

1. The ABI gives a program access to the hardware resources and services available in the system through the user ISA.	FALSE	17. Cache memory is invisible to the OS.	TRUE
2. A _____ is set at the beginning of each job to prevent any single job from monopolizing the system.	timer	18. The case of cooperation by sharing covers processes that interact with other processes without being explicitly aware of them.	TRUE
3. All processor designs include a register or set of registers, often known as the program status word, which contains status information.	TRUE	19. The central idea behind the simple batch-processing scheme is the use of a piece of software known as the _____.	monitor
4. A(n) _____ is a set of resources for the movement, storage, and processing of data and for the control of these functions.	computer	20. The central themes of operating system design are all concerned with the management of processes and threads.	TRUE
5. Any alteration of a resource by one thread affects the environment of the other threads in the same process.	TRUE	21. The _____ chooses which block to replace when a new block is to be loaded into the cache and the cache already has all slots filled with other blocks.	replacement algorithm
6. Any resource allocation and scheduling policy must consider three factors: Fairness, Differential responsiveness, and _____.	efficiency	22. The classic concurrency problem that involves multiple readers that can read from a shared data area when no single writer is exclusively writing to it is the _____ Problem.	readers/writers
7. _____ are characterized by the presence of many single-threaded processes.	multiprocess applications	23. The Clouds operating system implements the concept of a thread as primarily an entity that can move among address spaces which represents the _____ Thread-to-Process relationship.	One-to-Many
8. _____ are memory words used as a synchronization mechanism.	event flags	24. The collection of program, data, stack, and attributes is referred to as the _____.	process image
9. The _____ are the fundamental entities that can be scheduled and dispatched to run on one of the system processors.	Kernel threads	25. A common strategy to give each process in the queue some time in turn is referred to as a _____ technique.	round robin
10. _____ arises in three different contexts: multiple applications, structured application, and operating system structure.	concurrency	26. A _____ computer combines two or more processors on a single piece of silicon.	multicore
11. As a default, the kernel dispatcher uses the policy of hard affinity in assigning threads to processors.	FALSE	27. A computer platform consists of a collection of hardware resources, such as the processor, main memory, I/O modules, timers, and disk drives.	TRUE
12. As an extension of the principles of modular design and structured programming, some applications can be effectively programmed as a set of concurrent processes.	TRUE	28. The concept of multiple programs taking turns in execution is known as _____.	multiprogramming
13. Atomicity guarantees isolation from concurrent processes.	TRUE	29. Concurrent processes do not come into conflict with each other when they are competing for the use of the same resource.	FALSE
14. The basic form of communication between processes or threads in a micro kernel operating system is _____.	messages		
15. The blocked state in which the process is waiting for an event, such as the end of an I/O operation, the availability of a resource, or a signal from another process is the _____ state.	interruptible		
16. Both batch processing and time sharing use multiprogramming.	TRUE		

30. The _____ contains the data to be written into memory and receives the data read from memory.	memory buffer register
31. A Control/Status register that contains the address of the next instruction to be fetched is called the _____.	Program Counter (PC)
32. A design change in the structure or semantics of the process control block could affect a number of modules in the OS.	TRUE
33. Digital Signal Processors deal with streaming signals such as audio and video.	TRUE
34. Each location in Main Memory contains a _____ value that can be interpreted as either an instruction or data.	binary number
35. The earliest computers employed _____ processing, a name derived by the way the users have access to the systems.	Serial
36. An example of a multicore system is the Intel Core i7.	TRUE
37. An example of an application that could make use of threads is a file server.	TRUE
38. External, nonvolatile memory is also referred to as _____ or auxiliary memory.	secondary memory
39. The fetched instruction is loaded into the _____.	Instruction Register (IR)
40. The fetched instruction is loaded into the Program Counter.	FALSE
41. The first step in designing an OS to control processes is to describe the behavior that we would like the processes to exhibit.	TRUE
42. For efficiency, applications should be written directly for a given hardware platform.	FALSE
43. The four main structural elements of a computer system are:	Processor, Main Memory, I/O Modules and System Bus
44. The functioning of a process, and the output it produces, must be independent of the speed at which its execution is carried out relative to the speed of other concurrent processes.	TRUE
45. Hardware features desirable in a batch-processing operating system include memory protection, timer, privileged instructions, and _____.	interrupts
46. The _____ holds the address of the next instruction to be fetched.	Program Counter

