specify the service (usually a integer) we want to select can be passed using a register, a table in memory or the program stack.

65. Select the incorrect answer:
    a) Kernel modules are loaded as needed on demand within the kernel
    b) UNIX OS consists only of the kernel
    c) All the UNIX implementations are based on kernel modules
    d) Kernel modules are always included and executed in the kernel.

Solution: a. Because the UNIX OS consists of the kernel and the system programs, the parameters are passed to the OS in three ways, with registers, the stack and/or a block in memory, and the POSIX API is for POSIX-based systems(UNIX, Linux and Mac OS X).

66. The device-status table:
    a) Contains the information for handling all the system interrupts
    b) It is a table for a specific I/O device showing its type, address and state
    c) It is a table that contains an entry for each I/O device showing its type, address and state

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d) It is a table that stores all the interactions of the system with a determined I/O device

Solution: c. Since the Device-status table contains an entry for each I/O device indicating its type, address and state and is used by the operating system to determine the device status and to modify the table entry to include interrupts.

67. What is a process?
    a) A file that can be opened on a working computer
    b) An internal part of the Operating System made for user interaction
    c) A program or portion of a program that is on execution
    d) A program that can be opened by the Operating System

Solution: c.

68. What do we understand as a trap when referring to operating system operations?
    a) An infinite loop from which you cannot exit.
    b) A section of code which is not performing as intended.
    c) A request from the user program.
    d) None of the above

Solution: d. A trap, also known as an exception, is a software-generated interrupt caused either by an error (for example, division by zero or invalid memory access) or by a specific request from a user program that an operating-system service be performed. It is not an infinite loop neither a code section or am user request.

69. How many arguments has READ() for reading from a pipe?
    a) 1
    b) 2
    c) 3
    d) 4

Solution: c. Read has the following three arguments: read(file descriptor, pointer to the buffer to write, number of elements of the buffer)).

70. Select the INCORRECT answer: An interrupt handler (interrupt service routine)...:
    a) Executes an specific service.
    b) Determines address of service routine.
    c) Retrieves parameters sent by the user process.
    d) Transfers control to service routine.

Solution: a. As the handling routine, does not execute a service, it identifies the service that has to be executed.

71. Which are the main advantages of using multiprocessor systems?
    a) Less throughput, more reliability, less cost.
    b) Greater throughput
    c) Greater throughput, easier to implement, less cost.
    d) None of the above.

Solution: b. By having more processors, we expect to do more work in less time (More throughput). Multiprocessor systems can cost less than equivalent single processor systems as they can share different common resources (Less cost). If functions can be distributed in a good way throughout he different processors, then a failure in one processor will not affect the overall system, it will only cause a slow down on it (More reliability).

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72. The MS-DOS execution is:
    a) A multitasking system.
    b) A single-tasking system in which the whole process is loaded in memory.
    c) A kind of system in which there are loaded various processes in memory and they are executed at the same time.
    d) None of the above

    Solution: b. The MS-DOS execution is a monotasking operating system (can only execute one task at the same time) in which the command interpreter is loaded at start-up and then, the whole process is loaded in memory. That means that "a","c" and "d" are false.

73. Which one of the following calls allows sending a signal to a process?
    a) IOCTL
    b) PIPE
    c) KILL
    d) SIGNAL

    Solution: c. The kill call is used to send (generic) signals to a given process.

74. Layered operating systems are:
    a) Difficult to modify and debug
    b) Simple structured
    c) Easy to maintain and understand
    d) Fast to perform

    Solution: c. Because each part of a layered system can be modified without making changes in all the system.

75. Each device controller has a local buffer, what does it do?
    a) It is a region of a physical memory storage used to temporarily store data
    b) It is part from the I/O system that checks for interruptions only.
    c) The device controller does not have a local buffer.
    d) It prevents the computer from shutting down.

    Solution: a. Because it works for data tranferwhen you need to store it temporally.

76. Who is allowed to run the CPU in kernel mode?
    a) Operating system
    b) User
    c) Sysadmin
    d) Devices

    Solution: a. The OS is responsible for managing all resources of the computer. For this reason, only the OS is able to run the CPU in kernel mode.

