



CS502- Fundamentals of Algorithms
Solved MCQS
From Final term Papers

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MC100401285

Moaaz.pk@gmail.com

Mc100401285@gmail.com

PSMD01

FINAL TERM EXAMINATION
Spring 2010
CS502- Fundamentals of Algorithms (Session - 4)

Question No: 1 (Marks: 1) - Please choose one

An optimization problem is one in which you want to find,

- ▶ Not a solution
- ▶ An algorithm
- ▶ Good solution
- ▶ **The best solution (Page 97)**

Question No: 2 (Marks: 1) - Please choose one

Although it requires more complicated data structures, Prim's algorithm for a minimum spanning tree is better than Kruskal's when the graph has a large number of vertices.

- ▶ **True [click here 4 detail](#)**
- ▶ False

Question No: 3 (Marks: 1) - Please choose one

If a problem is in NP, it must also be in P.

- ▶ True
- ▶ False
- ▶ **unknown (Page 173)**

Question No: 4 (Marks: 1) - Please choose one

What is generally true of Adjacency List and Adjacency Matrix representations of graphs?

- ▶ **Lists require less space than matrices but take longer to find the weight of an edge (v1,v2)**
- ▶ Lists require less space than matrices and they are faster to find the weight of an edge (v1,v2)
- ▶ Lists require more space than matrices and they take longer to find the weight of an edge (v1,v2)
- ▶ Lists require more space than matrices but are faster to find the weight of an edge (v1,v2)

[click here 4 detail](#)

اللہ کا خوف سب سے بڑی دانائی ہے

Question No: 5 (Marks: 1) - Please choose one

If a graph has v vertices and e edges then to obtain a spanning tree we have to delete

- ▶ v edges.
- ▶ $v - e + 5$ edges
- ▶ $v + e$ edges.
- ▶ None of these

Question No: 6 (Marks: 1) - Please choose one

Maximum number of vertices in a Directed Graph may be $|V^2|$

- ▶ True
- ▶ False [click here for details](#)

Question No: 7 (Marks: 1) - Please choose one

The Huffman algorithm finds a (n) _____ solution.

- ▶ Optimal [click here for detail](#)
- ▶ Non-optimal
- ▶ Exponential
- ▶ Polynomial

Question No: 8 (Marks: 1) - Please choose one

The Huffman algorithm finds an exponential solution

- ▶ True
- ▶ False

Question No: 9 (Marks: 1) - Please choose one

The Huffman algorithm finds a polynomial solution

- ▶ True
- ▶ False

Question No: 10 (Marks: 1) - Please choose one

The greedy part of the Huffman encoding algorithm is to first find two nodes with **larger** frequency.

- ▶ True
- ▶ False (Page 100)

Question No: 11 (Marks: 1) - Please choose one

The codeword assigned to characters by the Huffman algorithm have the property that no codeword is the postfix of any other.

- ▶ True (Page 101)
- ▶ False

دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari

Question No: 12 (Marks: 1) - Please choose one

Huffman algorithm uses a greedy approach to generate a postfix code T that minimizes the expected length B (T) of the encoded string.

- ▶ True
- ▶ **False (Page 102)**

Question No: 13 (Marks: 1) - Please choose one

Shortest path problems can be solved efficiently by modeling the road map as a graph.

- ▶ **True (Page 153)**
- ▶ False

Question No: 14 (Marks: 1) - Please choose one

Dijkstra's single source shortest path algorithm works if all edges weights are non-negative and there are negative cost cycles.

- ▶ True
- ▶ **False (Page 159)**

Question No: 15 (Marks: 1) - Please choose one

Bellman-Ford allows negative weights edges and negative cost cycles.

- ▶ True
- ▶ **False (Page 159)**

Question No: 16 (Marks: 1) - Please choose one

The term "coloring" came form the original application which was in architectural design.

- ▶ True
- ▶ **False (Page 176)**

Question No: 17 (Marks: 1) - Please choose one

In the clique cover problem, for two vertices to be in the same group, they must be adjacent to each other.

- ▶ **True (Page 176)**
- ▶ False

Question No: 18 (Marks: 1) - Please choose one

Dijkstra's algorithm is operates by maintaining a subset of vertices

- ▶ **True (Page 155)**
- ▶ False

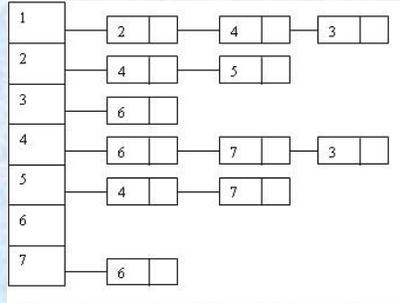
Question No: 19 (Marks: 1) - Please choose one

The difference between Prim's algorithm and Dijkstra's algorithm is that Dijkstra's algorithm uses a different key.

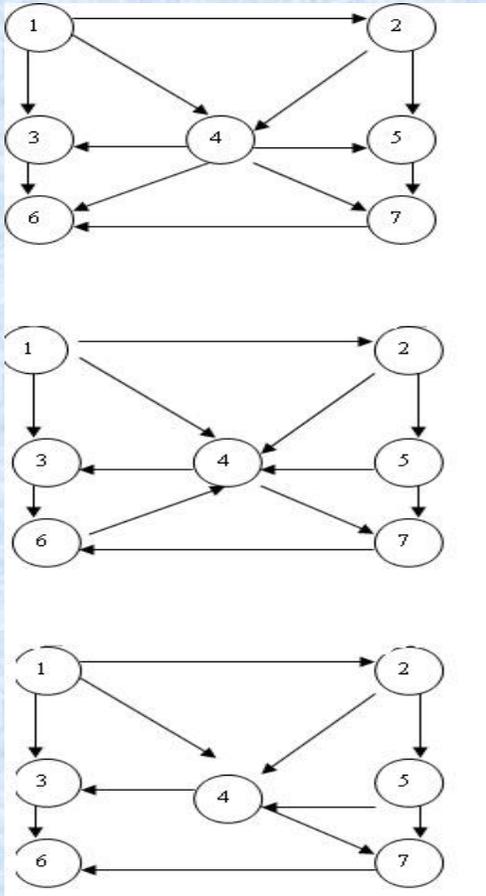
- ▶ **True (Page 156)**
- ▶ False

Question No: 20 (Marks: 1) - Please choose one

Consider the following adjacency list:



Which of the following graph(s) describe(s) the above adjacency list?

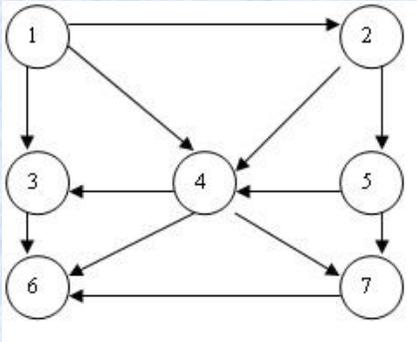


بری صحبت سے تنہائی بہتر ہے اور تنہائی سے نیک صحبت بہتر ہے

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari**



▶ **Correct Option**

Question No: 21 (Marks: 1) - Please choose one

We do sorting to,

- ▶ keep elements in random positions
- ▶ keep the algorithm run in linear order
- ▶ keep the algorithm run in $(\log n)$ order
- ▶ **keep elements in increasing or decreasing order (Page 40)**

Question No: 22 (Marks: 1) - Please choose one

After partitioning array in Quick sort, pivot is placed in a position such that

- ▶ **Values smaller than pivot are on left and larger than pivot are on right (Page 48)**
- ▶ Values larger than pivot are on left and smaller than pivot are on right
- ▶ Pivot is the first element of array
- ▶ Pivot is the last element of array

Question No: 23 (Marks: 1) - Please choose one

Merge sort is stable sort, but not an in-place algorithm

- ▶ **True (Page 54)**
- ▶ False

Question No: 24 (Marks: 1) - Please choose one

In counting sort, once we know the ranks, we simply _____ numbers to their final positions in an output array.

