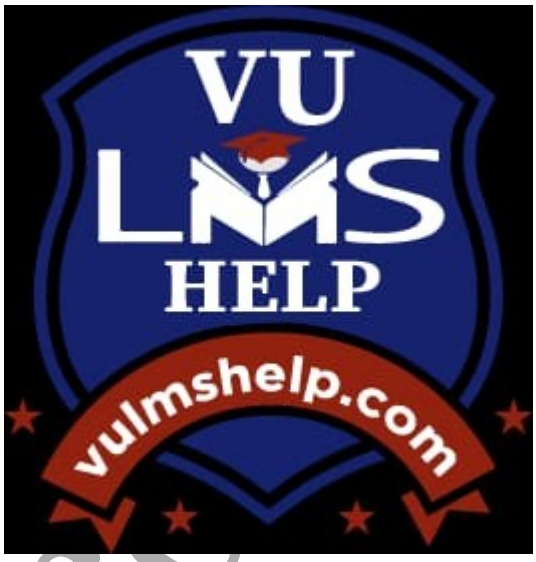

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CS502 Grand Quiz

1. The sequence of merge sort algorithm is:
   a. Divide Combine-Conquer
   b. Conquer-Divide-Combine
   c. Divide-Conquer-Combine Page 27
   d. Combine-Divide-Conquer
2. In _____ Knapsack Problem, limitation is that an item can either be put in the bag or not. Fractional items are not allowed.
   a. 0
   b. 1
   c. 0/1 Page 91
   d. Fractional
3. In Selection algorithm, we assume pivot selection takes theta _____ running time.
   a. n Page - 36
   b. n2
   c. n3
   d. log (n)
4. In Heap Sort algorithm (using max heap), when every time maximum elements removed from top _____.
   a. We call merge Sort Algorithm
   b. it becomes Order n2 Algorithm
   c. Divide and Conquer strategy helps us
   d. We are left with a hole Page – 41
5. If matrix A of dimension p x q is multiply with matrix B of dimension q x r, then each entry in resultant matrix takes _____ time.
   a. O (q) Page - 84
   b. O (1)

c. O (p x q)
d. O (q x r)

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6. _____ is a method of solving a problem in which we check all possible solutions to the problem to find the solution we need.
   a. Plane-Sweep Algorithm
   b. Sorting Algorithm
   c. Brute-Force Algorithm google
   d. Greedy approach
7. The worst case running time of Quick sort algorithm _____.
   a. Cannot be quadratic
   b. Is quadratic google QuickSort and its Analysis (codesdope.com) & http://personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/quickSort.htm
   c. Is always Exponential
   d. Is linear
8. In max heap (for Heap Sort algorithm), when every time maximum element is removed from top we replace it with _____ leaf in the tree.
   a. second last
   b. Last Page -41
   c. First
   d. Any
9. Quick sort algorithm was developed by -
   a. AlferdAho
   b. Sedgewick
   c. John Vincent Atanasoff
   d. Tony Hoare – Google wikipedia
10. If Matrix-A has dimensions "3x2" and Matrix-B has dimensions "2x3", then multiplication of Matrix-A and Matrix-B will result a new Matrix-C having dimensions.
    a. 3x2
    b. 2x3
    c. 2x2
    d. 3x3 http://www.calcul.com/show/calculator/matrix-multiplication

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11. For comparison-based sorting algorithms, it is possible to sort more efficiently than Omega n log(n) time.

a. Always

b. Not **P-54**

c. Sometimes

d. Sometimes not

12. Dynamic Programming approach is usually useful in solving optimization problems.
    a. True
    b. False

13. In Sorting the key value or attribute_____ from an ordered domain.
    a. Must be page 39
    b. Not always
    c. May be
    d. Occasionally

14. Result of asymptotical analysis of n(n -3) and 4n*n is that _____
    a. n(n-1) is asymptotically Less
    b. n(n-1) is asymptotically Greater
    c. Both are asymptotically Not equivalent
    d. Both are asymptotically Equivalent page 23 ($4n*n= 4n^2$)

15. Floor and ceiling are _____ to calculate while analyzing algorithms a. Very easy
    b. Usually considered difficult P-31
    c. 3rd Option is missing
    d. 4th Option is missing

16. _____ of reference is an important fact of current processor technology.
    a. Defining
    b. Assigning
    c. Formality
    d. Locality P-8

17. In max-heap, largest element is stored at root node. Where is the smallest element stored?
    a. Right Node
    b. Leaf Node
    c. Middle Node

d. Left Node

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18. In average-case time analysis of Quick sort algorithm, the most balanced case for partition is when we divide the list of elements into _.
    a. Equal no. of pieces as of input elements
    b. Single piece exactly
    c. Two nearly equal pieces
    d. Three nearly equal pieces
19. Which of the following is calculated with Big O notation?
    a. Medium bounds
    b. Upper bounds Page - 25
    c. Lower bounds
    d. Both upper and lower bounds
20. Edit distance algorithm based on _____ strategy
    a. Greedy
    b. Dynamic Programming Page - 81
    c. Divide and Conquer
    d. Searching
21. In Heapsort Algorithm, total time taken by heapify procedure is _____
    a. O (log n) Page-43
    b. O (log2 n)
    c. O (n log n)
    d. O (n2 log n)
22. Al-Khwarizmi was a/an _____
    a. Artist
    b. Mathematician P-7
    c. Astronomer
    d. Khalifah
23. When matrix A of 5x3is multiply with metric B of 3x4 then the number of multiplication required is: Not found exactly
    a. 15
    b. 12