77. How does the kernel receive the notifications of the I/O devices?
    a) By interruptions
    b) By signals
    c) By traps
    d) By files

    Solution: a. The kernel notifications are interruptions.

78. Which one of these schedulers is the responsible for allocating CPU and deciding which one of the processes in the ready state should be executed next?
    a) Short-term scheduler.

b) Mid-term scheduler.
c) Long-term scheduler.
d) There is not a scheduler for that task

Solution: a. It is also called job scheduler, and it is invoked with a high frequency.

79. The Magnetic disks are divided by platters which are...
    a) Divided by sectors and sectors are subdivided by tracks
    b) Divided by tracks, which are divided by surfaces and the surface is subdivided into sectors
    c) Divided by surfaces, which are divided by tracks and a track is subdivided into sectors
    d) None of them are correct

Solution: c. Magnetic disks are rigid metal or glass platters formed by surfaces. A surface is logically divided into tracks, which are subdivided into sectors.

80. Which one the of following system calls can be called with a variable number of arguments
    a) fork
    b) printf
    c) none
    d) create

Solution: c. All of them require of a fixed number of arguments. Note: do not mix the printf system call with the printf c function.

81. The Operating System does not...
    a) Manages all the files of the filesystem
    b) Manages the CPU cache memory
    c) Controls execution of programs to prevent errors and improper use of the computer
    d) Decides between conflicting requests for efficient and fair resource use

Solution: b. The hardware is responsible of the management of the cache memory (map blocks in lines, replace blocks, etc.).

TOPIC 2

1. Which of these schedulers cannot be used with a not preemptive scheduler?
    a) First-Come, First-Serve (FCFS).
    b) Shortest-Job-First (SJC).
    c) Round-Robin (RR).
    d) All of them can be used non-preemptively.

Solution: d.

2. Which one is the frequency of a short-term scheduler?
    a) Seconds.
    b) Milliseconds.
    c) Minutes.
    d) Hours.

Solution: b.

3. Which kind of processes are stored in the ready queue?

a) Ready queues do not store any processes, it is a reserved space of the system
b) Those processes that reside in main memory and are ready and waiting to be executed
c) The processes that are waiting for I/O device
d) All the answers are correct

Solution: b.

4. Which of the following statements is correct?
   a) The short-term scheduler can temporarily remove a process from main memory (swap out).
   b) The mid-term scheduler can temporarily remove a process from main memory (swap out).
   c) The short-term scheduler decides what jobs will be admitted to the ready queue.
   d) The mid-term scheduler decides what jobs will be admitted to the ready queue.

Solution: b.

5. Which one of these sentences describes the many-to-one multithreading model?
   a) Allows multiple threads to run in parallel on multiprocessors.
   b) Several kernel threads are mapped to a single user thread.
   c) If a thread makes a blocking system call the kernel manages another thread for execution.
   d) The entire process is blocked if a thread makes a blocking system call.

Solution: d.

6. A critical section is
   a) a section in which the resources of the computer are shared for the threads
   b) a section in which the validity of the data can be compromised
   c) a code segment that must be executed atomically
   d) all previous answers are correct

Solution: d. A critical section is a code segment that, when running several threads, its resources are shared and can be accessed by more than one thread at a given time if they are not executed atomically. Therefore, their integrity and validity can be compromised.

7. Select the correct answer about PCB:
   a) All information referred to a process is stored in its PCB.
   b) When a process execution is finalized, the PCB is released.
   c) Data can be shared in the PCB.
   d) All the previous answers are incorrect.

Solution: Not all the information is stored in the PCB (some is stored in memory). When a process finishes it can be zombie and PCB is preserved. Sharing memory is performed in memory, not in PCB.

8. The Many-To-Many model allows to:
   a) Allows many user level threads to be mapped to many kernel threads
   b) Allows many kernel level threads to be used as user threads
   c) Have only one kernel thread
   d) Rewrite the scheduler and the dispatcher

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Solution: a.

9. Which of the following options occur when we cancel a thread using deferred cancellation?
    a) Resources remain unallocated
    b) Terminate immediately the thread without checking
    c) Cancellation will occur after being processed by the cancelled thread
    d) None of the above can happen

    Solution: c.

