QUIZ BANK

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

YEAR/ SEM : III-I REGULATION: R20
COURSE NAME:**DESIGN AND ANALYSIS OF ALGORITHMS** ACADEMIC YEAR: 2022-23
COURSE CODE: CSE3102
COURSE COORDINATOR : VUYYURU MADHAVI

QUIZ BANK

001. _____refers to the task of determining how much computing time and storage an algorithm requires
B
A Validate Algorithms B Analyze algorithms
C Devise Algorithms D Test Algorithms
002. Which of the following condition belongs to termination of an algorithm after a limited number of steps
B
A Definiteness B Finiteness
C Infiniteness D Effectiveness
003. Which of the following not a criteria for all types of algorithms. **C**
A Definiteness B Finiteness
C Infiniteness D Effectiveness
004. The purpose of the _____is to assures that this algorithm will work correctly independently of the issues concerning the programming language it will eventually be written in.
D
A Performance analysis B Debugging
C Deploying D Validation
005. _____is the process of executing programs on sample data sets to determine whether faulty results occur and, if so, to correct them
A
A Debugging B Profiling
C Validation D program proving
006. The measure of the longest amount of time possibly taken to complete an algorithm is expressed as __.
D
A Little-O B Little-Omega
C Big-Omega D Big-O
007. Find the value returned by the following AB algorithm Algorithm AB(A, n)//A is an array
of size n { Result:=A[1]; for i :=2 to n do if A[i] >Result then Result:=A[i];return Result;}
A
A returns the maximum of n givennumbers
B returns the minimum of n given
numbers
C returns the average of n given
numbers

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DAA III – I B-Tech Regulation : R20

Course coordinator : V. MADHAVI A.Y : 2022-23

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A returns the maximum of n given numbers B returns the minimum of n given numbers
C returns the average of n given numbers D returns the sum of n given numbers

008. The following statement comes under _____type of category a:=a + b*e; **C**

A Declaration of variables B Loop statement
C Assignment of expression D Conditions statements

009. In algorithm specification blocks are indicated with ____braces **D**

A Parenthesis braces() B Square braces[]
C angular braces<> D Matching braces{}

010. The following example comes under _____data type node= record {Datatype1: data1; Datatype2data2; node *link; } **A**

A Compound B Derived
C Simple D Ternary

011. The _____of an algorithm is the amount of computer time it needs to run to completion **B**

A Space Complexity B Time complexity
C Factor Complexity D Eigen complexity

012. The amortized complexity to perform insert, delete, and search operations in splay trees is **B**

A O(n^3) B O(logn)
C O(n^2) D O(n)

013. ___ is defined as a set of well-defined instructions used to accomplish a particular task. a **A**

A Algorithm B Function
C Program D Procedure

014. _____ is a complexity of an algorithm is the amount of memory it needs to run to completion **A**

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A Space Complexity
B Time complexity
C Factor Complexity
D Eigen complexity

015. O(1) to mean a computing time is **B**
A Linear
B Constant
C Exponential
D Cubic

016. Potential function method is the technique that performs an amortized analysis based on ___. **D**
A Financial model
B Computational model
C Algorithm analysis
D Energy model

017. Consider the experiment of throwing three coins, how many possible outcomes will occur **C**
A 2
B 6
C 8
D 10

018. If $f(n)=a_m n^m+a_1 n+a_0$,then f(n)=O(___) **C**
A O(n)
B O(m)
C $O(n^m)$
D $O(m^n)$

019. Which of the following is not a method to arrive at amortized costs for operations are **C**
A Aggregate Method
B Potential Method
C Actual Cost Method
D Accounting Method

020. The only requirement is that the sum of the amortized complexities of all operations in any sequence of operations be _____to their sum of the actual complexities **B**
A Less than or equal to
B Greater than or equal to
C Less than
D Greater than

021. Which of the following is not an algorithmic approach **D**
A Dynamic Programming
B Greedy Approach
C Divide and Conquer
D 0/1 knapsack

022. O(n) is_____ **D**
A linear complexity
B factorial complexity
C exponential time
D Polynomial complexity

023. ___ within the limit deals with the behavior of a function for sufficiently large values of its parameter. **A**
A Asymptotic notation
B Big-Oh notation
C Omega notation
D Theta notation

024. _____ is the maximum amount of time an algorithm takes to execute a specific set of inputs. **C**
A Running time
B Average case time complexity
C Worst case time complexity
D Best case time complexity

025. An algorithm that uses random numbers to decide what to do next anywhere in its logic is called _____ **D**
A Dynamic approach
B Greedy approach
C Dynamic Programming
D Randomized Algorithm