- ▶ Delete
- ▶ **copy (Page 57)**
- ▶ Mark
- ▶ arrange

Question No: 25 (Marks: 1) - Please choose one

Dynamic programming algorithms need to store the results of intermediate sub-problems.

- ▶ **True (Page 75)**
- ▶ False

Question No: 26 (Marks: 1) - Please choose one

A $p \times q$ matrix A can be multiplied with a $q \times r$ matrix B. The result will be a $p \times r$ matrix C. There are $(p \cdot r)$ total entries in C and each takes _____ to compute.

- ▶ **O (q) (Page 84)**
- ▶ O (1)
- ▶ O (n^2)
- ▶ O (n^3)

FINAL TERM EXAMINATION

Fall 2008

CS502- Fundamentals of Algorithms (Session - 1)

Question No: 1 (Marks: 1) - Please choose one

_____ is a graphical representation of an algorithm

- ▶ Σ notation
- ▶ Θ notation
- ▶ **Flowchart** [Click here for detail](#)
- ▶ Asymptotic notation

Question No: 2 (Marks: 1) - Please choose one

Which of the following is calculated with **big o notation**?

- ▶ Lower bounds
- ▶ **Upper bounds** (Page 25)
- ▶ Both upper and lower bound
- ▶ Medium bounds

Question No: 3 (Marks: 1) - Please choose one

Merge sort makes two recursive calls. Which statement is true after these recursive calls finish, but before the merge step?

- ▶ The array elements form a heap
- ▶ **Elements in each half of the array are sorted amongst themselves** [click here 4 detail](#)
- ▶ Elements in the first half of the array are less than or equal to elements in the second half of the array
- ▶ None of the above

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari

Question No: 4 (Marks: 1) - Please choose one

Who invented Quick sort procedure?

▶ [Hoare click here 4 detail](#)

▶ Sedgewick

▶ Mellroy

▶ Coreman

Question No: 5 (Marks: 1) - Please choose one

What is the solution to the recurrence $T(n) = T(n/2) + n$, $T(1) = 1$

▶ $O(\log n)$

▶ **$O(n)$ (Page 37)**

▶ $O(n \log n)$

▶ $O(2n)$

Question No: 6 (Marks: 1) - Please choose one

Consider the following Huffman Tree

The binary code for the string TEA is

▶ **10 00 010** [click here 4 detail](#)

▶ 011 00 010

▶ 10 00 110

▶ 11 10 110

Question No: 7 (Marks: 1) - Please choose one

A greedy algorithm does not work in phases.

▶ True

▶ **False (Page 97)**

Question No: 8 (Marks: 1) - Please choose one

Can an adjacency matrix for a directed graph ever not be square in shape?

▶ Yes

▶ **No** [click here 4 detail](#)

Question No: 9 (Marks: 1) - Please choose one

One of the clever aspects of heaps is that they can be stored in arrays without using any_____.

▶ **Pointers (Page 40)**

▶ constants

▶ variables

▶ functions

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question No: 10 (Marks: 1) - Please choose one

Merge sort requires extra array storage,

- ▶ **True (Page 54)**
- ▶ False

Question No: 11 (Marks: 1) - Please choose one

Non-optimal or greedy algorithm for money change takes _____

- ▶ **O(k) (Page 99)**
- ▶ O(kN)
- ▶ O(2k)
- ▶ O(N)

Question No: 12 (Marks: 1) - Please choose one

The Huffman codes provide a method of encoding data **inefficiently** when coded using ASCII standard.

- ▶ True
- ▶ **False (Page 99)**

Question No: 13 (Marks: 1) - Please choose one

Using ASCII standard the string abacdaacac will be encoded with _____ bits.

- ▶ **80 (Page 99)**
- ▶ 160
- ▶ 320
- ▶ 100

Question No: 14 (Marks: 1) - Please choose one

Using ASCII standard the string abacdaacac will be encoded with 160 bits.

- ▶ True
- ▶ **False (Page 99)**

Question No: 15 (Marks: 1) - Please choose one

Using ASCII standard the string abacdaacac will be encoded with 320 bits.

- ▶ True
- ▶ **False (Page 99)**

Question No: 16 (Marks: 1) - Please choose one

Using ASCII standard the string abacdaacac will be encoded with 100 bits.

- ▶ True
- ▶ **False (Page 99)**

Question No: 17 (Marks: 1) - Please choose one

Using ASCII standard the string abacdaacac will be encoded with 32 bytes

- ▶ True
- ▶ **False (Page 99)**

Question No: 18 (Marks: 1) - Please choose one

The greedy part of the Huffman encoding algorithm is to first find two nodes with **smallest** frequency.

- ▶ **True (Page 100)**
- ▶ False

Question No: 19 (Marks: 1) - Please choose one

The greedy part of the Huffman encoding algorithm is to first find two nodes with **character** frequency

- ▶ True
- ▶ **False (Page 100)**

Question No: 20 (Marks: 1) - Please choose one

Huffman algorithm uses a greedy approach to generate an **antefix** code T that minimizes the expected length B (T) of the encoded string.

- ▶ True
- ▶ **False (Page 102)**

Question No: 21 (Marks: 1) - Please choose one

Depth first search is shortest path algorithm that works on un-weighted graphs.

- ▶ True
- ▶ **False (Page 153)**

Question No: 22 (Marks: 1) - Please choose one

Dijkstra s single source shortest path algorithm works if all edges weights are non negative and there are no negative cost cycles.

- ▶ **True (Page 159)**
- ▶ False

Question No: 23 (Marks: 1) - Please choose one

Dijkstra s single source shortest path algorithm works if all edges weights are negative and there are no negative cost cycles.

- ▶ True
- ▶ **False (Page 159)**

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Moderen Studies
(IEMS) Samundari**

Question No: 24 (Marks: 1) - Please choose one

Floyd-Warshall algorithm is a dynamic programming algorithm; the genius of the algorithm is in the clever recursive formulation of the shortest path problem.

- ▶ True (Page 162)
- ▶ Flase

Question No: 25 (Marks: 1) - Please choose one

Floyd-Warshall algorithm, as in the case with DP algorithms, we avoid recursive evaluation by generating a table for

- ▶ k
- ▶ d_{ij}^k (Page 164)
- ▶ True
- ▶ Flase

Question No: 26 (Marks: 1) - Please choose one

The term coloring came from the original application which was in map drawing.

- ▶ True (Page 176)
- ▶ False

Question No: 27 (Marks: 1) - Please choose one

In the clique cover problem, for two vertices to be in the same group, they must be _____ each other.

- ▶ Apart from
- ▶ Far from
- ▶ Near to
- ▶ Adjacent to (Page 176)

Question No: 28 (Marks: 1) - Please choose one

Fixed-length codes may not be efficient from the perspective of _____ the total quantity of data.

Select correct option:

- ▶ Minimizing (Page 99)
- ▶ Averaging
- ▶ Maximizing
- ▶ Summing

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Moderen Studies
(IEMS) Samundari**

Question No: 29 (Marks: 1) - Please choose one

In greedy algorithm, at each phase, you take the _____ you can get right now, without regard for future consequences.

- ▶ Worst
- ▶ Minimum
- ▶ Good
- ▶ **Best (Page 97)**

Question No: 30 (Marks: 1) - Please choose one

The difference between Prim s algorithm and Dijkstra s algorithm is that Dijkstra s algorithm uses a same key.