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c. 36

d. 60 **Not Found exactly but as per formula at page 84,**

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24. Pseudo code of algorithms are to be read by _____.
    a. People Page -12
    b. RAM
    c. Computer
    d. Compiler
25. The sieve technique is a special case, where the number of sub-problems is Just _____
    a. 1 P-34
    b. 2
    c. 3
    d. 4
26. When a recursive algorithm revisits the same problem over and over again, we say that the optimization problem has _____ sub-problems.
    a. Overlapping – Google Search
    b. Over costing
    c. Optimized
    d. Three
27. Sieve technique is very important special case of Divide-and-Conquer strategy.
    a. True P-34
    b. False
28. In order to say anything meaningful about our algorithms, it will be important for us to settle on a _____.
    a. Java Program
    b. C++ Program
    c. Pseudo program
    d. Mathematical model of computation P-10
29. Merge sort is based on _____.
    a. Brute-force
    b. Plan-sweep
    c. Axis-sweep

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d. Divide and Conquer **P-27**

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30. What time does Merge Sort algorithm take in order to sort an array of 'n' numbers?
    a. (n)
    b. (log n)
    c. (n^2)

    d. (n log n) Google Search 31. In Heap Sort
    31. algorithm, the first step is to _____.
    a. Call Build-Heap procedure Page - 46
    b. Sort the array in descending order
    c. Call Heapify procedure
    d. Find the number of input elements
32. The definition of theta-notation relies on proving _____ asymptotic bound.
    a. One
    b. Lower
    c. Upper
    d. Both lower & upper Page - 25
33. In merge sort algorithm, to merge two lists of size n/2 to a list of size n, takes _____ time.
    a. Theta (n) Page - 32
    b. Theta log(n)
    c. Theta log2(n)
    d. Theta n log(n)
34. We can make _____ recursive calls in Fibonacci Sequence.
    a. Infinite
    b. Finite google
    c. Only one
    d. Zero
35. Following is NOT the application of Edit Distance problem.
    a. Speech recognition

b. Spelling Correction

c. Ascending Sort

d. Computational Molecular Biology

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36. In plane sweep approach, a vertical line is swept across the 2d-plane and structure is used for holding the maximal points lying to the left of the sweep line.
    a. Array
    b. Queue
    c. Stack Page - 18
    d. Tree
37. When a heapify procedure is applied to the root node to restore the heap, then at each level, the comparison performed takes time:
    a. It will take (log n).
    b. It can not be predicted
    c. It will take O (1). Page - 43
    d. Time will vary according to the nature of input data.
38. _____ time is the maximum running time over all legal inputs.
    a. Worst-case Page - 13
    b. Average-case
    c. Best-case
    d. Good-case
39. Efficient algorithm requires less computational...
    a. Memory
    b. Running Time
    c. Memory and Running Time Page - 9
    d. Energy
40. For average-case time analysis of Quick sort algorithm, Pivot selection is on average basis from _____
    a. half of the input values
    b. all possible random values Page - 50
    c. Pivot is input separately
    d. values greater than 5
41. Selection algorithm takes theta _____

a. (n2)

b. (n)

c. log(n)

d. n log(n)

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42. Recurrence can be described in terms of a tree.
    a. Yes Page - 31
    b. No
43. Time complexity of Dynamic Programming based algorithm for computing the minimum cost of Chain Matrix Multiplication is _____
    a. Log n
    b. n
    c. n^2 (n square)
    d. n^3 (n cube) Page -90
44. The Iteration method is used for _____
    a. Comparing sorting algorithms only
    b. Solving Recurrence relations Page 31
    c. Merging elements in Merge sort
    d. Dividing elements in Merge sort
45. In 3-Dimensional space, a point P has _____ coordinate(s).
    a. (X, Y)
    b. (X, 0)
    c. (0, Y)
    d. (X,Y, Z)
46. Chain matrix multiplication problem can be solved through _____ strategy.
    a. Dynamic programming Page - 85
    b. Greedy
    c. Divide and conquer
    d. Sorting
47. Merge sort have running time....running time of Heap sort. Not found exactly
    a. Greater than
    b. Less than Google
    c. Equal to
    d. Different than

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48. Median is not useful measure of central tendency of given input set especially when the distribution of values is highly skewed.
    a. True
    b. False Page – 34

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49. We do not need to mathematically prove that for comparison-based sorting algorithms always takes Omega nlog (n) time.
    a. True Google & VU Tech (pg 46 not very clear)
    b. False
50. The Omega-notation allows us to state only the asymptotic _____ bounds.
    a. Middle
    b. Lower Page 25
    c. Upper
    d. Both lower & upper
51. Both lower & upperSorting can be in _____
    a. Increasing order only
    b. Decreasing order only
    c. Both Increasing and Decreasing order GOOGLR Search
    d. Random order
52. Radix sort performs sorting the numbers _____ digit (s) at a time.
    a. One Page - 71
    b. Two
    c. Three
    d. All
53. Quicksort is a/an _____ and _____ sorting algorithm.
    a. Not in place, not stable one
    b. In place , not stable one Page - 54
    c. In place , stable one
    d. Not in place , stable one
54. Consider three matrices X,Y,Z of dimensions 1x2, 2x3,3x4 respectively. The number of multiplications of (XY) Z is:
    a. 18 As per lecture slides
    b. 32
    c. 24
    d. 30