026. _____ presents the upper and the lower bound of the running time of an algorithm **A**
A Theta Notation (-notation)
B Omega Notation (-notation)
C Big-O Notation (O-notation)
D Asymptotic notation

027. Two events E1 and E2 are said to be mutual exclusive if and only if _____ existed **A**
A No common sample points
B common sample points
C Equal sample points
D At least one sample point

028. A ___ is a compact, informal, and environment-independent description of a computer programming algorithm. **C**
A Stack
B Queue
C Psuedocode
D Non-linear data structure

029. O(X) is_____ **C**

A linear complexity
B factorial complexity
C exponential time
D Polynomial complexity

030. Towers of Hanoiis a famous problem that has a recursive solution running in **C**
A $O(n^3)$
B $O(n^2)$
C $O(2^n)$
D $O(n^2)$

031. Flip a coin four times and then the sample space consists of_____sample points **A**
A 16
B 8
C 12
D 24

032. (log n) is? **B**
A constant asymptotic notations
B logarithmic asymptotic notations
C polynomial asymptotic notations
D quadratic asymptotic notations

033. The probability of the sum of two faces (six faced dice) is 10 **C**
A 1/36
B 2/36
C 3/36
D 10/36

034. Tossing three coins, The probability of the event {HHT,HTT,TTT} is_____ **B**
A 0.1245
B 0.25
C 0.375
D 0.5

035. The number of possible outcomes generated by rolling two (six-faced) dice **D**
A 6
B 12
C 24
D 36

036. Worst Case indicates maximum time required for program execution. **A**
A Yes
B No
C Can be yes or no
D Can not say

037. Asymptotic analysis is _____ bound. **B**
A Output
B Input
C Outer
D inner

038. _____ is linear asymptotic notations? **C**
A (1)
B (log n)
C (n)
D (n log n)

039. The Theta notation is the formal way to express _____ of an algorithm &#39s **C**
running time.
A upper bound
B lower bound
C lower bound and upper bound
D None of the above

040. _____case indicates the minimum time required for program execution. **A**
A best case
B average case
C worst case
D None of the above

041. _____ analysis, the time of the algorithm is found prior to implementation and time **B**
is not in terms of any such time units. Instead, it represents the number of operations that are carried out while executing the algorithm.
A Posteriori analysis
B Priori analysis
C Asymptotic analysis
D Symptotic analysis

042. In _____ analysis, algorithm is implemented and executed on certain fixed hardware **A**
and software. Then the algorithm is selected which takes the least amount of time to execute.
A Posteriori analysis
B Priori analysis
C Asymptotic analysis
D Symptotic analysis

043. Thetotal amortized costof insertion in the Red-Black Tree is_____. **B**
A O(1)
B O(N)
C O(logN)
D O(NlogN)

044. _____of an algorithm refers to defining the mathematical foundation/framing of **B**
its run-time performance.
A Symptotic analysis
B Asymptotic analysis
C PosteriorAnalysis
D PrioriAnalysis

045. _____is the time complexity in decreasing the node value in a binomial heap. **C**

A O(1)
B O(N)
C O(logN)
D O(NlogN)

046. O(nlogn) is known as **C**
A linear complexity
B logarithmic complexity
C loglinear complexity
D constant complexity

047. Divide and Conquer principle is naturally expressed by **B**
A Non Recursive algorithm
B Recursive algorithm
C Iterations
D Object Oriented

048. Find the order of best case time complexities **D**
A O(n),O(1),O(logn),O(n logn)
B O(1),O(logn),O(n logn),O(n)
C O(logn),O(n logn),O(n),O(1)
D O(1), O(logn),O(n),O(nlogn)

049. _____ types of asymptotic notations existed in analyzing algorithms **C**
A 1
B 2
C 3
D 4

050. _____of the following is case does not exist in time complexity **D**
A Best Case
B Worst Case
C Average Case
D Null Case

051. A defective chessboard is a $2^k * 2^k$ board of squares with _____defective sqaure **A**
A Exactly one defective square
B Exactly two defective squares
C Exactly three defective squares
D Any number of defective squares

052. In the defective chess board problem, are required to tile a defective chessboard using _____ **C**
A triangle
B Square
C Triominoes
D orientations

053. Time Complexity of Binary Search Algorithm for unsuccessful searches in the approach of divide and conquer **C**
A O(n)
B $O(n \log_2 n)$
C $O(\log_2 n)$.
D $O(n^2 \log_2 n)$

054. Best case complexity for successful searches in binary search tree using divide and conquer approach **B**
A O(n)
B O(1)
C O(logn)
D O(nlogn)