- ▶ True
- ▶ **False (Page 156)**

FINALTERM EXAMINATION
Spring 2007
CS502- Fundamentals of Algorithms (Session - 4)

Question No: 1 (Marks: 1) - Please choose one

If a problem is in NP-complete, it must also be in NP.

- ▶ **True (Page 178)**
- ▶ False

Question No: 2 (Marks: 1) - Please choose one

If there are n items, there are _____ possible combinations of the items.

- ▶ 2
- ▶ n
- ▶ **2^n (Page 92)**
- ▶ 3^n

Question No: 3 (Marks: 1) - Please choose one

Using ASCII code, each character is represented by a fixed-length code word of _____ bits per character.

- ▶ 4
- ▶ 6
- ▶ **8 (Page 99)**
- ▶ 10

Question No: 4 (Marks: 1) - Please choose one

In Knapsack Problem, the thief's goal is to put items in the bag such that the _____ of the items does not exceed the limit of the bag.

▶ **Value (Page 91)**

- ▶ Weight
- ▶ Length
- ▶ Balance

Question No: 5 (Marks: 1) - Please choose one

The knapsack problem does not belong to the domain of optimization problems.

- ▶ True
- ▶ **False (Page 91)**

Question No: 6 (Marks: 1) - Please choose one

In Huffman encoding, for a given message string, the frequency of occurrence (relative probability) of each character in the message is determined last.

- ▶ True
- ▶ **False (Page 100)**

Question No: 7 (Marks: 1) - Please choose one

Fixed-length codes are known for easy break up of a string into its individual characters.

- ▶ **True (Page 99)**
- ▶ False

Question No: 8 (Marks: 1) - Please choose one

In _____ Knapsack Problem, limitation is that an item can either be put in the bag or not-fractional items are not allowed.

- ▶ 0
- ▶ 1
- ▶ **0/1 (Page 91)**
- ▶ Fractional

Question No: 9 (Marks: 1) - Please choose one

The term "coloring" came from the original application which was in architectural design.

- ▶ True
- ▶ **False (Page 173)**

Question No: 10 (Marks: 1) - Please choose one

In Knapsack Problem, value and weight both are to be under consideration.

▶ **True (page 91)**

▶ False

Question No: 11 (Marks: 1) - Please choose one

Time complexity of DP based algorithm for computing the minimum cost of chain matrix Multiplication is _____ .

▶ log n

▶ n

▶ n²

▶ **n³ (Page 90)**

Question No: 12 (Marks: 1) - Please choose one

In DP based solution of knapsack problem, to compute entries of V we will imply a/an _____ approach.

▶ Subjective

▶ **Inductive (Page 93)**

▶ Brute force

▶ Combination

Question No: 13 (Marks: 1) - Please choose one

A greedy algorithm sometimes works well for optimization problems.

▶ **True (Page 97)**

▶ False

Question No: 14 (Marks: 1) - Please choose one

In Huffman encoding, frequency of each character can be determined by parsing the message and _____ how many times each character (or symbol) appears.

▶ Printing

▶ Incrementing

▶ **Counting (Page 100)**

▶ Deleting

Question No: 15 (Marks: 1) - Please choose one

Greedy algorithm can do very poorly for some problems.

▶ **True (Page 97)**

▶ False

Question No: 16 (Marks: 1) - Please choose one

The Huffman codes provide a method of _____ data efficiently.

- ▶ Reading
- ▶ **Encoding (Page 99)**
- ▶ Decoding
- ▶ Printing

Question No: 17 (Marks: 1) - Please choose one

In _____ based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.

- ▶ Brute force
- ▶ **Dynamic programming (Page 93)**

Question No: 18 (Marks: 1) - Please choose one

Those problems in which Greedy finds good, but not always best is called a greedy_____.

- ▶ Algorithm
- ▶ Solution
- ▶ **Heuristic (Page 97)**
- ▶ Result

Question No: 19 (Marks: 1) - Please choose one

In brute force based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.

- ▶ TRUE
- ▶ **FALSE (Page 97)**

Question No: 20 (Marks: 1) - Please choose one

_____ problem, we want to find the best solution.

- ▶ Minimization
- ▶ Averaging
- ▶ **Optimization (Page 97)**
- ▶ Maximization

Question No: 21 (Marks: 1) - Please choose one

Using ASCII standard the string abacdaacac will be encoded with 10 bytes.

- ▶ **True (Page 101)**
- ▶ False

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

Question No: 22 (Marks: 1) - Please choose one

In _____ algorithm, you hope that by choosing a local optimum at each step, you will end up at a global optimum.

- ▶ Simple
- ▶ Non Greedy
- ▶ **Greedy (Page 97)**
- ▶ Brute force

Question No: 23 (Marks: 1) - Please choose one

Huffman algorithm uses a greedy approach to generate an prefix code T that minimizes the expected length B (T) of the encoded string.

- ▶ **True (Page 102)**
- ▶ False

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

خود کو تمہیں سے بڑھ کر کوئی اچھا مشورہ نہیں دے سکتا

عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Modern Studies
(IEMS) Samundari**

CS502 – Quiz No.2 (26 – June - 2013)

Question # 1 of 10 (Marks: 1) Please choose one

Counting Money problem is an example which cannot be optimally solved by greedy algorithm.

▶ **True (Page 97)**

▶ False

Question # 1 of 10 (Marks: 1) Please choose one

Huffman algorithm generates an optimum prefix code.

▶ **True (Page 102)**

▶ False

Question # 1 of 10 (Marks: 1) Please choose one

If the string “lmncde” is coded with ASCII code, the message length would be _____ bits.

▶ 24

▶ 36

▶ **48 (6*8=48)**

▶ 60

Question # 1 of 10 (Marks: 1) Please choose one

There are _____ nested loops in DP based algorithm for computing the minimum cost of chain matrix multiplication.

▶ 2

▶ **3 (Page 90)**

▶ 4

▶ 5

Question # 1 of 10 (Marks: 1) Please choose one

Inductive approach to compute entries of V is implied in _____ based solution of knapsack problem.

▶ Brute force

▶ **Dynamic programming (Page 93)**

جو شخص ناکامیوں سے ڈر کر بھاگتا ہے کامیابی اس سے ڈر کر بھاگتی ہے

Question # 1 of 10 (Marks: 1) Please choose one

A number of lectures are to be given in a single lecture hall. Optimum scheduling for this is an example of Activity selection.

▶ **True (Page 105)**

▶ False

Question # 1 of 10 (Marks: 1) Please choose one

The activity scheduling is a simple scheduling problem for which the greedy algorithm approach provides a/an _____ solution.

▶ Simple

▶ Sub optimal

▶ **Optimal (Page 105)**

▶ Non optimal

Question # 1 of 10 (Marks: 1) Please choose one

The string |xyz|, if coded with ASCII code, the message length would be 24 bits.

▶ **True (3*8=24)**

▶ False

Question # 1 of 10 (Marks: 1) Please choose one

An application problem is one in which you want to find, not just a solution, but the _____ solution.

▶ Simple

▶ **Good (Page 113) not sure**

▶ Best

▶ Worst

جو لوگوں کے سامنے فخر کرتا ہے وہ لوگوں کی نظروں سے گر جاتا ہے

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Quiz No.3(January 28, 2013)

Question # 1 of 10 (Marks: 1) Please choose one

A dense undirected graph is:

- ▶ **A graph in which $E = O(V^2)$ [click here 4 detail](#)**
- ▶ A graph in which $E = O(V)$
- ▶ A graph in which $E = O(\log V)$
- ▶ All items above may be used to characterize a dense undirected graph

Question # 1 of 10 (Marks: 1) Please choose one

Suppose that a graph $G = (V,E)$ is implemented using adjacency lists. What is the complexity of a breadth-first traversal of G ?