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55. In Fibonacci Sequence, unnecessary repetitions do not exist at all.

a. True

b. False **Page – 74**

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56. It is not a Fibonacci sequence . 1,1,1,2,3,5,8,13,21,34,55,…..
    a. True Page - 73
    b. False
57. Heap sort is a/ an _____ and _____ sorting algorithem.
    a. Not in place, not stable one
    b. In place , not stable one Page - 54
    c. In place , stable one
    d. Not in place , stable one
58. Identify the True Statement
    a. The knapsack problem does not belong to the domain of optimization problems.
    b. The knapsack problem belongs to the domain of optimization problems. Page - 91
    c. The Knapsack problem cannot be solved by using dynamic programming
    d. The knapsack problem is optimally solved by using brute force algorithm.
59. In Dynamic Programming, our approach is to _____
    a. Develop the solution in a top-down fashion
    b. Express the problem non-recursively
    c. Build the solution in a bottom-up fashion Page - 75
    d. Input several sub-problems simultaneously
60. Counting sort is suitable to sort the elements in range 1 to K;
    a. K is large
    b. K is small Page - 57
    c. K may be large or small
    d. None
61. We can multiply two matrices A and B only when they are compatible which means
    a. Number of columns in A must be equal to number of rows in B. it seems Correct as per page 84

b. Number of rows and columns do not matter

c. Number of columns in A must be equal to number of columns in B
d. Number of rows in A must be equal to number of rows in B

62. Matrix multiplication is a (n) _____ operation.
a. Commutative
b. Associative Page 85
c. Neither commutative nor associative
d. Commutative but not associative

63. In Dynamic Programming approach, solution is modified / changed
a. Always once
b. At each stage google and wikipedia
c. Only for specific problems
d. At 4th stage only

64. In Knapsack problem, the goal is to put items in the Knapsack such that the value of the items is _____ subject to weight limit of knapsack.
a. Minimized
b. Decreased
c. Maximized Page - 91
d. None of the given options

65. An in-place sorting algorithm is one that _____ uses additional array for storage.
a. Always
b. Permanently
c. Does not Page - 54
d. Sometime

66. Memoization is a part of Dynamic Programming Strategy.
a. True Page - 74
b. False

67. If matrix A of dimension 2x4 is multiply with matrix B of dimension 4x3, then the dimension of resultant matrix is Not found exactly
a. 2x4

b. 4x3

c. 3x4

d. 2x3 It seems correct as per second last Para of page 84

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68. In Dynamic Programming approach, we do not store the solution to each sub-problem in case if it reappears.
    a. True
    b. False Page - 75
69. Dynamic Programming is a problem-solving approach in which___
    a. Problem is solved in Zero time
    b. Solution is developed only at final stage
    c. Both are correct
    d. Both are incorrect google
70. In Fibonacci sequence, each term is calculated by____ previous__ terms.
    a. Subtracting, Two
    b. Adding, Three
    c. Adding, Two Page - 73
    d. Multiplying, Two
71. Selection sort is not an in-place sorting algorithm.
    a. True Page - 54
    b. False
72. If there are θ (n^2) entries in edit distance matrix then the total running time is:
    a. θ (n)
    b. θ (1)
    c. θ (n^2) Page – 84
    d. θ (n logn)
73. The only way to convert a string of i characters into the empty string is with i deletions, represented as
    a. E(0.j) =j
    b. E(i.j) = 1
    c. E(0.i) = j
    d. E (i.0)=I Page - 78
74. Dynamic programming formulation of the matrix chain multiplication problem will store the solutions of each sub problem in an

a. Array
b. Table
c. Variable
d. class

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75. We can use the optimal substructure property to devise a formulation of the edit distance problem.
    a. Selective
    b. Optimum
    c. Iterative
    d. Recursive Page - 78
76. Sorting is performed on the basis of _____.
    a. Computational resources
    b. Asymptotic notation
    c. Summation
    d. Some key value of attribute page- 39
77. In Heap Sort algorithm, we call Build-heap procedure _____.
    a. Only once page 46
    b. Twice
    c. Thrice
    d. As many times as we need
78. Radix sort is not a non-comparative integer sorting algorithm.
    a. True Google Search
    b. False
79. In the statement "output P[1].x, P[1].y", the number of times elements of P are accessed is _____.
    a. 1
    b. 2 page 14
    c. 3
    d. 4
80. The main purpose of mathematical analysis is measuring the _____ required by the algorithm.
    a. Space
    b. Execution time P-13
    c. Inputs & outputs

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d. Execution time and memory

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81. _____ provides us more accurate result when input values are not closer with each other
    a. Average
    b. Median P-34
    c. Mode
    d. Mean
82. The process of _____ ends when you are left with such tiny pieces remaining that it is trivial to solve them.
    a. Brute-force
    b. Plan-sweep
    c. Divide and Conquer P-27
    d. Axis-sweep
83. _____ overcomes the limitations of _____ by working as per positional notations of numbers.
    a. Counting sort, Radix sort
    b. Radix sort, Counting sort P-71
84. Memorization is a part of Dynamic Programming strategy.
    a. True P-74
    b. False
85. Rank of an element can be defined as _____.
    a. One minus the number of elements that are smaller
    b. Two plus the number of elements that are greater
    c. One plus the number of elements that are smaller P-34
    d. Two minus the number of elements that are smaller
86. If the time complexity of an algorithm is given by O (1), then its time complexity would be
    a. Polynomial
    b. Exponential
    c. Constant - Wikipedia
    d. Average