055. The following recurrence relation using recursion tree method shows that T(n) = 2T(n/2) + n **A**
A A problem of size n will get divided into 2 sub-problems of size n/2 .
B A problem of size n will get divided into 2 sub-problems of size n.
C A problem of size n/2 will get divided into 2 sub-problems of size n
D A problem of size n/4 will get divided into 2 sub-problems of size n

056. The auxiliary space complexity of merge sort_____ **C**
A O(1)
B O(log n)
C O(n)
D O(n log n)

057. Choose the correct code for merge sort. **B**

A
```
Algorithm merge_sort(int arr[], int left, int right)
{
  if (left > right)
  {

    int mid = (right-left)/2;
    merge_sort(arr, left, mid);
    merge_sort(arr, mid+1, right);

    merge(arr, left, mid, right); //function to merge sorted arrays
  }
}
```

B
```
Algorithm merge_sort(int arr[], int left, int right)
{
  if (left < right)
  {

    int mid = left+(right-left)/2;
    merge_sort(arr, left, mid);
    merge_sort(arr, mid+1, right);

    merge(arr, left, mid, right); //function to merge sorted arrays
  }
}
```

C

D

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  }
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  }
}
```

058. The average case time complexity of merge sort **A**

A $O(n \log n)$ B $O(n^2)$

C $O(n^2 \log n)$ D $O(n \log n^2)$

059. The following recurrence relation using recursion tree method shows that $T(n) = T(n/5) + T(4n/5) + n$ **A**

A A problem of size n will get divided into 2 sub-problems- one of size n/5 and another of size 4n/5.

B A problem of size n will get divided into 2 sub-problems- one of size n/5 and another of size n.

C A problem of size n will get divided into 2 sub-problems- one of size 4n and another of size 4n/5

D A problem of size n will get divided into 2 sub-problems- one of size 4n/5 and another of size n

060. Merge sort uses which of the following technique to implement sorting? **C**

A backtracking B greedy algorithm

C divide and conquer D dynamic programming

061. Which of the below-given sorting techniques has the highest best-case runtime complexity. **B**

A Quick sort B Selection sort

C Insertion sort D Bubble sort

062. A sorting technique is called stable if: **B**

A It takes O(n log n) time.

B It maintains the relativeorder of occurrence of the same elements.

C It uses a divide andconquer approach.

D It takes O(n) space.

063. In quick sort, for sorting n elements, we choose the $n/4^{th}$smallest element as a pivot with an O(n) time algorithm. What is the worst-case time complexity for the quick sort **B**

A (n) B $(n \log n)$

C (n^2) D $(n^2 \log n)$

064. _____is the worst case time complexity of a quick sort algorithm? **C**

A O(N) B O(N log N)

C $O(N^2)$ D O(log N)

065. _____ pivoting improve the expected or average time complexity to O (N log N). **D**

A First element B last element

C middle element D random element

066. Which of the following algorithms is NOT a divide & conquer algorithm by nature? **D**

A Quick Sort B Merge Sort

C Binary Search D Heap Sort

067. More than one feasible solution is generated in_____ approach **A**

A Greedy B Divide and Conquer

C Dynamic Programming D Iterative

068. What is the worst case complexity of binary search using divide and conquer master theorem? **B**

A O(nlogn) B O(logn)

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C O(n)
D $O(n^2)$

069. Which is the best sorting algorithm to use if the elements in the array are more than one million in general? **C**
A Merge sort.
B Bubble sort.
C Quick sort.
D Insertion sort.

070. What is the average case time complexity of binary search using recursion? **B**
A O(nlogn)
B O(logn)
C O(n)
D $O(n^2)$

071. Consider a complete graph G with 4 vertices. The graph G has ____ spanning trees. **C**
A 15
B 8
C 16
D 13

072. Prims algorithm is _____type of approach **B**
A Divide and conquer algorithm
B Greedy algorithm
C Dynamic Programming
D Approximation algorithm

073. Which of the following is false in the case of a spanning tree of a graph G? **D**
A It is tree that spans G
B It is a sub graph of the G
C It includes every vertex of the G
D It can be either cyclic

074. An optimal solution is a feasible solution for which is ___-profit **A**
A maximized
B minimized
C equal
D zero

075. Consider the following instance of the knapsack problem: n = 3,m= 20,(pi,p2,P3) = (25,24,15), and (w,w2,w3)= (18,15,10).Find the optimal solution of maximum profit **B**
A 31
B 31.5
C 32
D 32.5

076. Optimal merge patternis a pattern that relates to the merging of two or more _____ files in a single sorted file **B**
A Unsorted files
B Sorted files
C binary files
D character files

077. If we have two sorted files containing n and m records respectively then they could be merged together, to obtain one sorted file in time **A**