- ▶ $O(|V|^2)$
- ▶ $O(|V| + |E|)$
- ▶ $O(|V|^2|E|)$
- ▶ $O(|V| + |E|)$ pg 116

Question # 1 of 10 (Marks: 1) Please choose one

Which is true statement?

- ▶ **Breadth first search is shortest path algorithm that works on un-weighted graphs (Page 153)**
- ▶ Depth first search is shortest path algorithm that works on un-weighted graphs.
- ▶ Both of above are true.
- ▶ None of above are true.

Question # 1 of 10 (Marks: 1) Please choose one

Forward edge is:

- ▶ (u, v) where u is a proper descendent of v in the tree.
- ▶ **(u, v) where v is a proper descendent of u in the tree. (Page 129)**
- ▶ (u, v) where v is a proper ancesstor of u in the tree.
- ▶ (u, v) where u is a proper ancesstor of v in the tree.

عقل مند اپنے عیب خود دیکھتا ہے اور بہرہ تو فوں کے عیب دنیا دیکھتی ہے

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Moderen Studies
(IEMS) Samundari**

Question # 1 of 10 (Marks: 1) Please choose one

What general property of the list indicates that the graph has an isolated vertex?

- ▶ There is Null pointer at the end of list.
- ▶ The Isolated vertex is not handled in list.
- ▶ Only one value is entered in the list.
- ▶ There is at least one null list.

Question # 1 of 10 (Marks: 1) Please choose one

If you find yourself in maze the better traversal approach will be :

- ▶ **BFS** [Click here for detail](#)
- ▶ BFS and DFS both are valid
- ▶ Level order
- ▶ DFS

Question # 1 of 10 (Marks: 1) Please choose one

In digraph $G=(V,E)$;G has cycle if and only if

- ▶ The DFS forest has forward edge.
- ▶ **The DFS forest has back edge** (Page 131)
- ▶ The DFS forest has both back and forward edge
- ▶ BFS forest has forward edge

Question # 1 of 10 (Marks: 1) Please choose one

Back edge is:

- ▶ **(u, v) where v is an ancestor of u in the tree.** (Page 128)
- ▶ (u,v) where u is an ancestor of v in the tree.
- ▶ (u, v) where v is a predecessor of u in the tree.
- ▶ None of above

Question # 1 of 10 (Marks: 1) Please choose one

Which statement is true?

- ▶ If a dynamic-programming problem satisfies the optimal-substructure property, then a locally optimal solution is globally optimal.
- ▶ If a greedy choice property satisfies the optimal-substructure property, then a locally optimal solution is globally optimal.
- ▶ **Both of above**
- ▶ None of above

بد صورت چہرہ بد صورت دماغ سے بہتر ہے

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question # 1 of 10 (Marks: 1) Please choose one

Cross edge is :

- ▶ (u, v) where u and v are not ancestor of one another
- ▶ (u, v) where u is ancestor of v and v is not descendent of u.
- ▶ **(u, v) where u and v are not ancestor or descendent of one another (Page 129)**
- ▶ (u, v) where u and v are either ancestor or descendent of one another.

Quiz No.4(February 5, 2013)

Question # 1 of 10 (Marks: 1) Please choose one

Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best tree edge) when the graph has relatively few edges.

▶ **True [click here 4 detail](#)**

▶ False

Question # 1 of 10 (Marks: 1) Please choose one

Which is true statement in the following?

▶ **Kruskal algorithm is multiple source technique for finding MST. [click here for detail](#)**

▶ Kruskal's algorithm is used to find minimum spanning tree of a graph, time complexity of this algorithm is $O(EV)$

▶ Both of above

▶ **Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best Tree edge) when the graph has relatively few edges. [click here 4 detail](#)**

Question # 1 of 10 (Marks: 1) Please choose one

What algorithm technique is used in the implementation of Kruskal solution for the MST?

▶ **Greedy Technique (Page 142)**

▶ Divide-and-Conquer Technique

▶ Dynamic Programming Technique

▶ The algorithm combines more than one of the above techniques

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Moderen Studies
(IEMS) Samundari**

Question # 1 of 10 (Marks: 1) Please choose one

What is the time complexity to extract a vertex from the priority queue in Prim's algorithm?

- ▶ $O(\log E)$
- ▶ (V)
- ▶ $(V+E)$
- ▶ **$O(\log V)$ (Page 152)**

Question # 1 of 10 (Marks: 1) Please choose one

The relationship between number of back edges and number of cycles in DFS is,

- ▶ Both are equal
- ▶ Back edges are half of cycles
- ▶ Back edges are one quarter of cycles
- ▶ **There is no relationship between no. of edges and cycles (Page 131)**

Question # 1 of 10 (Marks: 1) Please choose one

You have an adjacency list for G , what is the time complexity to compute Graph transpose G^T ?

- ▶ **$(V + E)$ (Page 138)**
- ▶ $(V E)$
- ▶ (V)
- ▶ (V^2)

Question # 1 of 10 (Marks: 1) Please choose one

There is relationship between number of back edges and number of cycles in DFS

- ▶ Both are equal.
- ▶ Cycles are half of back edges.
- ▶ Cycles are one fourth of back edges.
- ▶ **There is no relationship between back edges and number of cycles. (Page 131)**

Question # 1 of 10 (Marks: 1) Please choose one

A digraph is strongly connected under what condition?

- ▶ A digraph is strongly connected if for every pair of vertices $u, v \in V$, u can reach v .
- ▶ **A digraph is strongly connected if for every pair of vertices $u, v \in V$, u can reach v and vice versa. (Page 135)**
- ▶ A digraph is strongly connected if for at least one pair of vertex $u, v \in V$, u can reach v and vice versa.
- ▶ A digraph is strongly connected if at least one third pair of vertices $u, v \in V$, u can reach v and vice versa.

CS502 - Fundamentals of Algorithms Quiz No.5 Dated FEB 15TH 2013

Question # 1 of 10 (Marks: 1) Please choose one

In in-place sorting algorithm is one that uses arrays for storage :

- ▶ An additional array
- ▶ **No additional array (Page 54)**
- ▶ Both of above may be true according to algorithm
- ▶ More than 3 arrays of one dimension.

Question # 1 of 10 (Marks: 1) Please choose one

In stable sorting algorithm

- ▶ One array is used
- ▶ In which duplicating elements are not handled.
- ▶ More then one arrays are required.
- ▶ **Duplicating elements remain in same relative position after sorting. (Page 54)**

Question # 1 of 10 (Marks: 1) Please choose one

Which sorting algorithm is faster :

- ▶ $O(n^2)$
- ▶ **$O(n \log n)$ (Page 46)**
- ▶ $O(n+k)$
- ▶ $O(n^3)$

Question # 1 of 10 (Marks: 1) Please choose one

In Quick sort algorithm, constants hidden in $T(n \lg n)$ are

- ▶ Large
- ▶ Medium
- ▶ Not known
- ▶ **Small [Click here for detail](#)**

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question # 1 of 10 (Marks: 1) Please choose one

Quick sort is based on divide and conquer paradigm; we divide the problem on base of pivot element and:

- ▶ There is explicit combine process as well to conquer the solution.
- ▶ No work is needed to combine the sub-arrays, the array is already sorted
- ▶ Merging the sub arrays
- ▶ **None of above. (Page 51)**

Ref: - random choices for the pivot element and each choice have an equal probability of $1/n$ of occurring. So we can modify the above recurrence to compute an average rather than a max

Question # 1 of 10 (Marks: 1) Please choose one

Dijkstra's algorithm :

- ▶ Has greedy approach to find all shortest paths
- ▶ Has both greedy and Dynamic approach to find all shortest paths
- ▶ **Has greedy approach to compute single source shortest paths to all other vertices (Page 154)**
- ▶ Has both greedy and dynamic approach to compute single source shortest paths to all other vertices.