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87. Quick sort is a recursive algorithm.

a. True **Wikipedia ; Google**

b. False

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88. The asymptotic growth of n(n+1)/2 is:
    a. $O(n^2)$ As the n^2 term has the largest contribution, the Big-O complexity is O(n^2)
    b. O(n)
    c. O(n+2)
    d. O(n log n)
89. Approach of solving geometric problems by sweeping a line across the plane is called _____ sweep.
    a. Line
    b. Plane Page 18
    c. Cube
    d. Box
90. As per algorithm of Dynamic Programing, we need to store
    a. First sub-problem only
    b. Best solution only
    c. Intermediate sub-problems Pg:75
    d. Final solution only
91. In Sieve technique, we solve the problem
    a. In recursive manner Pg:34
    b. Non recursively
    c. Using Merge Sort algorithm
    d. Using Brute force technique
92. One of the limitation in 0/1 knapsack is that an item can either be _____ in the bag or not.
    a. Use
    b. Put Pg:91
    c. Move
    d. Store
93. Which one is not passed as parameter in Quick sort algorithm?
    a. End of the array
    b. Middle of the array

c. Array (containing input elements) **Google**

d. Start of the array

94. In the analysis of Selection algorithm, we get the convergent _____
    a. Harmonic
    b. Linear
    c. Arithmetic
    d. Geometric Pg:37
95. A Random Access Machine (RAM)is an idealized machine withrandom access memory.
    a. Infinite large Pg:10
    b. 512 MB
    c. 256 MB
    d. 2 GBs
96. While analyzing Selection algorithm, we make a number of passes, in fact it could be as many as
    a. n(n+1)
    b. log(n) Pg:37
    c. n/3
    d. n/4
97. In Random Access Machine (RAM), instructions are executed in
    a. Parallel
    b. Batch
    c. One by One Pg:10
    d. Multiple times
98. In selection problem, the rank of an element will be its _____ position
    a. First
    b. final Pg:34
    c. Second last
    d. Last
99. The worst-case running time of Merge sort is _____ in order to sort an array of n elements.
    a. O(log n)

b. O(n)

c. O(n log n) **page 40 and google**

d. O(n)

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100. f(n) and g(n) are asymptotically equivalent. This means that they have essentially the same _____.
   a. Results
   b. Variables
   c. Size
   d. Growth rates P:23

101. An algorithm is a mathematical entity. Which is independent of _____.
   a. Programming language
   b. Machine and Programming language
   c. Compiler and Programming language
   d. Programming language Compiler and Machine P:07

102. In Quick sort algorithm, Pivots form ___
   a. Stack
   b. Queue
   c. Binary Search Tree P:49
   d. Graph

103. Counting sort is suitable for sorting the elements within range 1 to P. where
   a. P is large
   b. P is small P-57
   c. P is very large
   d. P is undetermined

104. In asymptotical analysis of n'(5 2)-3, as n becomes large, the dominant (fastest growing) term is some constant times
   a. n_1
   b. n
   c. n+1
   d. n*n P-23

105. ___ Items are not allowed in the 0/1 knapsack. a. Lighter
   b. Fractional P-91

c. Whole
d. Weighty

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106. Fibonacci Sequence was named on _____, a famous mathematician in 12th Century.
    a. Fred Brooks
    b. Grady Booch
    c. Leonardo Pisano P-73
    d. Edgar F. Codd
107. In Heap Sort algorithm, we build _____ for ascending sort.
    a. Max heap P-41
    b. Min heap
108. Bubble sort is not an in-place sorting algorithm.
    a. True
    b. False P-54
109. In partition algorithm, the subarray _____ has elements which are greater than pivot element x.
    a. A[p...r]
    b. A[p...q-1]
    c. A[q]
    d. A[q+1..r] P-46
110. In Heap Sort algorithm, if heap property is violated
    a. We call Build heap procedure P-43
    b. We call Heapify procedure
    c. We ignore
    d. Heap property can never be violated
111. _____ is not a characteristic of Random Access Machine.
    a. Single-Processor P-10
    b. Assigning a value to a variable
    c. Locality of reference
    d. Executing an arithmetic instruction
112. The only way to convert an empty string into a sting of j characters is by doing j insertions, represented as _____

a. E(i,j) = 1
b. E(I,0) = I
c. E(0,j) = j page 78
d. E(1,j)= j

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113. In Selection problem, the Sieve technique works in _____.
    a. Non-recursive manner
    b. Constant time
    c. Phases page 34
    d. One complete go
114. Algorithm is a sequence of computational steps that ---- the input into output.
    a. Merge
    b. Assign
    c. Transform page 7
    d. Integrate
115. If pj dominates pi and pi dominates ph then pj also dominates ph, it means dominance relation is
    a. Transitive page 18
    b. Non Transitive
    c. Equation
    d. Symbolic
116. To find maximal points in brute-force algorithm each point of the space is compared against _____ of that space.
    a. One other point
    b. All other points page 11
    c. Few other points
    d. Most of the other points
117. In the following code the statement "cout<<j;"executes --------- times. for (j=1; j<=5; j = j+2)
        cout<<j;
    a. 5 times
    b. 2 times
    c. 3 times

