II Semester Online Examination 2019-20

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Section A Multiple Choice Questions

Attempt All Questions. Each question carry equal marks. (Q.1 to Q.90)

1. C language was developed by_____. 1 point

- ○ Martin Richards
- ○ Ken Thompson
- ◉ Dennis Ritchie
- ○ Bjarne Stroustrup

2. Which of the following symbols can be used in a variable name? 1 point

- ○ Ampersand (&)
- ○ Asterisk (*)
- ○ Hyphen (-)
- ◉ Underscore (_)

3. Which of the following is not a keyword in C? 1 point

- default
- continue
- variable
- volatile

4. After executing int a; statement, the value of a will be 1 point

- 0
- -1
- Garbage
- None of the above

5. Which of the following data types cannot be modified with sign specifiers (signed and unsigned)? 1 point

- char
- ling int
- short int
- float

6. Consider the statements: “int a=5; int *p=&a; int **q=&p;” What does the expression **q evaluate to? 1 point

- (●) 5
- ( ) 0
- ( ) Garbage value
- ( ) None of the above

7. Consider the statements “int x = 10, y=11; int *const p = &x;” Which of the following statements is illegal? 1 point

- ( ) x=11
- ( ) *p=11
- (●) p=&y
- ( ) y=12

8. If column-major order is used, the sequence of elements stored in memory for following matrix is 1 point

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$$

- abcdefghi
- adeghibcf
- adgbehcfi
- aeibcfdgh

9. Elements in an array are accessed 1 point

- randomly
- sequentially
- exponentially
- logarithmically

10. ..... data structure is used to represent hierarchical relationship between elements 1 point

- Array
- Linked list
- Tree
- Graph

11. Which of the following data structure is non linear type? 1 point

- Array
- Linked list
- Tree
- Queue

12. ..... is very useful in situation when data have to stored and then retrieved in reverse order. 1 point

- ○ Array
- ○ Queue
- ◉ Stack
- ○ Lined List

13. Which of the following function is more appropriate for reading in a multi-word string? 1 point

- ○ scanf()
- ○ printf()
- ◉ gets()
- ○ puts()

14. If the two strings are identical, then strcmp() function returns 1 point

- ○ -1
- ○ 1
- ◉ 0
- ○ None

15. What is the time complexity of the following code? 1 point

```
main()
        {
          Statement 1;
          Statement 2;
          Statement 3;
          ....
          ....
          ....
          Statement k;
        }
```

- O(N)
- O(N^2)
- O(1)
- O(k)

16. Formal definition of Ω Notation is 1 point

- Ω (g(n)) = {f(n): there exist positive constants c1, c2 and n0 such that 0 <= c1*g(n) <= f(n) <= c2*g(n) for all n >= n0}
- Ω (g(n)) = { f(n): there exist positive constants c and n0 such that 0 <= f(n) <= c*g(n) for all n >= n0}
- Ω (g(n)) {f(n): there exist positive constants c and n0 such that 0 <= c*g(n) <= f(n) for all n >= n0}
- None of above

17. If for an algorithm time complexity is given by O(1) then complexity of it is: 1 point

- (●) Constant
- ( ) Polynomial
- ( ) Exponential
- ( ) Linear

18. The number of element in array A (-10:10) is 1 point

- ( ) 10
- ( ) 100
- ( ) 20
- (●) 21

19. The number of element in array A (2:12, -5:5) is 1 point

- ( ) 60
- ( ) 100
- (●) 121
- ( ) 144

20. In which data structure memory is contiguous 1 point

- ○ Array
- ◉ Linked List
- ○ Both
- ○ None

21. Which of the following statement is false? 1 point

- ○ Arrays are dense lists and static data structure
- ○ Data elements in a linked list need not be stored in adjacent space in memory
- ◉ Pointers store the next data element of a list
- ○ Linked lists are a collection of the nodes that contain information part and next pointer

22. The operation of processing each element in the list is known as 1 point

- ○ Inserting
- ◉ Traversal
- ○ Sorting
- ○ Merging

23. Consider an array A[10, 20], assume 4 words per memory cell and the base address of array A is 100. What is the address of A[7, 15] ? Assume row major storage. 1 point