47. The idea of having a many-to-many relationship between threads and processes has been explored in the experimental operating system _____.	TRIX
48. An IDS comprises three logical components: sensors, _____, and user interface.	analyzers
49. If a process is swapped out, all of its threads are necessarily swapped out because they all share the address space of the process.	TRUE
50. If a system does not employ virtual memory each process to be executed must be fully loaded into main memory.	TRUE
51. If there is an application or function that should be implemented as a set of related units of execution, it is far more efficient to do so as a collection of separate processes rather than a collection of threads.	FALSE
52. In a _____ multiprocessor all processors can perform the same functions so the failure of a single processor does not halt the machine.	symmetric
53. In a multithreaded environment, a _____ is defined as the unit of resource allocation and a unit of protection.	process
54. In a multithreaded environment there are separate stacks for each thread, as well as a separate control block for each thread.	TRUE
55. In a pure ULT facility, all of the work of thread management is done by the application, and the kernel is not aware of the existence of threads.	TRUE
56. In a time-sharing, multiprogramming system, multiple users simultaneously access the system through _____.	terminals
57. In a time sharing system, a user's program is preempted at regular intervals, but due to the relatively slow human reaction time this occurrence is usually transparent to the user.	TRUE
58. In a two-level memory hierarchy the Hit Ratio is defined as the fraction of all memory accesses found in the slower memory.	FALSE
59. In a uniprocessor system, multiprogramming increases processor efficiency by:	Taking advantage of time wasted by long wait interrupt handling
60. Instruction processing consists of two steps:	fetch and execute

61. The _____ interface is the interface that is the boundary between hardware and software.	ISA	75. The _____ is a layer of software between the applications and the computer hardware that supports applications and utilities.	operating system
62. The interrupt can occur at any time and therefore at any point in the execution of a user program.	TRUE	76. A _____ is a legitimate user who accesses data, programs, or resources for which such access is not authorized, or who is authorized for such access but misuses their privileges.	misfeasor
63. Interrupts are provided primarily as a way to improve processor utilization.	TRUE	77. A _____ is a mutual exclusion mechanism in which a process executes in an infinite loop waiting for the value of a lock variable to indicate availability	spinlock
64. In the case of competing processes three control problems must be faced: mutual exclusion, deadlock, and _____.	starvation	78. A _____ is an entity corresponding to a user job or application that owns resources such as memory and open files.	process
65. In the case of _____, messages are not sent directly from sender to receiver but rather are sent to a shared data structure consisting of queues that can temporarily hold messages.	indirect addressing	79. A _____ is an individual who is not authorized to use the computer and who penetrates a system's access controls to exploit a legitimate user's account.	masquerader
66. In the case of _____, processes are sharing resources without being aware of the other processes.	competition	80. A _____ is an individual who seizes supervisory control of the system and uses this control to evade auditing and access controls or to suppress audit collection.	clandestine user
67. The invention of the _____ was the hardware revolution that brought about desktop and handheld computing.	microprocessor	81. A _____ is an integer value used for signaling among processes.	semaphore
68. _____ involves moving part or all of a process from main memory to disk.	Swapping	82. The _____ is a point-to-point link electrical interconnect specification that enables high-speed communications among connected processor chips.	QPI (Quick Path Interconnect)
69. A _____ is a data type that is used to block a process or thread until a particular condition is true.	condition variable	83. A _____ is a programming language construct that encapsulates variables, access procedures, and initialization code within an abstract data type.	monitor
70. The _____ is a device for staging the movement of data between main memory and processor registers to improve performance and is not usually visible to the programmer or processor.	cache	84. The _____ is a programming language construct that provides equivalent functionality to that of semaphores and is easier to control.	monitor
71. A _____ is a dispatchable unit of work that executes sequentially and is interruptible so that the processor can turn to another thread.	thread	85. An _____ is a program that controls the execution of application programs and acts as an interface between applications and the computer hardware.	operating system
72. _____ is a facility that allows programs to address memory from a logical point of view, without regard to the amount of main memory physically available.	Virtual memory	86. _____ is a section of code within a process that requires access to shared resources and that must not be executed while another process is in a corresponding section of code.	critical section
73. _____ is a function or action implemented as a sequence of one or more instructions that appears to be indivisible; no other process can see an intermediate state or interrupt the operations.	atomic operation	87. A _____ is a semaphore that takes only the values of 0 and 1.	binary semaphore
74. _____ is a good example of an OS using a combined user-level and kernel-level thread approach.	Solaris	88. A _____ is a single execution path with an execution stack, processor state, and scheduling information.	thread