d. 0 times

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118. In merge sort algorithm, we split the array around the _____ index q. a. Entring
    b. Mid page 17
    c. Exiting
    d. Summing
119. In Selection problem, the Sieve technique _____.
    a. Add some more input items each time
    b. Do not work recursively
    c. Do not uses Divide and Conquer approach
    d. Eliminates undesired data items each time
120. Consider three matrices X, Y, Z of dimensions 1 x 2, 2 x 3, 3 x 4 respectively. The number of multiplications of X(YZ) is .
    a. 16
    b. 32
    c. 26
    d. 32 page 84
121. In Heap Sort algorithm, the total running time for Heapify procedure is _____
    a. Theta (log n)
    b. Order (log n)
    c. Omega (log n)
    d. O(1) i.e. Constant time
122. The sieve technique works where we have to find_____ items(s) from a large input.
    a. Single page 34
    b. Two
    c. Three
    d. Similar
123. In Dynamic Programming based solution of Knapsack Problem, if we decide to take an object i , then we gain_____

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a. W(Total Weight of Knapsack)
b. V (Total Value of all items)
c. vi (Value of object i) page 93
d. Nome of the given option

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124. While Sorting, the order domain means for any two input elements x and y _____ satisfies only.
   a. x < y page 39
   b. x > y
   c. x = y
   d. All of the above

125. For solving Selection problem, we introduced Sieve technique due to _____
   a. Using Decrease and Conquer strategy page 34
   b. Avoiding to sort all input data
   c. Eliminating Rank of an element
   d. Using Brute-force approach

126. _____ is one of the few problems, where provable lower bounds exist on how fast we can sort.
   a. Searching
   b. Sorting page 38
   c. Both Searching & sorting
   d. Growing

127. In plane sweep approach, a vertical line is swept across the 2d-plane from_____.
   a. Right to Left
   b. Left to Right page 18
   c. Top to Bottom
   d. Bottom to top

128. In generating Fibonacci sequence, we can avoid unnecessary repetitions by _____ process.
   a. Tokenization
   b. Memorization page 43
   c. Randomization
   d. Memorization

129. For _____ values of n, any algorithm is fast enough.

a. Small page 14
b. Medium
c. Large
d. Infinity

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130. Dynamic programming comprises of _____.
    a. Recursion only
    b. Repetition only
    c. Recursion with Repetition
    d. No Repetition but Recursion page 75

131. The function f(n)=n(logn+1)/2 is asymptotically equalient t nlog n :Here Lower Bound means function f(n) grows asymptotically at __ as fast as nlog n.
    a. Least page 23
    b. Normal
    c. Most
    d. At

132. Counting sort has time complexity.
    a. O(n+k)
    b. O(n) page 58
    c. O(k)
    d. O(nlogn)

133. Due to left complete nature of binary tree, the heap can be stored in
    a. Array page 40
    b. Structures
    c. Link List
    d. Stack

134. Single item from a larger set of _____.
    a. Constant
    b. Pointers
    c. Phases
    d. n items page 34

135. In the clique cover problem, for two vertices to be in the same group, they must be _____ each other.
    a. Apart from
    b. Far from

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c. Near to

d. Adjacent to page 76

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136. How much time merge sort takes for an array of numbers?
    a. T(n^2)
    b. T(n)
    c. T(log n)
    d. T(n log n) page 40

137. In in-place sorting algorithm is one that uses arrays for storage.
    a. No additional array page 54
    b. An additional array
    c. Both of above may be true according to algorithm
    d. More than 3 arrays of one dimension

138. Brute-force algorithm for 2D-Maxima is operated by comparing _____ pairs of points.
    a. Two
    b. Some
    c. Most
    d. All page 18

139. While Sorting, the ordered domain means for any two input elements x and y ____ satisfies only.
    a. x > y
    b. x < y
    c. x = y
    d. All of the above page 38

140. Quick sort is.
    a. Stable & in place
    b. Not stable but in place page 54
    c. Stable but not in place
    d. Some time stable & some times in place

141. Which may be a stable sort?
    a. Merger
    b. Insertion

c. Both above **page 54**

d. None of the above

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142. For the Sieve Technique we take time.
   a. T(nk) page 34
   b. IT(n / 3)
   c. n^2
   d. n/3

143. Continuation sort is suitable to sort the elements in range 1 to k.
   a. K is Large
   b. K is not known
   c. K may be small or large
   d. K is small page 54

144. Asymptotic growth rate of the function is taken over _____ case running time. .
   a. Best
   b. Worst page 14
   c. Average
   d. Normal

145. The sieve technique is a special case, where the number of sub problems is just.
   a. 5
   b. Many
   c. 1 page 34
   d. Few

146. In Quick sort, we don't have the control over the sizes of recursive calls.
   a. True page 49
   b. False
   c. Less information to decide
   d. Ether true or false