10. What is the environment of a process?
    a) Set of process communications.
    b) Conditions at the beginning of a process.
    c) Mechanism to allow the execution of a process.
    d) Mechanism to pass information to a process.

    Solution: d. The environment of a process is the mechanism to pass information to a process.

11. Which of these sentences is correct?
    a) If a parent process does not collect the exit code of a child process with wait, the child process becomes an orphan adopted by init process, with pid = 1.
    b) The ready queue selects which process should be executed next
    c) A process may include the text section, data section, program counter, stack and heap
    d) If a process is waiting for some event to occur, such as reception of a signal, it is in the ready queue.

    Solution: c.

12. Which of these scheduling algorithms allows processes to move between queues?
    a) Multilevel queue scheduling algorithm
    b) Multilevel feedback queue scheduling algorithm
    c) Both algorithms allow processes to move between queues
    d) None of the previous answers is correct

    Solution: b.

13. What is a process?
    a) A program.
    b) An executable file.
    c) An active entity with a set of associated resources.
    d) A file containing a list of instructions stored in a disk.

    Solution: c.

14. Processes migrate during its lifetime through the different queues, therefore, for scheduling purposes:
    a) A long-term scheduler is needed to select the next active process to be executed and allocate CPU for it.
    b) A short-term scheduler is needed to select process to be brought into the ready queue from disk.
    c) A medium-term scheduler can be used to improve the process mix by swapping processes in and out the CPU.
    d) All the previous are correct.

Solution: c.

15. Which of the following is false:
    a) A running process could make an I/O request and then be placed in an I/O queue
    b) All of them all false.
    c) A running process could be removed forcibly by the CPU and terminated
    d) A running process could be removed forcibly the CPU and be put back in the ready queue

Solution: b.

16. In UNIX systems, what is the function of fork?
    a) Exit a program
    b) Fork system call interrupts a process for waiting an I/O device
    c) Fork system call creates new process
    d) Fork system replace the process memory space with a new program

Solution: c.

17. What is the currently most used thread model for computers?
    a) Many to one
    b) Many to many
    c) One to one
    d) None of the above

Solution: c. All the kernel threads are mapped to a user thread, which is the most used method by the most common OSs nowadays. (Windows, Linux 2.6, Solaris 9).

18. What is the cascade process termination?
    a) It when the parent process terminates and all the child processes are terminated by the system.
    b) It is a kind of termination used by Linux in which the child becomes orphan and adopted by init process.
    c) It is when all the used processes are terminated.
    d) It is also known as zombie, it is a process that has completed execution but still has an entry in the process table.

Solution: a.

19. Select the correct statement concerning the process schedulers:
    a) A scheduler with a First Come First Served policy is always preemptive since each process that arrives to the waiting queue goes directly to the processor.
    b) Using a round robin scheduler with a very big time quantum is the same than using a shortest job first (SJF) scheduling since those processes with shortest burn time will be executed first.
    c) The round robin scheduler preempts the running process when the time quantum has been consumed and adds this process to the end of the waiting queue.
    d) The main advantage of using Priority Scheduling is the avoidance of the problem of starvation, as this policy is a non-preemptive one.

Solution: c.

20. For optimizing scheduling criteria, which of the next actions would be appropriate?
    a) Maximize throughput, minimize turnaround time.

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b) Maximize throughput, maximize turnaround time.
c) Minimize throughput, maximize turnaround time.
d) Minimize throughput, minimize turnaround time.

Solution: a.

21. Which of the following options occur when we cancel a thread using deferred cancellation?
    a) Resources remain unallocated
    b) Terminate immediately the thread without checking
    c) Cancellation will occur after being processed by the cancelled thread
    d) None of the above can happen

Solution: c.

22. What is a zombie process?
    a) A process which has terminated, but whose parent has not called the wait system call yet
    b) The resulting process of executing wait before the parents process execution
    c) A process which is removed out of memory because it is no longer required
    d) All the answers are wrong

Solution: a.