- (●) 560
- ( ) 720
- ( ) 636
- ( ) 650

24. Which data structure is used for implementing recursion? 1 point

- ( ) Queue
- (●) Stack
- ( ) Arrays
- ( ) Linked List

25. ..... data structure is required to check balanced parenthesis in an expression. 1 point

- ( ) Linked List
- ( ) Queue
- ( ) Tree

- [x] Stack

26. A set of functions that grow slower than or at the same rate as expression is represented by 1 point

- [x] Big O
- [ ] Theta-Θ
- [ ] Omega-Ω
- [ ] None of the above

27. Which of the following is true? 1 point

- [ ] Array is a dynamic data structure
- [ ] Linked-list is a static data structures
- [x] Elements of an array can be accessed only sequentially
- [ ] Elements of a linked-list can be accessed only sequentially

28. The indirect change of the values of a variable in one module by another module is called 1 point

- [ ] Internal change
- [ ] Inter-module change
- [x] Side effect
- [ ] Side-module update

29. Which of the following data structure is not linear data structure? 1 point

- ○ Arrays
- ○ Linked List
- ○ Both of the above
- ◉ None of the above

30. In a doubly linked list, the number of pointers affected for an insertion operation will be 1 point

- ○ 0
- ○ 1
- ◉ 2
- ○ 4

31. The following steps in a linked list, result in which type of operation? 1 point

```
p=getnode()
info(p)=10
next(p)=list
list p
```

- ○ result in which type of operation

- ○ removal of a node
- ○ inserting a node
- ◉ modifying an existing node

32. Consider the following definition in c programming language Which of the following c code is used to create new node? 1 point

```
struct node
{
int data;
struct node * next;
}
typedef struct node NODE;
NODE *ptr;
```

- ◉ ptr=(NODE*)malloc(sizeof(NODE));
- ○ ptr=(NODE*)malloc(NODE);
- ○ ptr=(NODE*)malloc(sizeof(NODE*));
- ○ ptr=(NODE)malloc(sizeof(NODE));

33. A variation of linked list is circular linked list, in which the last node in the list points to first node of the list. One problem with this type of list is? 1 point

- ○ It waste memory space since the pointer head already points to the first node and thus the list node does not need to point to the first node.
- ○ It is not possible to add a node at the end of the list.
- ◉ It is difficult to traverse the list as the pointer of the last node is now not NULL
- ○ All of the above

34. A circular linked list can be used for 1 point

- ○ Stack
- ○ Queue
- ◉ Both Stack & Queue
- ○ Neither Stack or Queue

35. The situation when in a linked list START=NULL is 1 point

- ◉ Underflow
- ○ Overflow
- ○ Houseful
- ○ Saturated

36. Which of the following statements about linked list data structure is/are TRUE? 1 point

- ○ Addition and deletion of an item to/ from the linked list require modification of the existing pointers
- ◉ The linked list pointers do not provide an efficient way to search an item in the linked list
- ○ Linked list pointers always maintain the list in ascending order
- ○ The linked list data structure provides an efficient way to find kth element in the list

37. Linked lists are best suited 1 point

- for relatively permanent collections of data
- for the size of the structure and the data in the structure are constantly changing
- for both of above situation
- for none of above situation

38. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called 1 point

- Underflow
- Overflow
- Houseful
- Saturated

39. Which of the following is two way list? 1 point

- Grounded header list
- Circular header list
- Linked list with header and trailer nodes
- None of above

40. The data structure required for Breadth First Traversal on a graph is? 1 point

- ○ Stack
- ○ Array
- ◉ Queue
- ○ Tree

41. A queue follows _____ 1 point

- ◉ FIFO (First In First Out) principle
- ○ LIFO (Last In First Out) principle
- ○ Ordered Array
- ○ Linear Tree

42. If the elements “A”, “B”, “C” and “D” are placed in a queue and are deleted one at a time, in what order will they be removed? 1 point

- ◉ ABCD
- ○ DCBA
- ○ DCAB
- ○ ABDC

43. A data structure in which elements can be inserted or deleted at/from both the ends but not in the middle is? 1 point

- ○ Queue
- ○ Circular Queue
- ◉ Dequeue
- ○ Priority Queue

44. A normal queue, if implemented using an array of size MAX_SIZE, gets full when 1 point

- ◉ Rear = MAX_SIZE – 1
- ○ Front = (rear + 1)mod MAX_SIZE
- ○ Front = rear + 1
- ○ Rear = front