Question # 1 of 10 (Marks: 1) Please choose one

Which may be stable sort:

- ▶ Bubble sort
- ▶ Insertion sort
- ▶ **Both of above (page 54)**
- ▶ Selection sort

Question # 1 of 10 (Marks: 1) Please choose one

In the analysis of Selection algorithm, we eliminate a constant fraction of the array with each phase; we get the convergent _____ series in the analysis,

- ▶ linear
- ▶ arithmetic
- ▶ **geometric (page 37)**
- ▶ exponent

Question # 1 of 10 (Marks: 1) Please choose one

How much time merge sort takes for an array of numbers?

- ▶ $T(n^2)$
- ▶ **$T(n)$ (Page 40)**
- ▶ $T(\log n)$
- ▶ $T(n \log n)$

Question # 1 of 10 (Marks: 1) Please choose one

Counting sort has time complexity:

- ▶ **O(n)** [Click here for detail](#)
- ▶ O(n+k)
- ▶ O(k)
- ▶ O(nlogn)

Question # 1 of 10 (Marks: 1) Please choose one

The analysis of Selection algorithm shows the total running time is indeed _____ in n,

- ▶ arithmetic
- ▶ geometric
- ▶ **linear** (Page 37)
- ▶ orthogonal

Question # 1 of 10 (Marks: 1) Please choose one

Sorting is one of the few problems where provable _____ bounds exists on how fast we can sort,

- ▶ upper
- ▶ **lower** (Page 39)
- ▶ average
- ▶ log n

Question # 1 of 10 (Marks: 1) Please choose one

In the analysis of Selection algorithm, we make a number of passes, in fact it could be as many as,

- ▶ T(n)
- ▶ T(n / 2)
- ▶ **log n** (Page 37)
- ▶ $n/2 + n/4$

Question # 1 of 10 (Marks: 1) Please choose one

The number of nodes in a complete binary tree of height h is

- ▶ **$2^{(h+1)} - 1$** (Page 40)
- ▶ $2 * (h+1) - 1$
- ▶ $2 * (h+1)$
- ▶ $((h+1)^2) - 1$

بہترین تجربہ وہ ہے جس سے نصیحت حاصل ہو

Question # 1 of 10 (Marks: 1) Please choose one

How many elements do we eliminate in each time for the Analysis of Selection algorithm?

▶ **n / 2 elements (Page 37)**

- ▶ (n / 2) + n elements
- ▶ n / 4 elements
- ▶ 2 n elements

Question # 1 of 10 (Marks: 1) Please choose one

Slow sorting algorithms run in,

▶ **T(n²) (Page 39)**

- ▶ T(n)
- ▶ T(log n)
- ▶ T(n log n)

Question # 1 of 10 (Marks: 1) Please choose one

Counting sort is suitable to sort the elements in range 1 to k:

- ▶ K is large
- ▶ **K is small (Page 57)**
- ▶ K may be large or small
- ▶ None

Question # 1 of 10 (Marks: 1) Please choose one

Heaps can be stored in arrays without using any pointers; this is due to the _____ nature of the binary tree,

▶ **left-complete (Page 40)**

- ▶ right-complete
- ▶ tree nodes
- ▶ tree leaves

Question # 1 of 10 (Marks: 1) Please choose one

Sieve Technique can be applied to selection problem?

▶ **True (Page 35)**

- ▶ False

Question # 1 of 10 (Marks: 1) Please choose one

A heap is a left-complete binary tree that conforms to the _____

- ▶ increasing order only
- ▶ decreasing order only
- ▶ **heap order (Page 40)**
- ▶ (log n) order

Question # 1 of 10 (Marks: 1) Please choose one

Divide-and-conquer as breaking the problem into a small number of

- ▶ pivot
- ▶ Sieve
- ▶ **smaller sub problems (Page 34)**
- ▶ Selection

Question # 1 of 10 (Marks: 1) Please choose one

In Sieve Technique we do not know which item is of interest

- ▶ **True (Page 34)**
- ▶ False

Question # 1 of 10 (Marks: 1) Please choose one

The recurrence relation of Tower of Hanoi is given below $T(n) = \{1 \text{ if } n=1 \text{ and } 2T(n-1) \text{ if } n > 1$ In order to move a tower of 5 rings from one peg to another, how many ring moves are required?

- ▶ 16
- ▶ 10
- ▶ 32
- ▶ **31** [Click here 4 detail](#)

Question # 1 of 10 (Marks: 1) Please choose one

For the heap sort, access to nodes involves simple _____ operations.

- ▶ **arithmetic (Page 41)**
- ▶ binary
- ▶ algebraic
- ▶ logarithmic

Question # 1 of 10 (Marks: 1) Please choose one

For the sieve technique we solve the problem,

- ▶ **recursively (Page 34)**
- ▶ mathematically
- ▶ precisely
- ▶ accurately

Question # 1 of 10 (Marks: 1) Please choose one

The sieve technique works in _____ as follows

- ▶ **phases (Page 34)**
- ▶ numbers
- ▶ integers
- ▶ routines

Question # 1 of 10 (Marks: 1) Please choose one

A (an) _____ is a left-complete binary tree that conforms to the heap order

▶ **heap (Page 40)**

- ▶ binary tree
- ▶ binary search tree
- ▶ array

Question # 1 of 10 (Marks: 1) Please choose one

The sieve technique is a special case, where the number of sub problems is just

- ▶ 5
- ▶ many
- ▶ **1 (Page 34)**
- ▶ few

Question # 1 of 10 (Marks: 1) Please choose one

Analysis of Selection algorithm ends up with,

- ▶ $T(n)$
- ▶ $T(1 / 1 + n)$
- ▶ $T(n / 2)$
- ▶ **$T((n / 2) + n)$ (Page 37)**

Question # 1 of 10 (Marks: 1) Please choose one

For the heap sort we store the tree nodes in

- ▶ **level-order traversal (Page 40)**
- ▶ in-order traversal
- ▶ pre-order traversal
- ▶ post-order traversal

Question # 1 of 10 (Marks: 1) Please choose one

The reason for introducing Sieve Technique algorithm is that it illustrates a very important special case of,

- ▶ **divide-and-conquer (Page 34)**
- ▶ decrease and conquer
- ▶ greedy nature
- ▶ 2-dimension Maxima

Question # 1 of 10 (Marks: 1) Please choose one

Theta asymptotic notation for $T(n)$:

- ▶ Set of functions described by: $c_1 g(n) \leq T(n) \leq c_2 g(n)$ for $c_1, c_2 > 0$
- ▶ Theta for $T(n)$ is actually upper and worst case comp
- ▶ **Set of functions described by:**
- ▶ $c_1 g(n)$

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question # 1 of 10 (Marks: 1) Please choose one

Sieve Technique applies to problems where we are interested in finding a single item from a larger set of

► **n items (Page 34)**

- phases
- pointers
- constant

Question # 1 of 10 (Marks: 1) Please choose one

Memorization is?

- To store previous results for future use
- **To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later (Page 47)**
- To make the process accurate
- None of the above

Question # 1 of 10 (Marks: 1) Please choose one

Quick sort is

- Stable & in place
- **Not stable but in place (Page 57)**
- Stable but not in place
- Some time stable & some times in place

Question # 1 of 10 (Marks: 1) Please choose one

One example of in place but not stable algorithm is

- Merger Sort
- **Quick Sort (Page 54)**
- Continuation Sort
- Bubble Sort

Question # 1 of 10 (Marks: 1) Please choose one

Continuation sort is suitable to sort the elements in range 1 to k

- K is Large
- K is not known
- K may be small or large
- **K is small (Page 57)**

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question # 1 of 10 (Marks: 1) Please choose one

Which may be a stable sort?

