Multiple Choice Questions in

Design and Analysis of Algorithms with Answers

1. There are \_\_\_\_\_\_steps to solve the problem

A. Seven

B. Four

C. Six

D. Two

Answer: - C

2. \_\_\_\_\_\_is the first step in solving the problem

A. Understanding the Problem

B. Identify the Problem

C. Evaluate the Solution

D. None of these

Answer: - B

3. \_\_\_\_\_\_is the last step in solving the problem

A. Understanding the Problem

B. Identify the Problem

C. Evaluate the Solution

D. None of these

Answer: - C

4. Following is true for understanding of a problem

A. Knowing the knowledgebase

B. Understanding the subject on which the problem is based

C. Communication with the client

D. All of the above

Answer: - D

5. The six-step solution for the problem can be applied to

I. Problems with Algorithmic Solution

II. Problems with Heuristic Solution

A. Only I

B. Only II

C. Both I and II

D. Neither I nor II

Answer: - C

6. \_\_\_\_\_\_ solution requires reasoning built on knowledge and experience

A. Algorithmic Solution

B. Heuristic Solution

C. Random Solution

D. None of these

Answer: - B

7. While solving the problem with computer the most difficult step is \_\_\_\_\_\_\_\_\_\_.

A. describing the problem

B. finding out the cost of the software

C. writing the computer instructions

D. testing the solution

Answer:- C

8. The correctness and appropriateness of \_\_\_\_\_\_\_\_\_\_\_solution can be checked very easily.

A. algorithmic solution

B. heuristic solution

C. random solution

D. none of these

Answer:- A

9. The branch of computer that deals with heuristic types of problem is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. system software

B. real time software

C. artificial intelligence

D. none of these

Answer:- C

10. Artificial Intelligence makes use of following prominently

A. Database

B. Data Warehouse

C. Knowledge base

D. None of these

Answer:-C

11. Naming convention for variable is followed in company because \_\_\_\_\_\_\_\_\_\_\_\_.

A. it enhances readability

B. it allows to work without conflicts

C. it enhances the efficiency

D. all of the above

Answer:- D

12. The true and false values represent \_\_\_\_\_\_\_\_\_\_.

A. logical data

B. numeric data

C. character data

D. alphanumeric data

Answer:- A

13. Following operator distinguishes equation from expression

A. +, -, \*, /

B. < or >

C. Logical operators

D. Assignment Operator

Answer:- D

14. Following are called logical operators

A. +, -, \*, /

B. <, >, <=, >=

C. AND, OR, NOT

D. \, MOD

Answer:- C

15. The hierarchy of operations is denoted as \_\_\_\_\_\_\_\_\_\_\_\_\_.

I. +, -

II. Power

III. \*, /

IV. \, MOD

A. I, II, III, IV

B. II, IV, III, I

C. IV, I, III, II

D. II, III, IV, I

Answer:- B

16. The hierarchy of operations is denoted as \_\_\_\_\_\_\_\_\_\_\_\_\_.

I. +, -

II. Power

III. \*, /

IV. \, MOD

A. I, II, III, IV

B. II, IV, III, I

C. IV, I, III, II

D. II, III, IV, I

Answer:- B

17. Evaluate 5\*(x+y)-4\*y/(z+6) where x = 2, y = 3, and z = 6

A. 1

B. 24

C. 5

D. 10

Answer:- B

18. Evaluate a-2>b where a=6, b = 8

A. False

B. True

C. 6

D. 7

Answer:-A

19. Evaluate for a = 5, b = 4, c = 3, d = 12 for the equation E = a\*b+d/c

A. 40

B. 24

C. 10

D. 10.66

Answer:-B

20. Evaluate for the equation e = 5\*a\d\*(b+1) where a = 5, b = 4, c = 3, d = 12

A. 10

B. 24

C. 0

D. 10

Answer:- C

21. Evaluate for the following A = TRUE, B = FALSE, C = FALSE

i. R = NOT ( A OR B ) AND NOT (B OR C)

ii. R = B AND NOT ( A OR C ) OR NOT (B AND C)

A. i is true and ii is true

B. i is true and ii is false

C. i is false and ii is true

D. i is false and ii is false

Answer:- C

22. An employee came in to work and clocked in at MorningIn, clocked out at NoonOut1 for lunch, clocked back in at NoonIn, and clocked out to home at NoonOut2. Set up equation to calculate the number of hours worked for the day.

