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Weekly Test 3

* Required

1

Please Enter Your Full Name *

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2

Which of the following expressions surely supports the statement f(n) = Ω(g(n))? * (2 Points)

- ◯ f(n) ≤ 4g(n) for all n ≥ 1
- ◯ f(n) ≥ 4g(n) for all n ≥ 136

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = ($$

- ◉ Option 3
- ◯ none of the above

3

Let k denote the degree of polynomial p(n), and l the degree of polynomial q(n). If p(n) = o(q(n)), then necessarily * (2 Points)

- ◯ k = l.
- ◯ k < l.
- ◯ k > l.
- ◯ none of the above

4

An algorithm takes as input an n × n Boolean matrix A. If the running time of the algorithm is T(n) = O (n log n) when n is used as the input size parameter, then which of the following expressions describes the big-O growth of T(m), the running time of the algorithm when m = n 2 is used as the size parameter? * (2 Points)

- ◯ O (√ m log m)

- O (m2 log m)
- O (m log m)
- O (m2 log2 m)

5

Which of the following is not a desirable property of a hash function h(x)? * (2 Points)

- It should be computable in O (1) time.
- The range of h(x) should stay within the desired hash-table size.
- The range of h(x) should include a wide range of integers.
- If x1, . . ., xn are the items to be hashed, then the numbers h(x1), . . ., h(xn) should be uniformly distributed over the integers

6

Perfect hashing * (2 Points)

- may be applied to static hash tables.
- means there are no collisions when retrieving data from the hash table.
- represents one of the most efficient ways of retrieving data.
- all of the above

7

Which of the following graph problems cannot be solved in time that is linear with respect to the sum of the number of vertices and edges in the graph (i.e., O (m + n)). * (2 Points)

- determining if a simple graph is connected
- determining if a simple graph is bipartite
- determining a minimum spanning tree for a connected weighted graph
- determining a topological sort of the vertices for a directed acyclic graph

8

The worst-case running time T(n) for inserting n elements into an initially-empty binary search tree is * (2 Points)

- T(n) = O (n 2).
- T(n) = O (√ n log n).
- T(n) = O(n).
- T(n) = O (n log n).

9

Binary search tree T is said to be balanced when, for every node n in T, * (2 Points)

- n's left and right subtrees have equal height.

- ○ n's left and right subtrees have equal size.
- ○ n's left and right subtrees have heights that differ by at most one.
- ○ n's left and right subtrees have sizes that differ by at most one.

10

In dynamic-programming "memorization" refers to * (2 Points)

- ○ storing the dynamic-programming recurrence in a static array so that it may be applied at each level of recursion.
- ○ storing solutions to smaller subproblems for future look up when solving larger sub-problems.
- ○ the ability of a dynamic-programming algorithm to remember the current location in the re-cursion tree.
- ○ the ability to remember dynamic-programming recurrences for a comprehensive exam.

11

What algorithm is used to find the shortest path between two points? * (2 Points)

- ○ Depth-first search
- ○ Breadth-first search
- ◉ Linear search
- ○ Binary search

12

What data structure is best suited for storing unsorted data? * (2 Points)

- ○ Heap
- ○ Hash table
- ◉ BST
- ○ Stack

13

What type of algorithm finds whether a given list contains any duplicate elements? * (2 Points)

- ○ Insertion sort
- ◉ Merge sort
- ○ Bubble sort
- ○ Linear search

14

What does Big O notation indicate? * (2 Points)

- ○ Time complexity based upon operation cost per nth time increment
- ◉ Space complexity based upon storage allocation required per nth time increment

- ○ Graphical representation depicting algorithmic performance over given range
- ○ Representational diagram outlining how I/O operands work together during execution process

15

What type of analysis do we perform on Algorithm? * (2 Points)

- ○ Time Analysis
- ○ Memory Analysis
- ○ Space Analysis
- ◉ All

16

What is an algorithm? * (2 Points)