- ▶ Merger
- ▶ Insertion
- ▶ **Both above (Page 54)**
- ▶ None of the above

Question # 1 of 10 (Marks: 1) Please choose one

An in place sorting algorithm is one that uses ___ arrays for storage

- ▶ Two dimensional arrays
- ▶ More than one array
- ▶ **No Additional Array (Page 54)**
- ▶ None of the above

Question # 1 of 10 (Marks: 1) Please choose one

Continuing sort has time complexity of ?

- ▶ **O(n) [Click here fir detail](#)**
- ▶ O(n+k)
- ▶ O(nlogn)
- ▶ O(k)

Question # 1 of 10 (Marks: 1) Please choose one

single item from a larger set of _____

- ▶ **n items (Page 34)**
- ▶ phases
- ▶ pointers
- ▶ vconstant

Question # 1 of 10 (Marks: 1) Please choose one

For the Sieve Technique we take time

- ▶ **T(nk) (Page 34)**
- ▶ T(n / 3)
- ▶ n²
- ▶ n/3

تم اچھا کرو زمانہ تم کو برا سمجھے یہ اس سے بہتر ہے کہ تم برا کرو اور زمانہ تم کو اچھا سمجھے

Question # 1 of 10 (Marks: 1) Please choose one

One Example of in place but not stable sort is

► **Quick (Page 54)**

- Heap
- Merge
- Bubble

Question # 1 of 10 (Marks: 1) Please choose one

Consider the following Algorithm:

```
Factorial (n){  
  if (n=1)  
    return 1  
  else  
    return (n * Factorial(n-1))
```

Recurrence for the following algorithm is:

- $T(n) = T(n-1) + 1$
- $T(n) = nT(n-1) + 1$
- $T(n) = T(n-1) + n$
- **$T(n) = T(n(n-1)) + 1$**

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Some More MCQs

Question No: 1 (Marks: 1) - Please choose one

Due to left complete nature of binary tree, the heap can be stored in

- ▶ **Arrays (Page 40)**
- ▶ Structures
- ▶ Link Lis
- ▶ Stack

Question No: 2 (Marks: 1) - Please choose one

What type of instructions Random Access Machine (RAM) can execute?

- ▶ Algebraic and logic
- ▶ Geometric and arithmetic
- ▶ **Arithmetic and logic (Page 10)**
- ▶ Parallel and recursive

Question No: 3 (Marks: 1) - Please choose one

What is the total time to heapify?

- ▶ **$O(\log n)$ (Page 43)**
- ▶ $O(n \log n)$
- ▶ $O(n^2 \log n)$
- ▶ $O(\log^2 n)$

Question No: 4 (Marks: 1) - Please choose one

word Algorithm comes from the name of the muslim author _____

- ▶ **Abu Ja'far Mohammad ibn Musa al-Khowarizmi.**

Question No: 5 (Marks: 1) - Please choose one

al-Khwarizmi's work was written in a book titled _____

- ▶ **al Kitab al-mukhatasar fi hisab al-jabr wa'l-muqabalah**

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Question No: 6 (Marks: 1) - Please choose one

Random access machine or RAM is a/an

- ▶ Machine build by Al-Khwarizmi
- ▶ Mechanical machine
- ▶ Electronics machine
- ▶ **Mathematical model (Page 10)**

Question No: 7 (Marks: 1) - Please choose one

A RAM is an idealized machine with _____ random-access memory.

- ▶ 256MB
- ▶ 512MB
- ▶ **an infinitely large (Page 10)**
- ▶ 100GB

Question No: 8 (Marks: 1) - Please choose one

What will be the total number of max comparisons if we run brute-force maxima algorithm with n elements?

- ▶ n^2
- ▶ $\frac{n}{n^2}$
- ▶ **n (Page 14)**
- ▶ n^8

Question No: 9 (Marks: 1) - Please choose one

Consider the following code:

```
For(j=1; j<n;j++)
    For(k=1; k<15;k++)
        For(l=5; l<n; l++)
            {
                Do_something_constant();
            }
```

What is the order of execution for this code.

- ▶ **$O(n)$**
- ▶ $O(n^3)$
- ▶ $O(n^2 \log n)$
- ▶ $O(n^2)$

Question No: 10 (Marks: 1) - Please choose one

Is it possible to sort without making comparisons?

- ▶ **Yes (Page 57)**
- ▶ No

Question No: 11 (Marks: 1) - Please choose one

When we call heapify then at each level the comparison performed takes time

- ▶ **It will take $\Theta(1)$ (Page 43)**
- ▶ Time will vary according to the nature of input data
- ▶ It can not be predicted
- ▶ It will take $\Theta(\log n)$

Question No: 12 (Marks: 1) - Please choose one

In Quick sort, we don't have the control over the sizes of recursive calls

- ▶ **True (Page 40)**
- ▶ False
- ▶ Less information to decide
- ▶ Either true or false

Question No: 13 (Marks: 1) - Please choose one

If there are $\Theta(n^2)$ entries in edit distance matrix then the total running time is

- ▶ $\Theta(1)$
- ▶ **$\Theta(n^2)$ [Click here for detail](#)**
- ▶ $\Theta(n)$
- ▶ $\Theta(n \log n)$

Question No: 14 (Marks: 1) - Please choose one

For Chain Matrix Multiplication we can not use divide and conquer approach because,

- ▶ **We do not know the optimum k (Page 86)**
- ▶ We use divide and conquer for sorting only
- ▶ We can easily perform it in linear time
- ▶ Size of data is not given

Question No: 15 (Marks: 1) - Please choose one

The Knapsack problem belongs to the domain of _____ problems.

- ▶ **Optimization (Page 91)**
- ▶ NP Complete
- ▶ Linear Solution
- ▶ Sorting

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question No: 16 (Marks: 1) - Please choose one

Suppose we have three items as shown in the following table, and suppose the capacity of the knapsack is 50 i.e. $W = 50$.

Item	Value	Weight
1	60	10
2	100	20
3	120	30

The optimal solution is to pick

- ▶ Items 1 and 2
- ▶ Items 1 and 3
- ▶ **Items 2 and 3 (correct)**
- ▶ None of these

Question No: 17 (Marks: 1) - Please choose one

who invented the quick sort

- ▶ **C.A.R. Hoare** [Click here for detail](#)

Question No: 18 (Marks: 1) - Please choose one

main elements to a divide-and-conquer

- ▶ **Divide, conquer, combine (Page 27)**

Question No: 19 (Marks: 1) - Please choose one

Mergesort is a stable algorithm but not an in-place algorithm.

- ▶ **True (Page 54)**
- ▶ false

Question No: 20 (Marks: 1) - Please choose one

Counting sort the numbers to be sorted are in the range 1 to k where k is small.