45. Which of the following is not the type of queue? 1 point

- ○ Ordinary queue
- ◉ Single ended queue
- ○ Circular queue
- ○ Priority queue

46. In linked list implementation of a queue, front and rear pointers are tracked. Which of these pointers will change during an insertion into a NONEMPTY queue? 1 point

- ○ Only front pointer
- ◉ Only rear pointer
- ○ Both front and rear pointer
- ○ None of the front and rear pointer

47. In Queues, we can insert an element at _____ end and can delete an element at _____ end. 1 point

- ◉ REAR, FRONT
- ○ FRONT, REAR
- ○ TOP, BOTTOM
- ○ BOTTOM, TOP

48. A circular queue is implemented using an array of size 10. The array index starts with 0, front is 6, and rear is 9. The insertion of next element takes place at the array index of_____. 1 point

- ○ 0
- ○ 7
- ○ 9

9

10

49. In Queue, ENQUEUE means____ whereas DEQUEUE refers_____. 1 point

- An insertion operation, a deletion operation
- End of the queue, defining a queue
- Both A and B
- None of above

50. To implement a stack using queue(with only enqueue and dequeue operations), how many queues will you need? 1 point

- 1
- 2
- 3
- 4

51. Pushing an element into stack already having five elements and stack size of 5, then stack becomes 1 point

- Overflow
- Crash
- Underflow
- Userflow

52. A data structure in which elements are added and removed only at one end is known as 1 point

- ○ Queue
- ◉ Stack
- ○ Array
- ○ String

53. Stack is 1 point

- ○ Static data structure
- ○ Dynamic data structure
- ◉ In built data structure
- ○ None of these

54. Get the value of most recently inserted node and delete the node 1 point

- ◉ POP
- ○ PUSH
- ○ EMPTY
- ○ None of the above

55. A stack may be represented by a _____ linked list. 1 point

- (●) Linear
- ( ) Non-linear
- ( ) None of the above

56. Push operation in stack may result in _____. 1 point

- (●) Overflow
- ( ) Underflow
- ( ) Userflow
- ( ) None of the above

57. A stack is a linked-list that can be accessed from either end. 1 point

- ( ) True
- (●) False

58. Transform the following infix expression to postfix form: A – B / (C * D) 1 point

- ( ) A B * C D - /
- (●) A B C D * / -

- A B C D *
- / - D C * B A
- - / * A B C D

59. Which one of the following is an application of Stack Data Structure? 1 point

- Managing function calls
- The stock span problem
- Arithmetic expression evaluation
- All of the above

60. Evaluate the following prefix expression* - + 4 3 5 / + 2 4 3 1 point

- 4
- 8
- 1
- None of the above

61. To evaluate an expression without any embedded function calls: 1 point

- One stack is enough
- Two stacks are needed
- As many stacks as the height of the expression tree are needed
- A Turing machine is needed in the general case

62. The result of evaluating the postfix expression 10 5 + 60 6 / * 8 - will be? 1 point

- 284
- 213
- 142
- 71

63. Every tree can be uniquely represented by a binary tree. 1 point

- True
- False

64. Tree traversal is a procedure by which each node in the tree is processed exactly twice, in a systematic manner. 1 point

- True
- False

65. Suppose a binary tree is constructed with n nodes, such that each node has exactly either zero or two children. The maximum height of the tree will be? 1 point

- (n+1)/2

- [x] (n-1)/2
- [ ] (n/2)-1
- [ ] ((n+1)/2)-1

66. Binary search tree is generated by inserting in order the following integers::: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24 ....The number of the node in the left sub-tree and right sub-tree of the root, respectively, is 1 point

- [ ] (4, 7)
- [x] (7, 4)
- [ ] (8, 3)
- [ ] (3, 8)

67. Which type of traversal of binary search tree outputs the value in sorted order? 1 point

- [ ] Preorder
- [x] Inorder
- [ ] Postorder
- [ ] None of the above

68. In the ..... traversal we process all of a vertex's descendants before we move to an adjacent vertex. 1 point

- [ ] Depth Limited
- [ ] With First
- [ ] Breath First

- [x] Depth First

69. In an AVL tree the heights of two subtrees of every node never differ by more than _____. 1 point

- [x] 1
- [ ] 0
- [ ] None of the above

70. A NULL left link of any node is replaced with an address of inorder _____ which performing inorder threading of a given binary tree. 1 point