147. Before sweeping a vertical line in plane sweep approach, in start sorting of the points is done in increasing order of their _____ coordinates. .
   a. X page 18

b. Y
c. Z
d. X , Y

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148. Random access machine or RAM is a/an.
   a. Machine build by Al-Khwarizmi
   b. Mechanical machine
   c. Mathematical model page 10
   d. Electronics machine

149. The Huffman codes provide a method of encoding data inefficiently when coded using ASCII standard.
   a. True
   b. False page 99

150. A heap is a left-complete binary tree that confirms to the _____.
   a. increasing order only
   b. decreasing order only
   c. heap order page 40
   d. log n order

151. If we associate (x, y) integers pair to cars where x is the speed of the car and y is the negation of the price. High y value for a car means a _____ car.
   a. Fast
   b. Slow
   c. Expensive
   d. Cheap

152. Which one of the following sorting algorithms is the fastest?
   a. Merge sort
   b. Quick sort
   c. Insertion sort
   d. Heap sort

153. Quick sort algorithm divide the entire array into _____ sub arrays.
   a. 2
   b. 3
   c. 4
   d. 5

154. In brute force algorithm, we measure running time T(n) based on _____.

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a. Average-case time and best-case time
b. Worst-case time and average-case time page 46
c. Worst-case time and best-case time
d. Best-case time and staring-case time

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155. For 2D Maxima problem. Plane Sweep algorithm first of all _____.
   a. Sorts all points
   b. Delete some points
   c. Output the elements
   d. Pushes all points on stack

156. There are _____ entries in the Edit Distance Matrix
   a. ɵ (n)
   b. ɵ (n_2) page 84
   c. ɵ (n+2)
   d. ɵ (n + 100)

157. Which symbol is used for Omega notation?
   a. (O)
   b. (ɵ)
   c. (Ω)
   d. (@)

158. Selection sort is a _____ sorting algorithm
   a. In-place page 54
   b. Not In-Place
   c. Stable
   d. in-partition

159. In Dynamic Programming based solution of knapsack problem, to compute entries of 'V', we will imply a(n) _____ approach.
   a. Subjective
   b. Inductive
   c. Brute Force
   d. Combination

160. We do not need to prove comparison-based sorting algorithms by mathematically. It always takes _____ time.
   a. Big Oh nlog(n)
   b. Omega nlog(n) NOT SURE

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c. **Omega n(n^2)**
d. **Theta nlog(n)**

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161. Merge sort is a/an _____ and _____ sorting algorithm
    a. Not in-place, not stable one
    b. In-place, not stable one
    c. In-place, stable one
    d. Not in-place, stable one page 54
162. Cubic function will _____ a quadratic function.
    a. Prove
    b. be equal to
    c. overtake Page 25
    d. find
163. Insertion sort is a _____ sorting algorithm
    a. Unstable
    b. In-place Page 54
    c. Not In-Place
    d. in-partition
164. To check whether a function grows faster or slower than the other function, we use some asymptotic notations, which is _____.
    a. Big-oh notation
    b. Theta notation
    c. Omega notation
    d. All of the given
165. Asymptotic growth of 8n^2 + 2n – 3 is:
    a. Θ(n^2 + n)
    b. Θ (n^2) page 14
    c. Θ(8n^2)
    d. Θ(8n^2 + 2n)
166. In the analysis of algorithms, _____ plays an important role.
    a. text analysis
    b. time
    c. growth rate

d. money

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167. In inductive approach of knapsack problem, we consider 2 cases, _____ Or _____.
    a. Median, Mode
    b. Recursive, Iterative
    c. Leave object, Take object page 93
    d. Sequentially. Parallel
168. Random Access Machine (RAM) can execute _____ instructions
    a. only logical
    b. parallel
    c. only arithmetic
    d. logical and arithmetic
169. Using _____ algorithm, efficiency is not given much importance
    a. Greedy
    b. Merge sort
    c. Processing as there is no algorithm by this name
    d. Brute Force
170. Bubble sort takes theta _____ in the worst case
    a. (n2) page 39
    b. (n)
    c. log(n)
    d. nlog(n)
171. If matrix A of dimension p × q is multiply with matrix B of dimension q × r, then dimension of resultant matrix is:
    a. p × q
    b. p × r page 84
    c. q × r
    d. r × p
172. Dynamic Programing algorithms often use some kind of _____ to store the results of intermediate sub-problems
    a. table (Page 75)

b. variable
c. stack
d. loop

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173. _____ is in-place sorting algorithm.
   a. Bubble sort (Page 54)
   b. Merge sort
   c. Linear search
   d. Binary Search

174. Which one of the following problems can be solved using dynamic problem?
   a. Bubble sort problem
   b. Matrix chain multiplication problem page 85
   c. Greedy search problem
   d. Fractional knapsack problem

175. In chain matrix multiplication, solutions of the sub-problems are stored in a _____.
   a. Array
   b. Table page 86
   c. Tree
   d. Link list

176. What is the average running time of a quick sort algorithm?
   a. O(n^2)
   b. O(n)
   c. O(n log n) (Page 49)
   d. O(log n)

177. Sorting Algorithms having O _____ running time are considered to be slow ones.
   a. (n)
   b. (n^2) (Page 39)
   c. (nlog(n))
   d. (log(n))

178. While solving Selection problem, in Sieve technique we partition input data _____
   a. In increasing order

b. In decreasing order
c. According to Pivot
d. Randomly

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179. _____ is the process of avoiding unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later.
    a. Loop
    b. Memoization page 74
    c. Recursion
    d. Function