A. WorkingHrs = (12 - (MorningIn+NoonOut1) + (NoonOut2-NoonIn))

B. WorkingHrs = (12 – MorningIn + (NoonOut1-12.00) + (NoonOut2-NoonIn))

C. WorkingHrs = (12 – MorningIn) + (NoonOut1-12.00)-(NoonOut2-NoonIn))

D. WorkingHrs = (MorningIn+NoonIn) + (12.00-NoonOut2)

Answer:- B

23. A large department store has its own charge card. The policy for a customer to charge an item is that the customer must have a valid charge card and either a balance of less than Rs.500 or a charge of less than Rs.50.

A. ChargeCard AND (Balance < 500 OR Amount < 50)

B. ChargeCard OR (Balance < 500 AND Amount < 50)

C. ChargeCard OR (Balance < 500 OR Amount < 50)

D. ChargeCard AND (Balance < 500 AND Amount < 50)

Answer:- A

24. Consider the use of PAC for obtaining the solution for converting distance in Miles to Kilometers. The use of formula “Kilometers = 1.609\* Miles” will be in

A. given data section

B. required result section

C. processing required section

D. solution alternative section

Answer:- C

25. The PAC stands for

A. Program Analysis Chart

B. Problem Algorithm Code

C. Problem Access Code

D. Problem Analysis Chart

Answer:- D

26. In interactivity chart the darkened circle indicates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. duplicate module

B. loop

C. decision

D. no special meaning

Answer:- B

27. In interactivity chart the diamond indicates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. duplicate module

B. loop

C. decision

D. no special meaning

Answer:- C

28. The interactivity chart is also known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. IPO Chart

B. Problem Analysis Chart

C. flow chart

D. structure chart

Answer:- D

29. The IPO stands for

A. Input Programming Option

B. Input Programming Output

C. Input Processing Output

D. Input Operating Operation

Answer:- C

30. The difference between /, \ and MOD operator is

A. \ Integer Division, / Division and MOD Modulo Division

B. / Division, \ escape sequence, MOD remainder

C. / Division, \ not an operator, MOD is module

D. \ Division /Integer Division, MOD is Modulo Division

Answer:- A

31. The help menus or user manuals are the part of \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. Program

B. Algorithm

C. Internal Documentation

D. External Documentation

Answer:- D

32. The main measure for efficiency algorithm are-

A. Processor and Memory

B. Complexity and Capacity

C. Data and Space

D. Time and space

Answer:- D

33. What does the algorithmic analysis count?

A. The number of arithmetic and the operations that are required to run the program

B. The number of lines required by the program

C. The number of seconds required by the program to execute

D. None of these

Answer:- A

34. Examples of O(1) algorithms are\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. Multiplying two numbers.

B. assigning some value to a variable

C. displaying some integer on console

D. All of the above

Answer:- D

35. Examples of O(n2) algorithms are\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. Adding of two Matrices

B. Initializing all elements of matrix by zero

C. Both A and B

D. Neither A nor B

Answer:- C

36. The complexity of three algorithms is given as: O(n), O(n2) and O(n3). Which should execute slowest for large value of n?

A. O(n)

B. O(n2)

C. O(n3)

D. All will execute in same time.

Answer:-

37. There are four algorithms A1, A2, A3, A4 to solve the given problem with the order log(n), nlog(n), log(log(n))n/log(n), Which is the best algorithm.

A. A1

B. A2

C. A3

D. A4

Answer:- C

38. Express the formula (n-1)\*(n-5) in terms of big Oh notation

A. O(1)

B. O(log n)

C. O(n)

D. O(n2)

Answer:- D

39. The time complexity of binary search is\_\_\_\_\_\_\_\_.

A. O(1)

B. O(log n)

C. O(n)

D. O(n logn)

Answer:- B

40. The time complexity of linear search is\_\_\_\_\_\_\_\_.

A. O(1)

B. O(log n)

C. O(n)

D. O(n logn)

Answer:- C

41. In quick sort, the number of partitions into which the file of size n is divided by a selected record is

a. n

b. n - 1

c. 2

d. n/2

Answer:- C

42. A sort technique is said to be stable when the original relative order of records with equal keys are retained after sorting.

A. True

B. False

Answer:- A

43. The three factors contributing to the sort efficiency considerations are the efficiency in coding, machine run time and the space requirement for running the procedure.