23. Select the false statement. When cancelling a thread in asynchronous mode:
    a) The cancel request will be delivered immediately.
    b) The cancel request will wait until the thread reaches a cancellation point
    c) You have a risk of causing memory leaks.
    d) You have a risk of blocking other threads forever.

Solution: b.

24. Which of the following actions is performed by the wait( ) system call?
    a) Returns the PID of the parent process.
    b) Blocks process until a child terminates.
    c) Returns the PID of the currently executed child.
    d) A, B and C are performed.

Solution: b. Wait ( ) system call blocks the process until a child terminates and returns the PID of the terminated child.

25. Thread pools:
    a) Are a possible solution for multi-threading problems.
    b) Contain the maximum threads available depending on the amount of memory.
    c) Are usually faster and efficient.
    d) All previous answers are correct.

Solution: d.

26. Select the correct statement:
    a) There are two different schedulers: CPU scheduler, in charge of selecting the process from the ready queue and I/O scheduler selecting the process in the I/O queue
    b) The Short-term scheduler is much slower than the Long-term scheduler.
    c) The Short-term scheduler selects which process should be executed next in the CPU.

d) The Long-term scheduler selects which processes should abandon the CPU and terminates them.

Solution: c.

27. Which of the following statements is true?
    a) The FCFS algorithm ensures the shortest waiting times.
    b) Round Robin is the same as Priority Scheduling but with limited time quantum.
    c) It´s always best to have a very short quantum for the Round Robin
    d) It´s always best to have a very long quantum for the Round Robin

Solution: a.

28. Thread pools:
    a) Are a possible solution for multi-threading problems.
    b) Contain the maximum threads available depending on the amount of memory.
    c) Are usually faster and efficient.
    d) All previous answers are correct.

Solution: d.

29. The SJF scheduling takes into account:
    a) The turnaround time of the processes
    b) The length of its CPU burst.
    c) The length of its I/O burst
    d) The overall number of processes

Solution: b.

30. Which of the following is a model of interprocess communication (IPC)?
    a) Interrupts
    b) Create a process that acts as a messenger
    c) Message passing
    d) Process don´t communicate with each other

Solution: c.

31. The Many-To-Many model allows to:
    a) Allows many user level threads to be mapped to many kernel threads
    b) Allows many kernel level threads to be used as user threads
    c) Have only one kernel thread
    d) Rewrite the scheduler and the dispatcher

Solution: a.

32. If in Round-Robin scheduling "q" equals infinity, we could say that this would be the same as:
    a) Shortest job first
    b) First to come first to serve
    c) Both are correct
    d) None of the above

Solution: b. Since q is infinity, each process in each round has infinite time to finish, therefore the first process will finish completely before jumping onto the next process in the round and so on.

33. The Many-to-Many model...:
    a) Is a many user-level threads mapped to single kernel thread
    b) Allows many user level threads to be mapped to many kernel threads

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c) Allows a user thread to be bound to kernel thread

d) Has a expensive creation of kernel threads

Solution:

34. The process memory space does not include...:

a) Stack

b) Code section

c) State

d) Data section

Solution: c.

35. Select the incorrect answer: Process Control Blocks...

a) Are stored in a global process table

b) Store information related with the program counter

c) Store information related with the CPU registers

d) Are deleted when the process related to it is stopped

Solution: d.

36. Which is the main function of the Process Control Block (PCB) ?

a) To duplicate processes

b) Each entry in table keeps information about one process

c) To assign the memory space that a process can use

d) To assign a processor to a new process.

Solution: b. The PCB contains information about the identification, state and control of the process.

37. In thread cancellation:

a) There are three approaches: Synchronous cancellation, Asynchronous cancellation and Deferred cancellation.

b) Synchronous cancellation allows the target thread to periodically check if it should be cancelled.

c) Asynchronous cancellation terminates the target thread immediately.

d) The cancellation points are those from where the OS can recover the threads terminated since that moment, they are assigned periodically by the kernel.

Solution: c.

38. Which of the following is NOT shared by threads of one process?

a) Code.

b) Open files.

c) Signals.

d) Registers

Solution: d.