A O (n+m).
B O (n).
C O(m)
D O(mlogn)

078. Let us consider the given files, f_1, f_2, f_3, $f_4$and $f_5$with 20, 30, 10, 5 and 30 number of elements respectively. Find the total number of moves required to merge all these files according to the ascending order. **C**
A 270
B 230
C 210
D 190

079. _____is the worst case time complexity of Prims algorithm if adjacency matrix is used? **B**
A O(log V)
B $O(V^2)$
C $O(E^2)$
D O(V log E)

080. Consider the files x1,x2, x3 with the length of 30,20,and 10 records each. The total number of moves required to merge the three files according to the given order **A**
A 110
B 60
C 85
D 120

081. In a knapsack problem, if a set of items are given, each with a weight and a value, the goal is to find the number of items that ___ the total weight and ___ the total value.Ans: **D**
A Minimizes, Minimizes
B Maximizes, Maximizes
C Maximizes, Minimizes
D Minimizes, Maximizes

082. With respect to finding the time complexity of Kruskals algorithm, which operation keeps track of the parent pointer until it reaches the root parent? **C**
A Makeset
B Union
C Find
D Merge

083. In the optimal merge pattern, list(L) is represented as a min-heap. and the value in the root is less than or equal to the values of its children ,in this case the time complexity is — D

A O(n^2) B O(n)
C O(logn) D O (n log n).

084. In the optimal merge pattern the list is kept in increasing order according to the weight value in the roots and insertion performed on O(n) then total time complexity is — A

A O(n^2) B O(n)
C O(logn) D O (n log n).

085. A Huffman code: A = 1, B = 000, C = 001, D = 01, P(A) = 0.4, P(B) = 0.1, P(C) = 0.2, P(D) = 0.3 The average number of bits per letter is — B

A 8.0 bit B 1.9 bit
C 2.0 bit D 2.1 bit

086. Finding maximum and minimum numbers from the given set requires _____no of comparisons in the case of divide and conquer approach when n is power of 2 — A

A (3n/2) 2 B 2(n-1)
C n^2 D logn

087. Kruskals Algorithm for finding the Minimum Spanning Tree of a graph is a kind of a? — C

A Dynamic programming B Divide and Conquer
C Greedy approach D Adhoc Approach

088. How many printable characters does the ASCII character set consists of? — C

A 120 B 128
C 100 D 98

089. _____is an application of binary trees with minimal weighted external path length is to obtain an optimal set of codes for messages M1,M2,Mn+1 and each code is binary string that is used for transmission of the corresponding message. — B

A A.Single Source shortest path B Huffman coding
C Binary Search tree D Merge Sort

090. The given graphG=(V,E) is represented as an adjacency matrix.w[u, v]stores the weight of edge(u, v). The priority queueQ is represented as an unordered list. Let|E| and |V| be the number of edges and vertices in the graph, respectively. Then the time complexity is _____ — B

A O(V^3) B O(V^2)
C O(E+V) D O(|E|+|V|*log|V|)

091. Which of the following algorithms is the best approach for solving Huffman codes? — B

A exhaustive search B greedy algorithm
C brute force algorithm D divide and conquer algorithm

092. Which of the following is not related to Dijkstras algorithm — B

A Dijkstras algorithm works only for connected graphs.
B It works for graphs that contain any edges with positive and negative weights.
C It only provides the value or cost of the shortest paths.
D The algorithm works for directed and undirected graphs.

093. Straight MaxMin requires _____ element comparisons in the best, average & worst cases. — B

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```
Algorithm straight MaxMin (a, n, max, min)
// Set max to the maximum & min to the minimum of a [1: n]
{
Max = Min = a [1];
For i = 2 to n do
{
If (a [i] > Max) then Max = a [i];
If (a [i] < Min) then Min = a [i];
}}
```

A n^2 B 2(n-1)
C n D (3n/2) 2

094. Which of the following is the most commonly used data structure for implementing Dijkstras Algorithm? **D**

A Max priority queue B Stack
C Circular queue D Min priority queue

095. Advantage of finding maximum and minimum using divide and conquer method instead of using conditional operators is _____ **C**

A Less space complexity B Accuracy
C Reduced Time Complexity D Less number of calculation

096. With respect to finding the time complexity of Kruskals algorithm, which operation keeps track of the parent pointer until it reaches the root parent? **C**

A Makeset B Union
C Find D Merge

097. Merge sort is _____type of sorting **A**

A External Sorting B Insertion Sorting
C Internal Sorting D Exponential Sorting

098. Dijkstras Algorithm is used to solve _____ problems. **B**

A All pair shortest path B Single source shortest path
C Network flow D Sorting

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