89. A _____ is a static entity, consisting of an address space and ports through which messages may be sent and received.	domain	105. It is possible in a single-processor system to not only interleave the execution of multiple processes but also overlap them	FALSE
90. _____ is a technique in which a process, executing an application, is divided into threads that can run concurrently.	Multithreading	106. It is the principal responsibility of the _____ to control the execution of processes.	operating system
91. A _____ is a unit of activity characterized by the execution of a sequence of instructions, a current state, and an associated set of system resources.	process	107. It takes less time to terminate a process than a thread.	FALSE
92. A _____ is a user-created unit of execution within a process.	user-level thread	108. The key states for a thread are: Running, _____, and Blocked.	Ready
93. _____ is concerned with the proper verification of the identity of users and the validity of messages or data.	Authenticity	109. The key to the success of Linux has been its character as a free software package available under the auspice of the _____.	Free Software Foundation
94. _____ is more efficient than interrupt-driven or programmed I/O for a multiple-word I/O transfer.	Direct memory access	110. The management of multiple processes within a uniprocessor system is _____.	multiprogramming
95. The _____ is the collection of program, data, stack, and attributes defined in the process control block.	process image	111. A means for two processes to exchange information is with the use of _____.	messages
96. The _____ is the internal data by which the OS is able to supervise and control the process.	execution context	112. A monitor supports synchronization by the use of _____ that are contained within the monitor and accessible only within the monitor.	condition variables
97. The _____ is the less-privileged mode.	user mode	113. A monolithic kernel is implemented as a single process with all elements sharing the same address space.	TRUE
98. A _____ is the maximum amount of time that a process can execute before being interrupted.	Time slice	114. Most operating systems contain two fundamental forms of concurrent activity: processes and _____.	interrupts
99. _____ is when the sequence of instruction is guaranteed to execute as a group, or not execute at all, having no visible effect on system state.	atomic operation	115. Multiprogramming operating systems are fairly sophisticated compared to single-program or _____ operating systems.	uniprogramming
100. _____ is where the OS must prevent independent processes from interfering with each other's memory, both data and instructions.	Process isolation	116. A _____ occurs when multiple processes or threads read and write data items so that the final result depends on the order of execution of instructions in the multiple processes.	race condition
101. It is necessary to _____ the activities of various threads so they do not interfere with each other or corrupt data structures.	synchronize	117. On a uniprocessor, multiprogramming does not enable the interleaving of multiple threads within multiple processes.	FALSE
102. It is not possible for a communications interrupt to occur while a printer interrupt is being processed.	FALSE	118. One mechanism Intel uses to make its caches more effective is _____, in which the hardware examines memory access patterns and attempts to fill the caches speculatively with data that is likely to be requested soon.	prefetching
103. It is not the responsibility of the operating system to control the execution of processes.	FALSE		
104. It is possible for one process to lock the mutex and for another process to unlock it.	FALSE		

119.	One of the driving forces in operating system evolution is advancement in the underlying hardware technology.	TRUE
120.	One of the first time-sharing operating systems to be developed was the _____.	Compatible Time-Sharing System
121.	One of the most common problems faced in concurrent processing is the producer/consumer problem.	TRUE
122.	Only three operations may be performed on a semaphore: initialize, increment, and _____.	decrement
123.	The operating system acts as an interface between the computer hardware and the human user.	TRUE
124.	Operating systems must evolve over time because:	new hardware is designed and implemented in the computer system
125.	The operating system's _____ refers to its inherent flexibility in permitting functional modifications to the system without interfering with service.	ability to evolve
126.	A _____ organization has a number of potential advantages over a uniprocessor organization including performance, availability, incremental growth, and scaling.	symmetric multiprocessor
127.	The OS frequently relinquishes control and must depend on the processor to allow it to regain control.	TRUE
128.	The OS has five principal storage management responsibilities: process isolation, automatic allocation and management, support of modular programming, protection and access control, and _____	long-term storage.
129.	The OS masks the details of the hardware from the programmer and provides the programmer with a convenient interface for using the system.	TRUE
130.	The OS may create a process on behalf of an application.	TRUE
131.	The OS may suspend a process if it detects or suspects a problem.	TRUE
132.	The OS must maintain _____ tables to manage processes.	process