- ▶ **True (Page 57)**
- ▶ False

Question No: 21 (Marks: 1) - Please choose one

In selection algorithm, because we eliminate a constant fraction of the array with each phase, we get the

- ▶ **Convergent geometric series (Page 37)**
- ▶ Divergent geometric series
- ▶ None of these

Question No: 22 (Marks: 1) - Please choose one

If an algorithm has a complexity of $\log_2 n + n \log_2 n + n$. we could say that it has complexity

- ▶ $O(n)$
- ▶ $O(n \log_2 n)$
- ▶ $O(3)$
- ▶ $O(\log_2(\log_2 n))$
- ▶ $O(\log_2 n)$

Question No: 23 (Marks: 1) - Please choose one

In RAM model instructions are executed

- ▶ **One after another (Page 10)**
- ▶ Parallel
- ▶ Concurrent
- ▶ Random

Question No: 24 (Marks: 1) - Please choose one

Due to left-complete nature of binary tree, heaps can be stored in

- ▶ Link list
- ▶ Structure
- ▶ **Array (Page 40)**
- ▶ None of above

Question No: 25 (Marks: 1) - Please choose one

The time assumed for each basic operation to execute on RAM model of computation is-----

- ▶ Infinite
- ▶ Continuous
- ▶ **Constant (Page 10)**
- ▶ Variable

Question No: 26 (Marks: 1) - Please choose one

If the indices passed to merge sort algorithm are not equal, the algorithm may return immediately.

- ▶ True
- ▶ **False (Page 28)**

Question No: 27 (Marks: 1) - Please choose one

Brute-force algorithm uses no intelligence in pruning out decisions.

- ▶ **True (Page 18)**
- ▶ False

Question No: 28 (Marks: 1) - Please choose one

In analysis, the Upper Bound means the function grows asymptotically no faster than its largest term.

▶ **True (Page 24)**

▶ False

Question No: 29 (Marks: 1) - Please choose one

For small values of n, any algorithm is fast enough. Running time does become an issue when n gets large.

▶ **True (Page 14)**

▶ Fast

Question No: 30 (Marks: 1) - Please choose one

The array to be sorted is not passed as argument to the merge sort algorithm.

▶ True

▶ **False**

Question No: 31 (Marks: 1) - Please choose one

In simple brute-force algorithm, we give no thought to efficiency.

▶ **True (Page 11)**

▶ False

Question No: 32 (Marks: 1) - Please choose one

The ancient Roman politicians understood an important principle of good algorithm design that is plan-sweep algorithm.

▶ True

▶ **False (Page 27) [Divide and Conquer]**

Question No: 33 (Marks: 1) - Please choose one

In 2d-space a point is said to be _____ if it is not dominated by any other point in that space.

▶ Member

▶ Minimal

▶ **Maximal (Page 11)**

▶ Joint

Question No: 34 (Marks: 1) - Please choose one

An algorithm is a mathematical entity that is dependent on a specific programming language.

▶ True

▶ **False (Page 7)**

Question No: 35 (Marks: 1) - Please choose one

The running time of an algorithm would not depend upon the optimization by the compiler but that of an implementation of the algorithm would depend on it.

▶ **True (Page 13)**

▶ False

Question No: 36 (Marks: 1) - Please choose one

F (n) and g (n) are asymptotically equivalent. This means that they have essentially the same _____ for large n.

▶ Results

▶ Variables

▶ Size

▶ **Growth rates (Page 23)**

Question No: 37 (Marks: 1) - Please choose one

$8n^2 + 2n - 3$ will eventually exceed $c^2 \cdot n$ no matter how large we make c.

▶ **True (Page 25)**

▶ False

Question No: 38 (Marks: 1) - Please choose one

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.

▶ Fast

▶ Slow

▶ Expensive

▶ **Cheap (Page 11)**

Question No: 39 (Marks: 1) - Please choose one

The function $f(n) = n(\log n + 1)/2$ is asymptotically equivalent to $n \log n$. Here Upper Bound means the function f(n) grows asymptotically _____ faster than $n \log n$.

▶ More

▶ Quiet

▶ **Not (Page 24)**

▶ At least

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question No: 40 (Marks: 1) - Please choose one

After sorting in merge sort algorithm, merging process is invoked.

- ▶ True (Page 28)
- ▶ False

Question No: 41 (Marks: 1) - Please choose one

Asymptotic growth rate of the function is taken over _____ case running time.

- ▶ Best
- ▶ Average
- ▶ Worst (Page 14)
- ▶ Normal

Question No: 42 (Marks: 1) - Please choose one

In analysis of $f(n) = n(n/5) + n - 10 \log n$, $f(n)$ is asymptotically equivalent to _____.

- ▶ n
- ▶ 2n
- ▶ n+1
- ▶ n² (Page 23)

Question No: 43 (Marks: 1) - Please choose one

Algorithm is concerned with.....issues.

- ▶ Macro
- ▶ Micro
- ▶ Both Macro & Micro (Page 8)
- ▶ Normal

Question No: 44 (Marks: 1) - Please choose one

We cannot make any significant improvement in the running time which is better than that of brute-force algorithm.

- ▶ True
- ▶ False (Page 18)

Question No: 45 (Marks: 1) - Please choose one

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

- ▶ Two (Page 28)
- ▶ Three
- ▶ Four
- ▶ Five

Question No: 46 (Marks: 1) - Please choose one

In analysis, the Lower Bound means the function grows asymptotically at least as fast as its largest term.

▶ **True (Page 24)**

▶ False

Question No: 47 (Marks: 1) - Please choose one

Efficient algorithm requires less computational.....

▶ Memory

▶ Running Time

▶ **Memory and Running Time (Page 9)**

▶ Energy

Question No: 48 (Marks: 1) - Please choose one

The O-notation is used to state only the asymptotic _____ bounds.

▶ Two

▶ Lower

▶ **Upper (Page 25)**

▶ Both lower & upper

Question No: 49 (Marks: 1) - Please choose one

For the worst-case running time analysis, the nested loop structure containing one “for” and one “while” loop, might be expressed as a pair of _____ nested summations.

▶ 1

▶ **2 (Page 16)**

▶ 3

▶ 4

Question No: 50 (Marks: 1) - Please choose one

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

▶ **X (Page 18)**

▶ Y

▶ Z

▶ X & Y

اطمینان قلب چاہتے ہو تو حسد سے دور رہو

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question No: 51 (Marks: 1) - Please choose one

Brute-force algorithm for 2D-Maxima is operated by comparing _____ pairs of points.

- ▶ Two
- ▶ Some
- ▶ Most
- ▶ **All (Page 18)**

Question No: 52 (Marks: 1) - Please choose one

The function $f(n)=n(\log n+1)/2$ is asymptotically equivalent to $n \log n$. Here Lower Bound means function $f(n)$ grows asymptotically at _____ as fast as $n \log n$.

- ▶ Normal
- ▶ **Least (Page 23)**
- ▶ Most
- ▶ All

Question No: 53 (Marks: 1) - Please choose one

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.

- ▶ Array
- ▶ Queue
- ▶ **Stack (Page 18)**
- ▶ Tree

Question No: 54 (Marks: 1) - Please choose one

Algorithm analysts know for sure about efficient solutions for NP-complete problems.

- ▶ True
- ▶ **False (Page 9)**

Question No: 55 (Marks: 1) - Please choose one

The analysis of Selection algorithm shows the total running time is indeed _____ in n ,

- ▶ arithmetic
- ▶ geometric
- ▶ **linear (Page 37)**
- ▶ orthogonal

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question No: 56 (Marks: 1) - Please choose one

The sieve technique works where we have to find _____ item(s) from a large input.

▶ **Single (Page 34)**

- ▶ Two
- ▶ Three
- ▶ Similar

Question No: 57 (Marks: 1) - Please choose one

In which order we can sort?

- ▶ increasing order only
- ▶ decreasing order only
- ▶ **increasing order or decreasing order (Page 39)**
- ▶ both at the same time

Question No: 58 (Marks: 1) - Please choose one

For the heap sort we store the tree nodes in

- ▶ **level-order traversal (Page 40)**
- ▶ in-order traversal
- ▶ pre-order traversal
- ▶ post-order traversal

Question No: 59 (Marks: 1) - Please choose one

In the analysis of Selection algorithm, we eliminate a constant fraction of the array with each phase; we get the convergent _____ series in the analysis,

- ▶ linear
- ▶ arithmetic
- ▶ **geometric (Page 37)**
- ▶ exponent

Question No: 60 (Marks: 1) - Please choose one

How much time merge sort takes for an array of numbers?