39. What are drawbacks of process-based servers?

a) It is necessary to fork for each new request, and it has a high resource use

b) It is necessary to destroy a process for each processed request and it consumes auxiliary graphic card processor

c) It is necessary to destroy a process for each processed request and it can destroy threads

d) It can destroy threads and it has a high resource use.

Solution: a.

40. When a parent process create a child process by means of a fork():

a) Both parent and child process share the pid.
b) The return code for the fork() is zero for the parent process, whereas the parent process identifier (nonzero) is returned to the child.
c) If the parent process is killed, its children processes will become orphans and will have no parent to collect their status.
d) The return code for the fork() is the child's pid for the parent process, whereas a zero value is returned to the child.

Solution: d.

41. SIGILL, SIGALRM and SIGKILL are examples of a basic element in inter-process communication, which one?
   a) Exceptions
   b) Timers
   c) Signals
   d) Pipes

Solution: c. Some examples of signals are SIGILL (illegal instruction), SIGALRM (timer elapsed) and SIGKILL (kill process).

42. What is the difference between the process state of "Ready" and "Waiting"?
   a) During the "Ready" state the process is waiting until a certain event occurs, whereas "Waiting" indicates the process is waiting on itself to finish
   b) During the "Ready" state the process is waiting to be assigned to a processor, whereas "Waiting" indicates the process is waiting for an event to occur
   c) During the "Ready" state the process is ready to receive the next instruction, whereas "Waiting" indicates the process is busy and can't receive the next instruction
   d) During the "Ready" state the process is waiting to be assigned to a processor, whereas "Waiting" indicates the process's instructions are being executed

Solution: b.

43. For the fork() system call in Linux, which of the following is true?
   a) The fork() process takes in an argument and returns a process ID.
   b) The process ID of the parent process is 0.
   c) A child process is created but it does not execute the fork() function.
   d) When fork() is executed, an identical copy of its address space is created as well as its PCB.

Solution: d. Option A is incorrect as the fork() process takes in no argument. Option B is incorrect as fork() returns the pid of the child to the parent and the pid of the child is 0. Option C because both parent and child return the fork() function -with different return values-. After the fork() system call, the parent and child process runs independently.

44. Which of the following sentences about interprocess communication is True?
   a) Message passing is faster than shared memory but it may create conflicts
   b) Message passing is useful for small amounts of data but it takes more time than shared memory.
   c) Shared memory use way more system calls than message passing

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d) All of the previous sentences are false

Solution: b.

45. In the context of a process termination, the value passed to exit(n) function, upon failure is
    a) -1
    b) 0
    c) Any non-zero
    d) Answers a) and b) are correct

Solution: c. The function exit, with a 0, means success, and with any non-zero number interprets it as a failure.

46. PCB contains:
    a) processor state
    b) scheduling information
    c) process priority
    d) All of the above

Solution: d. The PCB contains all the above mentioned information.

47. What does it mean that a process terminates in a Zombie termination?
    a) That a process has completed execution but still has an entry in the process table.
    b) That a process has no father, so it has not a entry in the process table.
    c) That a process is unable to create child processes, because it is corrupted.
    d) That a process has no father.

Solution: a.

48. The time quantum in the Round-Robin scheduling algorithm…
    a) It should be small compared with the context switch.
    b) If it is too large, RR degenerates to FCFS.
    c) If it is too small, RR creates the appearance that each process has its own processor (processor sharing).
    d) Both b) and c) are correct.

Solution: d.

49. Choose the incorrect answer.
    a) Threads are created slower than processes
    b) Threads share resources inside each process
    c) Several tasks can be performed concurrently
    d) Threads can run on a multiprocessor system in parallel

Solution: a.

50. Which of the following is NOT a valid Multithreading model? (User to Kernel)
    a) One to Many
    b) Many to one
    c) Many to many
    d) One to one

Solution: a.

51. The dispatcher is...
    a) The program that decides the kind of scheduler is going to be used
    b) The program that switches from a process selected by the short-term scheduler to another one
    c) A kind of scheduling similar to First-Come, First-Served

d) None of the answers are correct

Solution: b.

52. What part of the OS design can be affected by using or not using preemption?
    a) The scheduler
    b) The file system manager
    c) Both a and b are correct
    d) Neither a nor b are correct

    Solution: a.