- ◉ A set of instructions to be followed in order to achieve a goal
- ○ A type of data structure
- ○ A specific programming language
- ○ A programming technique

17

What is the primary purpose of data structures? * (2 Points)

- ○ To efficiently store and retrieve information from memory storage devices
- ○ To solve problems quickly and effectively
- ◉ To organize data in an efficient manner
- ○ To increase the speed of computer processing

18

What type of cycle does a linked list typically have? * (2 Points)

- ○ Dynamic Cycle
- ◉ Static Cycle
- ○ Circular Cycle
- ○ None

19

What kind of search technique does a binary search use? * (2 Points)

- ○ Linear Search
- ○ Hashing Search
- ◉ Divide & Conquer Search
- ○ Boolean Search

20

How does Bubble Sort work? * (2 Points)

- By comparing two adjacent elements in an array and swapping if they are out of order
- By dividing an array into two halves until only one element remains
- By exchanging two elements repeatedly until no more exchanges need to be made
- By using hashing techniques to pinpoint values within an array

21

What is a heuristic algorithm? * (2 Points)

- A systematic approach to problem solving
- A type of decision tree
- A piece of code used to approximate an answer
- A data structure consisting of nodes and edges

22

What is Big-O notation? * (2 Points)

- An algorithm design technique
- A time complexity analysis tool
- A way of measuring space complexity

- ◯ An efficient data storage format.

23

What is meant by a divide and conquer approach? * (2 Points)

- ◯ To break up a problem into simpler sub-problems that can be solved independently before combining their solutions into the overall solution
- ◯ To recursively partition data structures until they cannot be broken down any further
- ◯ To improve the performance and scalability of programs by separating them into multiple parts
- ◯ To search for items within an array using binary search technique

24

What is the time complexity of a binary search algorithm? * (2 Points)

- ◯ O (log n)
- ◯ O(n)
- ◯ O (n log n)
- ◯ O(2^n)

25

What is a linear data structure? * (2 Points)

- ◯ A data structure where elements are linked together in a sequence

- A data structure where each element contains links to one or more other elements
- A data structure where each element has connections with the preceding and next elements
- A data structure where each element is connected to one other element only

26

What type of algorithm uses space complexity? * (2 Points)

- Graph algorithms
- Hash algorithms
- Sorting algorithms
- Searching algorithms

27

Which of the following program acts as an interface between the user, the computer software and the hardware resources. * (2 Points)

- Application program
- Operating system
- Computer program
- Shell program

28

Which one of the following is the function of operating system? * (2 Points)

- Security Management
- Managing files
- Managing hardware
- All

29

Which one of the following resource allocation strategy suffers from lack of flexibility? * (2 Points)

- Partitioning allocation
- Pool based approach
- Dynamic allocation
- None

30

In _____ approach, software is characterized by the fact that different parts of the software know each other's internal details and freely use this knowledge in their functioning (no data hiding). * (2 Points)

- Microkernel's
- layered systems

- monolithic systems
- virtual machines

31

Which one of the following process state is described by the process is temporarily stopped to let another process run and is waiting to be assigned to a processor? * (2 Points)

- New
- Ready
- Waiting
- Running

32

The phenomena where all the children processes terminate when their parent process terminates is _____. * (2 Points)

- Cascading termination
- Normal exit
- Fatal error
- Error exit

33

Which of the following scheduler selects processes from the mass-storage devices and loads then into memory for execution? * (2 Points)

- Short-term scheduler
- Medium-term scheduler
- Emergency scheduler
- Long-term scheduler

34

Which of the following is a common characteristic of process and threads? * (2 Points)

- Both process and thread execute sequentially.
- Like process, threads are not independent of one another.
- Unlike processes, thread can create children.
- Like processes, threads are designed to assist one other.