- ▶ $T(n^2)$
- ▶ $T(n)$
- ▶ $T(\log n)$
- ▶ **$T(n \log n)$ (Page 40)**

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Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus:- Institute of E-Learning & Modern Studies
(IEMS) Samundari**

Question No: 61 (Marks: 1) - Please choose one
Memoization is?

- ▶ To store previous results for future use
- ▶ **To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later (page 74)**
- ▶ To make the process accurate
- ▶ None of the above

Question No: 62 (Marks: 1) - Please choose one
Cont sort is suitable to sort the elements in range 1 to k

- ▶ K is Large
- ▶ K is not known
- ▶ K may be small or large
- ▶ **K is small (Page 57)**

Question No: 63 (Marks: 1) - Please choose one
In place stable sorting algorithm.

- ▶ **If duplicate elements remain in the same relative position after sorting (Page 54)**
- ▶ One array is used
- ▶ More than one arrays are required
- ▶ Duplicating elements not handled

Question No: 64 (Marks: 1) - Please choose one

Sorting is one of the few problems where provable _____ bounds exists on how fast we can sort,

- ▶ upper
- ▶ **lower (Page 39)**
- ▶ average
- ▶ log n

Question No: 65 (Marks: 1) - Please choose one

Counting sort has time complexity:

- ▶ **O(n) (Page 58)**
- ▶ O(n+k)
- ▶ O(k)
- ▶ O(nlogn)

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Question No: 66 (Marks: 1) - Please choose one

The running time of quick sort depends heavily on the selection of

- ▶ No of inputs
- ▶ Arrangement of elements in array
- ▶ Size o elements
- ▶ **Pivot elements (Page 49)**

Question No: 67 (Marks: 1) - Please choose one

Which may be stable sort:

- ▶ Bubble sort
- ▶ Insertion sort
- ▶ **Both of above (Page 54)**

Question No: 68 (Marks: 1) - Please choose one

In Quick Sort Constants hidden in $T(n \log n)$ are

- ▶ Large
- ▶ Medium
- ▶ **Small** [Click here for detail](#)
- ▶ Not Known

Question No: 69 (Marks: 1) - Please choose one

Quick sort is based on divide and conquer paradigm; we divide the problem on base of pivot element and:

- ▶ There is explicit combine process as well to conquer the solution.
- ▶ No work is needed to combine the sub-arrays, the array is already sorted
- ▶ Merging the sub arrays
- ▶ **None of above. (Page 51)**

Ref: - random choices for the pivot element and each choice have an equal probability of $1/n$ of occurring. So we can modify the above recurrence to compute an average rather than a max

Question No: 70 (Marks: 1) - Please choose one

A point p in 2-dimensional space is usually given by its integer coordinate(s)_____

- ▶ p.x only
- ▶ p.y only
- ▶ p.x & p.z
- ▶ **p.x & p.y (Page 10)**

وہ لوگ مبارک ہیں جو الفاظ سے نصیحت نہیں کرتے بلکہ عمل سے کرتے ہیں

Muhammad Moaaz Siddiq – MCS(4th)

Moaaz.pk@gmail.com

**Campus: - Institute of E-Learning & Moderen Studies
(IEMS) Samundari**

Question No: 71 (Marks: 1) - Please choose one

In _____ we have to find rank of an element from given input.

- ▶ Merge sort algorithm
- ▶ **Selection problem (Page 34)**
- ▶ Brute force technique
- ▶ Plane Sweep algorithm

Question No: 72 (Marks: 1) - Please choose one

In Heap Sort algorithm, if heap property is violated _____

- ▶ We call Build heap procedure
- ▶ **We call Heapify procedure**
- ▶ We ignore
- ▶ Heap property can never be violated

Question No: 73 (Marks: 1) - Please choose one

Upper bound requires that there exist positive constants c_2 and n_0 such that $f(n) \leq c_2 n$ for all $n \leq n_0$ (ye question ghalat lag raha hai mujhae)

- ▶ Less than
- ▶ **Equal to or Less than (Page 25)**
- ▶ Equal or Greater than
- ▶ Greater than

Question No: 74 (Marks: 1) - Please choose one

A RAM is an idealized algorithm with takes an infinitely large random-access memory.

- ▶ True
- ▶ **False (Page 10)**

Question No: 75 (Marks: 1) - Please choose one

_____ is one of the few problems, where provable lower bounds exist on how fast we can sort.

- ▶ Searching
- ▶ **Sorting (Page)**
- ▶ Both Searching & Sorting
- ▶ Graphing

Question No: 76 (Marks: 1) - Please choose one

Floor and ceiling are _____ to calculate while analyzing algorithms.

- ▶ Very easy
- ▶ **Usually considered difficult (Page 31)**

Question No: 77 (Marks: 1) - Please choose one

In Heap Sort algorithm, the maximum levels an element can move upward is _____

- ▶ **Theta (log n) (Page 43)**
- ▶ Order (log n)
- ▶ Omega (log n)
- ▶ O (1) i.e. Constant time

Question No: 78 (Marks: 1) - Please choose one

A point p in 2-dimensional space is usually given by its integer coordinate(s)_____

- ▶ p.x only p.y
- ▶ only p.x & p.z
- ▶ **p.x & p.y (Page 17)**

Question No: 79 (Marks: 1) - Please choose one

In Heap Sort algorithm, the total running time for Heapify procedure is _____

- ▶ **Theta (log n) (Page 43)**
- ▶ Order (log n)
- ▶ Omega (log n)
- ▶ O (1) i.e. Constant time

Question No: 80 (Marks: 1) - Please choose one

Algorithm is a mathematical entity, which is independent of a specific machine and operating system.

- ▶ True
- ▶ **False (Page 7)**

Question No: 81 (Marks: 1) - Please choose one

While Sorting, the ordered domain means for any two input elements x and y _____ satisfies only.

- ▶ $x < y$
- ▶ $x > y$
- ▶ $x = y$
- ▶ **All of the above (Page 39)**

Question No: 82 (Marks: 1) - Please choose one

Quick sort is best from the perspective of Locality of reference.

- ▶ **True (Page 9)**
- ▶ False

Question No: 83 (Marks: 1) - Please choose one

In Heap Sort algorithm, we build _____ for ascending sort.

▶ **Max heap (Page 41)**

▶ Min heap

Question No: 84 (Marks: 1) - Please choose one

In Sieve Technique, we know the item of interest.

▶ True

▶ **False (Page 34)**

Question No: 85 (Marks: 1) - Please choose one

While solving Selection problem, in Sieve technique we partition input data _____

▶ In increasing order

▶ In decreasing order

▶ **According to Pivot (Page 35)**

▶ Randomly

Question No: 86 (Marks: 1) - Please choose one

In pseudo code, the level of details depends on intended audience of the algorithm.

▶ **True (Page 12)**

▶ False

Question No: 87 (Marks: 1) - Please choose one

If the indices passed to merge sort algorithm are _____, then this means that there is only one element to sort.

▶ Small

▶ Large

▶ **Equal (Page 28)**

▶ Not Equal

خدا کے سوا کسی سے امید مت رکھو
اچھائی کرنے کے لئے ہمیشہ کسی بہانے کی تلاش میں رہو
کامیاب و کامران زندگی یہی ہے کہ جہاں رہو جس حال میں رہو خوش رہو