- [ ] Successor
- [x] Predecessor
- [ ] None of the above

71. In _____ , the balance of any node must be 1, -1, or 0 1 point

- [x] AVL Tree
- [ ] Threaded Tree
- [ ] Binary Search Tree
- [ ] None of the above

72. To represent hierarchical relationship between elements, which data structure is suitable? 1 point

- ○ Dequeue
- ○ Priority
- ◉ Tree
- ○ Graph

73. Which data structure is used in breadth first search of a graph to hold nodes? 1 point

- ○ Stack
- ◉ Queue
- ○ Tree
- ○ Array

74. What is the number of edges present in a complete graph having n vertices? 1 point

- ○ (n*(n+1))/2
- ◉ (n*(n-1))/2
- ○ n
- ○ Information given is insufficient

Information given is insufficient

75. A connected graph T without any cycles is called ..... 1 point

- (●) Free graph
- ( ) No cycle graph
- ( ) Non cycle graph
- ( ) Circular graph

76. Suppose we do merge sort with a three-way split: divide the array into 3 equal parts, sort each part and do a 3 way merge. What would the worst-case complexity of this version be? 1 point

- ( ) O(n(log2 n)^2)
- (●) O(n log2 n)
- ( ) O(n^2 log3 n)
- ( ) O(n^2)

77. A connected undirected graph G has 1225 edges. What can we say about n, the number of vertices in G? 1 point

- ( ) 51 ≤ n ≤ 1225
- ( ) 50 ≤ n ≤ 1225
- ( ) 51 ≤ n ≤ 1226
- (●) 50 ≤ n ≤ 1226

30 ≤ n ≤ 1220

78. Which sorting algorithm will perform best if the list to be sorted is already sorted? 1 point

- Quick Sort
- Insertion Sort
- Radix Sort
- Merge Sort

79. Key-value pairs are usually seen in which of the following data structures? 1 point

- Hash Tables
- Heaps
- B Trees
- AVL Trees

80. What causes a collision? 1 point

- The program you are running crashes
- There are too many hash keys in the array
- Two hash keys are the same
- The program is out of memory

81. Suppose we do merge sort with a five-way split: divide the array into 5 equal parts, sort each part and do a 5 way merge. What would the worst-case complexity of this version be? 1 point

- O(n^2)
- O(n^2 log5 n)
- O(n log2 n)
- O(n(log2 n)^2)

82. Using which of the following methods, is sorting not possible? 1 point

- Insertion
- Selection
- Exchange
- Deletion

83. The worst case occur in linear search algorithm when 1 point

- Item is somewhere in the middle of the array
- Item is not in the array at all
- Item is the last element in the array
- Item is the last element in the array or item is not there at all

84. The complexity of sorting algorithm measures the ..... as a function of the number n of items to be sorter. 1 point

- ○ Average time
- ◉ Running time
- ○ Average-case complexity
- ○ Case-complexity

85. Sorting algorithm can be characterized as 1 point

- ○ Simple algorithm which require the order of n2 comparisons to sort n items
- ○ Sophisticated algorithms that require the O(nlog2n) comparisons to sort items
- ◉ Both of the above
- ○ None of the above

86. What is the worst-case time for serial search finding a single item in an array? 1 point

- ○ Quadratic Time
- ◉ Linear Time
- ○ Logarithmic Time
- ○ Constant Time

87. Consider the situation in which assignment operation is very costly. Which of the following sorting algorithm should be performed so that the number of assignment operations is minimized in general? 1 point

- ○ Insertion Sort
- ◉ Selection Sort
- ○ Heap Sort
- ○ None

88. Which of the following algorithms has lowest worst case time complexity? 1 point

- ○ Insertion Sort
- ○ Selection Sort
- ○ Quick Sort
- ◉ Heap Sort

89. Which of the following sorting algorithms is/are stable 1 point

- ○ Bucket Sort
- ○ Radix Sort
- ◉ All of the above

90. Which of the following sorting algorithm has the running time that is least dependant on the initial ordering of the input? 1 point

- ○ Insertion Sort
- ○ Quick Sort
- ◉ Merge Sort
- ○ Selection Sort

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