53. Select the incorrect process mode
    a) User
    b) Privileged
    c) Register
    d) Kernel

    Solution: c. Register is not a valid process mode.

54. What is the difference between preemptive and nonpreemptive scheduling?
    a) Non-preemptive scheduling is more efficient than premptive
    b) In preemptive scheduling, there are no interruptions
    c) In preemptive scheduling, there are interruptions while in nonpreemptive there are not.
    d) A process runs all the time in CPU with non-preemptive scheduling.

    Solution: c.

55. Where the processes ready to execute can be found?
    a) In hard disk.
    b) In ready queue.
    c) It is always only one process ready to execute.
    d) All processes which are ready are immediately executed.

    Solution: b.

56. When a process is in the state running and changes to ready, what has happened?
    a) It has been interrupted
    b) It is waiting for and event
    c) It is ready to exit
    d) None of the above

    Solution: a.

57. What is the heap of a process?
    a) The name and identification code of the process.
    b) The code of the process.
    c) Dynamically allocated memory.
    d) A piece of previously allocated memory containing global variables.

    Solution: c.

58. Which is correct basic lifecycle of process?
    a) Ready-running-blocked
    b) Start-finish-running
    c) Ready-block-running
    d) Running- start-blocked

    Solution: a. Basic lifecyle of process is Ready-running-blocked.

59. The real difficulty of the SJF scheduling algorithm is:

a) Knowing the length of the next CPU request for long-term scheduling.
b) Knowing the length of the next CPU request for short-term scheduling.
c) Solving the problem of starvation.
d) Both a) and b) are correct.

Solution: b.

60. What scheduling method is used by most of the current Operating systems?
a) First to come first to serve
b) Shortest Job First
c) Round Robin
d) Shortest Job First with priority

Solutions: c. Windows, Mac, Linux distributions... all those use round robin scheduling method with different time slides that can be changed. This method is usually combined with priority scheduling.

61. If we want to terminate a thread before it has competed its execution:
a) It is not possible to terminate a thread before it completes.
b) The target thread is terminated immediately.
c) The target thread can be configured to periodically check whether it should terminate; if so, it terminates itself.
d) Both b) and c)

Solution: d.

62. What is the incorrect answer. What is a zombie process?
a) A process with no process control block (PCB)
b) A PCB with no process
c) A process that terminates other processes
d) None of the above

Solution: b.

63. If you had to save private data, why should you never use threads?
a) It takes a lot of time accessing to a thread
b) Its response time is very short, but it requires the consumption of many hardware resources
c) None of these answers is correct. Threads can be used to save private data safely.
d) Threads share the same data space, thus one thread can steal private data from the other.

Solution: c.

64. Select the correct answer:
a) POSIX threads are implemented in user level and kernel level
b) Win32 library is implemented only in user level
c) Java library relies on the configuration of the Java API, which varies from one OS to another
d) None of the answers are correct

Solution: a.

65. What happens when a parent exits and its child processes still runs?
a) Only the child´s PCB is destroyed.
b) The child process becomes an zombie process
c) The child process becomes an orphan process
d) None of the above.

Solution: c.

66. Choose the correct statement related with the interprocess communication:
    a) An independent process never needs to perform interprocess communication.
    b) A cooperating process can affect or be affected by the execution of another process, without including sharing data.
    c) Cooperating processes need interprocess communication(IPC), which are message passing and shared memory.
    d) None of the above.

Solution: c.

67. Which one has the less access time?
    a) Cache
    b) Main memory
    c) Registers
    d) Disk storage

Solution: c. Register is the most speedy between these options.

68. In a multithreaded program, a signal is usually delivered to:
    a) Every thread in the process.
    b) Certain threads in the process.
    c) A specific thread that receives all the signals for the process.
    d) All the options can be correct.

Solution: d.

69. What is the main characteristic of preemptive scheduling?
    a) It interrupts the actual process if another may be executed
    b) It does not interrupt the actual process if needed
    c) It is the same as Round Robin scheduling
    d) It uses a special memory address for scheduling the processes

Solution: a.