180. In average-case time the probability of seeing input is denoted by _____.
    a. p{I}
    b. p[I]
    c. p<i>
    d. p(i) page 13

181. While applying the Sieve technique to selection sort, how to choose a pivot element.
    a. Through mean
    b. Linear
    c. Randomly page 35
    d. Sequentially

182. Number of _____ of the pseudo code are counted to measure the running time.
    a. Inputs
    b. Outputs
    c. Steps page 13
    d. Pages

183. Developing a dynamic programming algorithm generally involves _____ separate steps.
    a. One
    b. Two page 75
    c. Three
    d. Four

184. 8n^2+2n+3 will exceed c28(n), no matter how large we make _____.
    a. n

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b. 2n

c. c2 page 25

d. this quadratic equation

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185. The running time of quick sort algorithm_____.
    a. Is impossible to compute
    b. Has nothing to do with pivot selection
    c. Is Random upon each execution
    d. Greatly influenced by the selection of pivot page 49

186. _____ involves breaking up the problem into sub problems whose solutions can be combined to solve the global problem.
    a. Complexity Theory
    b. Dynamic programming solution
    c. Divide and Conquer Strategy page 34
    d. Greedy Algorithms

187. In _____ we have to find rank of an element from given input.
    a. Merge sort algorithm
    b. Selection problem page 34
    c. Brute force technique
    d. Plane Sweep algorithm

188. How many steps are involved to design the dynamic programming strategy?
    a. 2
    b. 3
    c. 1
    d. 4 page 92

189. In Bucket sort, if there are duplicates then each bin can be replaced by a a. Stack
    b. Linked list page 69
    c. Hash table
    d. Heap

190. In merge sort algorithm, we split the array _____ to find index q.
    a. from start
    b. midway page 28
    c. from end

d. both from start or end

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191. Find the maximum value of the items which can carry using knapsack Knapsack weight capacity = 50.

Item Weight Value
11070
22020
33080
470 200

a. 280
b. 100
c. 90
d. 200

192. In 2-d maxima problem a point p is said to be dominated by point q if _____.

a. p.x <= q.x
b. p.x <= q.x and p.y <= q.y page 17
c. p.y <= q.y
d. p.x >= q.x and p.y >=q.y

193. Sorting can be in _____.

a. Increasing order only
b. Decreasing order only
c. Both increasing and decreasing order
d. Random order

194. Recurrence can be described in terms of _____.

a. Array
b. Linear
c. Tree page 31
d. Graph

195. The brute-force algorithm for 2D-Maxima runs in order O(__) time.

a. n
b. n(log n)

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c. n*n page 18

d. n3

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196. In plane sweep approach of solving geometric problems, a _____ is swept across the plane.
   a. Line page 18
   b. Plane
   c. Cube
   d. Box

197. Which of the following is calculated with Big Omega notation?
   a. Medium bounds
   b. Upper bounds
   c. Lower bounds Page - 25
   d. Both upper and lower bounds

198. _____ is always based on divide and conquer strategy.
   a. Bubble sort
   b. Selection sort
   c. Pigeon sort
   d. Quick sort page 46

199. If a matrix has three rows and two columns, then dimensions of matrix will be:
   a. 3x2
   b. 2x3
   c. 3x3
   d. 2x2

200. Asymptotic notations are used to describe _____ of an algorithm.
   a. Length
   b. running time google
   c. size
   d. compile time

201. Catalan numbers are related the number of different _____ on 'n' nodes.
   a. Arrays
   b. linked lists

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c. binary trees **page 85**

d. functions

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202. Applying the sieve technique to selection problem, _____ element is picked from array.
    a. Output
    b. Total
    c. Input
    d. Pivot page 35

203. Dynamic Programming approach is usually useful in solving _____ problems.
    a. Normal
    b. Optimization google
    c. Array
    d. Loop

204. In recursive formulation of knapsack Problem: V [0, j] = _____ for j>=0
    a. -1
    b. 0 page 93
    c. 1
    d. 2

205. _____ is a linear time sorting algorithm.
    a. Merge sort
    b. Radix sort page 71
    c. Quick sort
    d. Bubble sort

206. Quick sort is one of the _____ sorting algorithm.
    a. Fastest page 19
    b. Slowest
    c. Major
    d. Average

207. The time assumed for each basic operation to execute on RAM model of computation is _____.

a. Infinite
b. Continuous
c. Constant page 10
d. Variable

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208. In Sieve Technique, we know the item of interest. a. True
b. False page 34

209. While analyzing algorithms, _____ and _____ usually considered difficult to calculate.
a. Finite, Infinite
b. Floor, ceiling google
c. Row, Column
d. Graph, Tree

210. While analysis of the brute-force maxima algorithm, an array sorted in the reverse order is the type of _____ case input.
a. Best
b. Worst page 14
c. Somewhat bad
d. Average

211. _____ is not useful measure of central tendency of given input set especially when the distribution of values is highly skewed.
a. Mean
b. Mode
c. Average
d. Median page 34

212. In asymptotical analysis of n(n-3) and 4n*n, as n becomes large, the dominant (fastest growing) term is some constant times _____.
a. n+1
b. n-1
c. n
d. n*n page 23