35

The ability of an OS to execute the different parts of the program * (2 Points)

- Multitasking
- Multithreading

- Multi Programming
- Multi Operating System

36

If multiple threads are searching a database, if one gets the result others should be cancelled. This type of strategy is_____. * (2 Points)

- Signal Handling
- Thread Pools
- Thread Cancellation
- Scheduler Activation

37

Which of the following is correct about non-preemptive scheduling? * (2 Points)

- When a process switches from running to waiting state
- When a process switches from running to ready state
- When a process switches from waiting to ready
- None

38

During the processing of a system call, the kernel may be busy with an activity on behalf of a process. Such activities may involve changing important kernel

data (for instance, I/0 queues). What happens if the process is preempted in the middle of these changes and the kernel (or the device driver) needs to read or modify the same structure? * (2 Points)

- By waiting a system call to complete
- An I/O block to take place before doing a context switch
- By modify the structure
- a and b

39

_____ is an integer variables used to solve the critical section problem by combining the two atomic procedures, wait and signal for process synchronization. * (2 Points)

- Queue
- Peterson's Solution
- Semaphore
- Lock Variable

40

Consider a system with 12 tape drives. Assume there are three processes: P1, P2, and P3. Assume we know the maximum number of tape drives that each process may request: P1: 10, P2: 4, P3: 9. Suppose at time **tnow**, 9 tape drives are allocated as follows : P1: 5, P2 : 2, P3 : 2. If the allocation sequence of the processes is <P2, P1, P3>, then the system is_____. * (2 Points)

- Deadlock state

- Safe state
- Unsafe state
- a and c are the answers

41

Consider the following resource allocation graph(RAG)
Which of the following is true about the above graph?
* (2 Points)

- a graph contains a cycle with a deadlock
- a graph contains a cycle but there is no a deadlock
- a graph contain a cycle with unsafe state
- a graph contains a cycle with starvation

42

_____ is a situation where several processes access and manipulate the shared data concurrently and the outcome of the execution depends on the particular order in which the access takes place. * (2 Points)

- Critical-Section
- Entry Section
- Race condition
- Remainder Section

43

Which of the following scheduling algorithm is highly characterize by starvation? * (2 Points)

- RR Algorithm
- FCFS
- SJF
- None

44

What is Important in a Scheduling Algorithm? * (2 Points)

- Minimize throughput
- Maximize response time
- Maximize context switch time
- Maximize throughput

45

Which of the following is true about turnaround time? * (2 Points)

- It is the time required by a device to handle a request
- It is the amount of time it takes from the submission of a request till the first response is produced.

- ◯ It is the sum of the periods spent waiting to get the memory, waiting in the ready queue, executing on the CPU and doing I/O.
- ◯ It is the sum of the periods spent waiting in the ready queue.

46

Linux scheduler is characterizing by_____. * (2 Points)

- ◯ A preemptive, priority-based algorithm.
- ◯ Linux assigns higher-priority tasks longer time quanta.
- ◯ lower-priority tasks shorter time quanta
- ◯ All

47

Which of the following is a direct deadlock prevention method? * (2 Points)

- ◯ Mutual exclusion
- ◯ Circular wait
- ◯ No preemption
- ◯ Hold and wait

48

Which of the following is false about segmentation and paging? * (2 Points)

- Segmentation is visible to the programmer whereas paging is transparent.
- Segments are variable-size; Pages are fixed-size.
- Segments are fixed-size; Pages are variable-size.
- Segmentation requires more complicated hardware for address translation than paging.

49

While designing an I/O software it should be_____. * (2 Points)

- Device independence
- Device dependence
- Uniform Naming
- a and c are the correct answers

50

_____ is a memory management technique in which process address space is broken into blocks of the same size. * (2 Points)

- Demand Segmentation
- Demand Paging
- Lazy Swapper
- Page Table

51

What is the goal of selection sort? * (2 Points)

- To sort elements into ascending order according to their size
- To sort elements into descending order according to their size
- To find the largest element in an array
- To rearrange elements in an array so that they are ordered from lowest to highest value