A. True

B. False

Answer:- A

44. How many passes are required to sort a file of size n by bubble sort method?

A. N2

B. N

C. N-1

D. N/2

Answer:- C

45. How many number of comparisons are required in insertion sort to sort a file if the file is sorted in reverse order?

A. N2

B. N

C. N-1

D. N/2

Answer:- A

46. How many number of comparisons are required in insertion sort to sort a file if the file is already sorted?

A. N2

B. N

C. N-1

D. N/2

Answer:- C

47. The worst-case time complexity of Quick Sort is\_\_\_\_\_\_\_\_.

A. O(n2)

B. O(log n)

C. O(n)

D. O(n logn)

Answer:- A

47. The worst-case time complexity of Bubble Sort is\_\_\_\_\_\_\_\_.

A. O(n2)

B. O(log n)

C. O(n)

D. O(n logn)

Answer:- A

48. The worst-case time complexity of Selection Exchange Sort is\_\_\_\_\_\_\_\_.

A. O(n2)

B. O(log n)

C. O(n)

D. O(n logn)

Answer:- A

49. The worst-case time complexity of Merge Sort is\_\_\_\_\_\_\_\_.

A. O(n2)

B. O(log n)

C. O(n)

D. O(n logn)

Answer:- D

50. The algorithm like Quick sort does not require extra memory for carrying out the sorting procedure. This technique is called \_\_\_\_\_\_\_\_\_\_.

A. in-place

B. stable

C. unstable

D. in-partition

Answer:- A

51. Which of the following sorting procedures is the slowest?

A. Quick sort

B. Heap sort

C. Shell sort

D. Bubble sort

Answer:- D

52. Two main measures for the efficiency of an algorithm are

A. Processor and memory

B. Complexity and capacity

C. Time and space

D. Data and space

Answer:- C

53. The space factor when determining the efficiency of algorithm is measured by

A. Counting the maximum memory needed by the algorithm

B. Counting the minimum memory needed by the algorithm

C. Counting the average memory needed by the algorithm

D. Counting the maximum disk space needed by the algorithm

Answer:- A

54. The time factor when determining the efficiency of algorithm is measured by

A. Counting microseconds

B. Counting the number of key operations

C. Counting the number of statements

D. Counting the kilobytes of algorithm

Answer:- B

55. A list of n strings, each of length n, is sorted into lexicographic order using the merge-sort algorithm. The worst case running time of this computation is

A. O (n log n)

B. O (n2 log n)

C. O (n2 + log n)

D. O (n2)

Answer:- A

56. Which of the following case does not exist in complexity theory?

A. Best case

B. Worst case

C. Average case

D. Null case

Answer:- D

57. The concept of order Big O is important because

A. It can be used to decide the best algorithm that solves a given problem

B. It determines the maximum size of a problem that can be solved in a given amount of time

C. It is the lower bound of the growth rate of algorithm

D. Both A and B

Answer:- A

58. The recurrence relation capturing the optimal execution time of the Towers of Hanoi problem with n discs is

A. T(n) = 2T(n - 2) + 2

B. T(n) = 2T(n - 1) + n

C. T(n) = 2T(n/2) + 1

D. T(n) = 2T(n - 1) + 1

Answer:- D

59. Which of the following sorting methods would be most suitable for sorting a list which is almost sorted?

A. Bubble Sort

B. Insertion Sort

C. Selection Sort

D. Quick Sort

Answer: - B.

60. Suppose we are sorting an array of eight integers using some quadratic sorting algorithm. After four iterations of the algorithm’s main loop, the array elements are ordered as shown here:

2 4 5 7 8 1 3 6

A. Insertion sort

B. Selection sort

C. Either of a and b

D. None of the above

Answer: - A.

61. The running time of insertion sort is

A. O(n^2)

B. O(n)

C. O(log n)

D. O(n log n)

Answer: - A.

62. A sort which compares adjacent elements in a list and switches where necessary is \_\_\_\_.

A. insertion sort

B. heap sort

C. quick sort

D. bubble sort

Answer: - A.

63. The correct order of the efficiency of the following sorting algorithms according to their overall running time comparison is

A. Insertion>selection>bubble

B. Insertion>bubble>selection

C. Selection>bubble>insertion.

D. bubble>selection>insertion

Answer: - D.

64. A sort which iteratively passes through a list to exchange the first element with any element less than it and then repeats with a new first element is called

A. insertion sort

B. selection sort

C. heap sort

D. quick sort

Answer: - A.

65. The number of swapping’s needed to sort the numbers 8, 22, 7, 9, 31, 19, 5, 13 in ascending order, using bubble sort is

A. 10

B. 9

C. 13

D. 14

66. The way a card game player arranges his cards as he picks them one by one can be compared to

A. Quick sort

B. Merge sort

C. Insertion sort

D. Bubble sort

Answer: C

67. Which among the following is the best when the list is already sorted?

A. Insertion sort

B. Bubble sort

C. Merge sort

D. Selection sort

Answer: A

68. As part of the maintenance work, you are entrusted with the work of rearranging the library books in a shelf in proper order, at the end of each day. The ideal choice will be

A. Bubble sort

B. Insertion sort

C. Selection sort

D. Merge sort

Answer : B

69. In quick sort, the number of partitions into which the file of size n is divided by a selected record is

A. n

B. n - 1

C. 2

D. None of the above

Answer:- C.