213. In addition to passing in the array itself to Merge Sort algorithm, we will pass in other arguments which are indices.

a. Two P-38
b. Three
c. Four
d. Five

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214. In 2d-maximal problem, a point is said to be if it is not dominated by any other point in that space.
    a. Member
    b. Minimal
    c. Maximal P-11
    d. Joint

215. Counting sort assumes that the numbers to be sorted are in the range _____.
    a. K to n where n is large
    b. 1 to k where k is small (P-57)
    c. K to n where k is small
    d. k to n where n is small

216. Insertion sort is an efficient algorithm for sorting a _____ number of elements
    a. Large P-39
    b. Small
    c. Extra large
    d. Medium

217. If the indices passed to merge sort algorithm are _____ then this means that there is only one element to sort.
    a. Small page 28
    b. Large
    c. Equal
    d. Not Equal

218. In Knapsack Problem, each item must be entirely accepted or rejected, is called _____ problem.
    a. Fractional
    b. 0-1 P-92
    c. Linear
    d. Optimal

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219. If the time complexity of an algorithm is O(n). then it is called _____ time complexity.
   a. Linear Wikipedia
   b. Constant
   c. Average
   d. Exponential

220. In the case of _____ analysis does not depend upon on the distribution of input.
   a. Merge sort
   b. Quick sort P-50
   c. Insertion sort
   d. Heap sort

221. We can use the _____ Property to devise a recursive formulation of the edit distance problem.
   a. Small substructure
   b. Algorithmic
   c. Real
   d. Optimal substructure page 78

222. The following sequence is called _____
   1,2,3,5,8,13,21,34,55,.....
   a. Optimize sequence
   b. Fibonacci sequence page 73
   c. Optimal sequence
   d. Overlapping sequence

223. Which one sorting algorithm is best suited to sort an array of 2 million elements?
   a. Bubble sort
   b. Insert sort
   c. Merge sort
   d. Quick sort

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e. Ridx Sort **page 71**

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224. We can improve the performance of quick sort if we could be able to _,_____.
    a. Skip input elements somehow
    b. Select two or more pivots page 34
    c. Skip any sub-array completely
    d. Eliminate recursive calls
225. The problem with the brute-force algorithm is that is uses _____ in pruning out de
    a. Worst-case time
    b. No intelligence page 18
    c. Outside looping
    d. Artificial intelligence
226. In chain matrix multiplication, the order of the matrices _____.
    a. Can be changed
    b. Can not be changed page 85
    c. is equal
    d. is reverse
227. In quick sort algorithm, we choose pivot_____.
    a. Always the smallest element
    b. Greater than 5
    c. Randomly page 35
    d. Less than 5
228. In Heap Sort algorithm. Heapify procedure is _____ in nature.
    a. Recursive
    b. Non-Recursive page 43
    c. Fast
    d. Slow
229. When matrix A of 5x 3 is multiplied with matrix B of 3 x 4 then the number of multiplications required will be _____.
    a. 15

b. 12
c. 36
d. 60

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230. An algorithm is said to be correct if for every _____ instance, it halts with the correct _____.
   a. Input, Output page 13
   b. Design, Analysis
   c. Value, Key
   d. Key, Analysis

231. In chain matrix multiplication, table is filled _____ to find the multiplication of matrix.
   a. row wise
   b. column wise
   c. diagonally
   d. bottom-to-up page 86

232. If we have an equation 8n2+7f*n + 5f + 6 then is large, _____ term will be muchxxxxxxxthe n term and will dominate the running time.
   a. f g (n)
   b. g (n) * 2
   c. n * 2 page 23
   d. f (n)

233. For quick sort algorithm. Partitioning takes theta _____.
   a. (n)
   b. log(n)
   c. n log (n)
   d. n2log (n)

234. In Heap Sort algorithm, the maximum levels an element can move upward is _____
   a. Theta (log n) page 43
   b. Big-ch (log n)
   c. Omega (log n)
   d. 0 (1) i.e. Constant time

235. _____ programming is essentially recursion without repetition.

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a. Fast
b. Dynamic page 75
c. Array
d. n (log n)

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236. There are no hard formal rules to the syntax of the _____ code.
   a. Basic
   b. Programming
   c. Pseudo
   d. Assembly

237. In Heap Sort algorithm, to remove the maximum element every time.
   a. We call Build-Heap procedure
   b. Heap Sort algorithm terminates without result
   c. We call heapify procedure
   d. Nothing happens

238. Which process is used for avoiding unnecessary repetitions and looking them up again if we need them later.
   a. Greedy Approach
   b. Memoization page 74
   c. Divide and conquer
   d. Recursion

239. The worst-case running time of Quick sort is _____ in order to sort an array of n element.
   a. O(n log n) page 49
   b. O(n)
   c. $O(n^2)$
   d. O(log n)

240. Boolean operation is a _____ operation on an idealized RAM model of computation.
   a. Starting
   b. Basic page 10
   c. Advance
   d. Normal

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241. In chain matrix multiplication, if there are n items, there are _____ ways in which outer most pair of parentheses can placed.
    a. n^2
    b. 2n
    c. n+1
    d. n-1 page 85

242. The number of nodes in a complete binary tree of height h is: a. 2 * (h+1) - 1
    b. 2^(h+1) – 1 page 40
    c. 2 * (h+1)
    d. ((h+1)^2) – 1