133.	The OS performs a protection function to prevent unwanted interference between processes with respect to resources.	TRUE
134.	An OS should be constructed in such a way as to permit the effective development, testing, and introduction of new system functions without interfering with service.	TRUE
135.	Over the years memory access speed has consistently increased more rapidly than processor speed.	FALSE
136.	The phrase "control is passed to a job" means that the processor is now fetching and executing instructions from the monitor program.	FALSE
137.	The portion of the monitor that is always in main memory and available for execution is referred to as the _____.	resident monitor
138.	The portion of the OS that selects the next process to run is called the _____.	dispatcher
139.	The potential performance benefits of a multicore organization depend on the ability to effectively exploit the parallel resources available to the application.	TRUE
140.	The principal disadvantage of the _____ approach is that the transfer of control from one thread to another within the same process requires a mode switch to the kernel.	kernel-level thread
141.	The principal function of the OS is to create, manage, and terminate processes.	TRUE
142.	The principal objective of _____ is to maximize processor use.	Batch Multiprogramming
143.	The principle objective of Batch Multiprogramming is to minimize response time.	FALSE
144.	Probably the most useful combination, _____ allows a process to send one or more messages to a variety of destinations as quickly as possible.	nonblocking send, blocking receive
145.	A process consists of three components: an executable program, the associated data needed by the program, and the execution context of the program.	TRUE

146. The process control block information can be grouped into three general categories: Process identification, _____, and process control information.	processor state information
147. The process control block is the key tool that enables the OS to support multiple processes and to provide for multiprocessing.	TRUE
148. The process control block is the least important data structure in an OS.	FALSE
149. Processes need to be synchronized to enforce mutual exclusion.	TRUE
150. The processing required for a single instruction is called a(n) _____ cycle.	instruction
151. A process in the _____ state is in main memory and available for execution.	Ready
152. A process is in the _____ state when it is in main memory and awaiting an event.	Blocked
153. A process is in the _____ state when it is in secondary memory and awaiting an event.	Blocked/Suspended
154. The process is said to be operating in a _____ fashion if each process in the queue is given a certain amount of time, in turn, to execute and then returned to the queue, unless blocked.	round robin
155. The processor controls the operation of the computer and performs its data processing functions	TRUE
156. The processor itself is not a resource so the OS is not involved in determining how much of the processor time is devoted to the execution of a user program.	FALSE
157. The processor itself provides only limited support for multiprogramming, and _____ is needed to manage the sharing of the processor and other resources by multiple applications at the same time.	software
158. A process or task in Linux is represented by a _____ data structure.	task_struct

159. A process switch may occur any time that the OS has gained control from the currently running process.	TRUE
160. A process that is not in main memory is immediately available for execution, regardless of whether or not it is awaiting an event.	FALSE
161. A process that is waiting for access to a critical section does not consume processor time.	FALSE
162. The Program Status Word contains status information in the form of condition codes, which are bits typically set by the programmer as a result of program operation.	FALSE
163. Race condition is a situation in which two or more processes continuously change their states in response to changes in the other process(es) without doing any useful work.	FALSE
164. _____ refers to the ability of an OS to support multiple, concurrent paths of execution within a single process.	Multithreading
165. Registers that are used by system programs to minimize main memory references by optimizing register use are called _____.	user-visible registers
166. A _____ relationship allows multiple server processes to provide concurrent service to multiple clients.	many-to-many
167. The requirement that when one process is in a critical section that access shared resources, no other process may be in a critical section that accesses any of those shared resources is _____.	mutual exclusion
168. The _____ routine determines the nature of the interrupt and performs whatever actions are needed.	interrupt handler
169. Security and protections as it relates to operating systems is grouped into four categories: Availability, Data integrity, Authenticity, and _____.	Confidentiality
170. A semaphore that does not specify the order in which processes are removed from the queue is a _____ semaphore.	weak
171. A semaphore whose definition includes the policy that the process that has been blocked the longest is released from the queue first is called a _____ semaphore.	strong