70. The total number of comparisons made in quick sort for sorting a file of size n, is

A. O(n log n)

B. O(n2)

C. n(log n)

D. None of the above

Answer:- A.

71. Quick sort efficiency can be improved by adopting

A. non-recursive method

B. insertion method

C. tree search method

D. None of the above

Answer:- A.

72. For the improvement of efficiency of quick sort the pivot can be

A. the first element

B. the mean element

C. the last element

D. None of the above

Answer:- B.

73. Quick sort is the fastest available method of sorting because of

A. low over head

B. O(n log n) comparisons

C. low overhead and also O(n log n) comparisons

D. None of the above

Answer:- C

74. Straight selection sort is basically a method of repeated

A. interchange

B. searching

C. position adjustment

D. None of the above

Answer:- C

75. Number of selections required to sort a file of size N by straight selection requires

A. N - 1

B. log N

C. O(N2)

D. None of the above

Answer:- A

76. For sorting a file of size n by straight selection sort, the number of comparisons made in the first pass is

A. n

B. n - 1

C. n(n - 1)/2

D. None of the above

Answer:- B.

77. Heap is defined to be a

A. complete binary tree

B. binary tree

C. tree structure

D. None of the above

Answer:- A.

78. In a Max heap the largest key is at

A. the root

B. a leaf

C. a node

D. None of the above

Answer:- A.

79. In heap sort the input is arranged in the form of a

A. heap

B. tree

C. queue

D. None of the above

Answer:- A.

80. Heap sort is found to be very efficient

A. with regard to storage requirement

B. in time consumption

C. regarding overheads involved

D. None of the above

Answer:- A.

81. Suppose we need to sort a list of employee records in ascending order, using the social security number (a 9-digit number) as the key (i.e., sort the records by social security number). If we need to guarantee that the running time will be no worse than n log n, which sorting methods could we use?

A. mergesort

B. quicksort

C. insertion sort

D. Either mergesort or quicksort

E. None of these sorting algorithms guarantee a worst-case performance of n log n or better

Answer:- A.

82. Consider the following function f:

int f(int n)

{

int s = 0;

while(n > 1)

{

n = n/2;

s++;

}

return s;

}

What is the asymptotic complexity in terms of n? (Pick the smallest correct answer)

A. O(nlog n)

B. O(n)

C. O( n)

D. O(log n)

E. O(n^2 )

Answer:- D.

83. The most important reason for including a destructor in a class is:

A. To print a message for debugging purposes

B. To store information about an object before it goes out of scope

C. To free up resources allocated by that class

D. To reset the original object’s pointer to NULL

E. To make your TA happy

Answer:- C.

84. One of these code fragments calls the copy constructor for class A. Which one? (Assume that doSomething is a void function with a parameter of the appropriate type.)

A. A a;

B b;

a = b;

B. A array[20];

C. A a;

doSomething(a);

D. A\* a;

doSomething(a)

E. A a;

doSomething(&a);

Answer:- C.

85. What is the asymptotic runtime for traversing all nodes in a binary search tree with n nodes and printing them in order?

A. O(n ⋅ log(n))

B. O(n)

C. O( n)

D. O(log(n))

E. O(n^2 )

Answer:- B.

86. Consider a class List that implements an unordered list. Suppose it has as its representation a dynamically expanding (resizable) array. Which of these operations might need to delete some dynamically allocated storage to avoid a memory leak?

I. Default Constructor

II. Copy Constructor

III. Destructor

IV. Assignment operator

A. I and II

B. II and III

C. II and IV

D. III and IV

E. II, III, and IV

Answer:- D.

87. What is the postfix representation of this expression?

(12 – a) \* (b + 9) / (d \* 4)

A. 4 b \* d 9 + a 12 - \* /

B. / 12 a – b 9 + d 4 \*

C. 12 – a \* b + 9 / d \* 4

D. 12 a – b 9 + \* d 4 \* /

E. None of the above

Answer:- D.

88. Assuming that the hash function for a table works well, and the size of the hash table is reasonably large compared to the number of items in the table, the expected (average) time needed to find an item in a hash table containing n items is

A. O(1)

B. O(log n)

C. O(nlog n)

D. O(n)

E. O( n)

Answer:- A.