70. In which scheduling algorithm can we find a ´convoy effect´?
    a) Priority scheduling algorithm
    b) Shortest-job-first scheduling (SJF)
    c) Round-Robin scheduling (RR)
    d) First-come, first-served scheduling algorithm (FCFS)

Solution: d.

71. Choose the correct statement related to the many-to-many model:
    a) The advantage of this model is that when one user thread blocks, the rest can execute if they are assigned to a different kernel thread.
    b) It allows the operating system to create a sufficient number of kernel threads.
    c) An example of this model is IRIX.
    d) The context switch is in user lever, which makes it fast.

Solution: a.

72. Select the correct answer, when a process is duplicated (fork):
    a) It duplicates open files table
    b) Shares intermediate table with i-nodes and positions
    c) A and B are correct
    d) A and B are incorrect

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Solution: c. When a process is duplicated it creates and exact copy (child) of the main process (parent) being distinguished by its PID (process ID) having a duplication of its open files table and sharing an intermediate table with i-nodes and positions.

73. The convoy effect happens...
   a) When a process with low CPU burst arrives to the CPU before the processes with high CPU in a FCFS scheduling
   b) When a process with high CPU burst arrives to the CPU before the processes with low CPU in a Round Robin scheduling
   c) When a process with high CPU burst arrives to the CPU before the processes with low CPU in a FCFS scheduling
   d) When two processes arrive to the CPU with the same priority at the same time in a Priority Scheduling

Solution: c.

74. Can the Shortest Job First Scheduling algorithm affected by starvation?
   a) It can
   b) No it can never happen
   c) It can only happen if the system has a lot of I/O usage
   d) None of these answers

Solution: a. Starvation is a problem of SJF, because if there are all the time coming new short processes a maybe arrived long job will never executed.

75. The scheduling algorithm called shortest job first has a limitation, and that is:
   a) When a process takes too long, it is physically impossible to be used
   b) You have to know beforehand the duration of the processes
   c) It is very inefficient
   d) None of the above

Solution: b. The main problem is the SJF is that it need to know a priori the process execution times. It is a efficient algorithm in terms of providing reduced turn around times.

76. What is a job scheduler?
   a) It is a scheduler that selects processes from the pool of jobs pending to execute and loads them into memory.
   b) It is a scheduler that selects processes with more frequency than the CPU scheduler
   c) It is a scheduler that selects from among the processes that are ready to execute and allocates them on the CPU.
   d) It is a scheduler not in charge of the degree of multiprogramming.

Solution: a.

77. Which of these process components are not shared across threads in a multithread process?
   a) The code of the program
   b) The global variables
   c) The stack
   d) The files

Solution: c.

78. What is SWAP used for in the lifecycle of a process?
   a) To backup a process in secondary storage
   b) To improve performance by sending some processes to swap area

c) To make the threads of a process easily configurable by means of an STD
d) To make the system boot faster

Solution: b. When there are many processes performance can degrade due to excessive memory use (paging). The system is, however, smart enough to send blocked or inactive processes to the swap area, generating two new process states: ready and suspended, and blocked and suspended.

79. What is the difference if any between parallelism and concurrency?
    a) Parallelism refers to allowing more than one task to make progress and concurrency refers to running more than one task simultaneously.
    b) Parallelism refers to running more than one task simultaneously and concurrency refers to allowing more than one task to make progress.
    c) Both are the same.
    d) With concurrency, only one task is executed, with parallelism there are executed several tasks.

Solution: b.

80. What is a zombie process?
    a) A process with completed execution which still has an entry in the process table.
    b) A process that was stopped in the middle of its execution and has not been completely terminated.
    c) A process without father.
    d) A process that has exceeded allocated resources.

Solution: a.

81. What is POSIX?
    a) An implementation for System Calls in UNIX.
    b) An Operating System standard.
    c) An UNIX Operative System.
    d) All the answers are correct.

Solution: b.

82. Which of the following is not an advantage of virtual machines?
    a) Applications and services run on the virtual machine can`t interfere with the main operating system.
    b) Virtual machines are portable: easy to move and copy.
    c) Running virtual machines always consumes a very low amount of resources.
    d) Virtual machines provide extra security levels.

Solution: c.

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