172. The sharing of main memory among processes is useful to permit efficient and close interaction among processes because such sharing does not leads to many problems.	FALSE	188. The technique where a system clock generates interrupts, and at each clock interrupt the OS regains control and assigns the processor to another user, is called ____.	time slicing
173. A significant point about the ____ is that it contains sufficient information so that it is possible to interrupt a running process and later resume execution as if the interruption had not occurred.	process control block	189. Termination of a process does not terminate all threads within that process.	FALSE
174. A situation in which a runnable process is overlooked indefinitely by the scheduler, although it is able to proceed, is ____.	starvation	190. The term ____ refers to a technique in which a process can do nothing until it gets permission to enter its critical section but continues to execute an instruction or set of instructions that tests the appropriate variable to gain entrance.	spin waiting
175. A situation in which multiple threads or processes read and write a shared data item and the final result depends on the relative timing of their execution is a ____ .	race condition	191. "The process was placed in a suspended state by an agent; either itself, a parent process, or the OS, for the purpose of preventing its execution," is a characteristic of a ____ process.	suspended
176. A situation in which two or more processes are unable to proceed because each is waiting for one of the others to do something is a ____.	deadlock	192. There are four basic thread operations associated with a change in thread state: Block, Unblock, Finish, and ____.	Spawn
177. The six states of a Windows thread are: Ready, Standby, Running, Waiting, Transition, and ____.	Terminated	193. There are two broad categories of thread implementation: user-level threads and ____.	kernel-level threads
178. Small, fast memory located between the processor and main memory is called:	Cache memory	194. A thread enters the ____ state, after waiting, if it is ready to run but the resources are not available.	transition
179. An SMP can be defined as a stand-alone computer system with two or more similar processors of comparable capacity.	TRUE	195. Three major lines of computer system development created problems in timing and synchronization that contributed to the development of the concept of the process: multiprogramming batch operations, time sharing, and ____.	real-time transaction systems
180. A special type of address register required by a system that implements user visible stack addressing is called a ____.	stack pointer.	196. To satisfy the requirements of handheld devices, the classic microprocessor is giving way to the ____, where not just the CPUs and caches are on the same chip, but also many of the other components of the system, such as DSPs, GPUs, I/O devices and main memory.	System on a Chip (SoC)
181. A special type of programming language used to provide instructions to the monitor is ____.	JCL	197. A total of ____ process states are recognized by the UNIX SVR4 operating system.	9
182. The ____ state is when the thread has terminated.	ZOMBIE	198. The traditional approach of a single thread of execution per process, in which the concept of a thread is not recognized, is referred to as a ____.	single-threaded approach
183. Swapping is not an I/O operation so it will not enhance performance.	FALSE	199. The two basic types of processor registers are:	User-visible and Control/Status
184. System access threats fall into two general categories: ____ and malicious software.	intruders		
185. A system bus transfers data between the computer and its external environment.	FALSE		
186. ____ tables are used to keep track of both main (real) and secondary (virtual) memory.	Memory		
187. The ____ tables provide information about the existence of files, their location on secondary memory, their current status, and other attributes.	file		

200. Two essential elements of a process are _____ and a set of data associated with that code.	program code	213. When a new block of data is read into the cache the _____ determines which cache location the block will occupy.	mapping function
201. Two major problems with early serial processing systems were scheduling and _____.	setup time	214. When an external device becomes ready to be serviced by the processor the device sends a(n) _____ signal to the processor.	interrupt
202. Two or more processes can cooperate by means of simple signals, such that a process can be forced to stop at a specified place until it has received a specific signal.	TRUE	215. When an external device is ready to accept more data from the processor, the I/O module for that external device sends an _____ signal to the processor.	interrupt request
203. Uniprogramming typically provides better utilization of system resources than multiprogramming.	FALSE	216. When a process is in the _____ state it is in secondary memory but is available for execution as soon as it is loaded into main memory.	Ready/Suspended
204. The unit of data exchanged between cache and main memory is _____.	block size	217. When one process spawns another, the spawned process is referred to as the _____.	child process
205. The unit of dispatching is usually referred to as a process or task.	FALSE	218. When processes cooperate by communication, the various processes participate in a common effort that links all of the processes.	TRUE
206. The user has direct access to the processor with batch-processing type OS.	FALSE	219. When the OS creates a process at the explicit request of another process, the action is referred to as _____.	process spawning
207. A user program executes in a _____, in which certain areas of memory are protected for the user's use and in which certain instructions may not be executed.	user mode	220. Windows is an example of a kernel-level thread approach.	TRUE
208. Virtualization technology enables a single PC or server to simultaneously run multiple operating systems or multiple sessions of a single OS.	TRUE	221. Windows makes use of two types of process-related objects: processes and _____.	threads
209. _____ was designed to keep the processor and I/O devices, including storage devices, simultaneously busy to achieve maximum efficiency.	Multiprogramming	222. Windows process design is driven by the need to provide support for a variety of OS environments.	TRUE
210. _____ was invented to allow processing time to be dynamically shared among a number of active applications.	multiprogramming	223. A windows process must contain at least _____ thread(s) to execute.	1
211. A way to overcome the problem of blocking threads is to use a technology referred to as _____, which converts a blocking system call into a nonblocking system call.	jacketing	224. The _____ Windows Process Object Attribute describes who created an object, who can gain access to or use the object, and who is denied access to the object.	security descriptor
212. We can characterize the behavior of an individual process by listing the sequence of instructions, referred to as a _____, that executes for that process.	trace	225. With interrupts, the processor can not be engaged in executing other instructions while an I/O operation is in progress.	FALSE