VIRTUAL UNIVERSITY OF PAKISTAN

A Good Education is a Foundation For a Better Future

CORRECT ANSWER SOLVED BY HADI
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(Final Term Past Paper)

MADE AND SOLVED BY TEAM HADI

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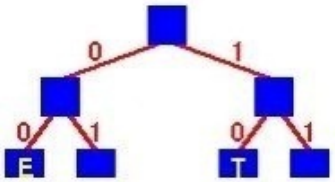
Best of luck!

PAST PAPER

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Huffman Tree



Answer (Please select your correct option)

- 10 00 010
- 011 00 010
- 10 00 110
- 11 10 110

correct answer
solved by hadi

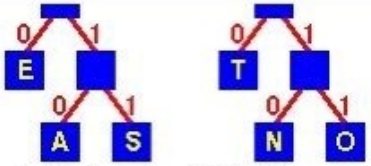
Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

Total running time of BFS is

Answer (Please select your correct option)

- O(V + E)
- O(V - E)
- O(VE)
- None of these

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)



The binary code for the string "**TEA**" is

Answer (Please select your correct option)

- 10 00 010 ⇦ correct answer solved by hadi
- 011 00 010
- 10 00 110
- 11 10 110

Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

Total running time of BFS is

Answer (Please select your correct option)

- O(V + E)  correct answer solved by hadi
- O(V - E)
- O(VE)
- None of these

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- 80  correct answer solved by hadi
- 160
- 320
- 100

Question No : 4 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Consider the string "abacdaacac" if the string is coded with ASCII codes using Huffman encoding scheme, the message length would be

Answer (Please select your correct option)

- 8 bits
- 80 bits
- Less than 50 bits
- More than 50 bits

correct answer
solved by hadi

Question No : 5 of 52 **Marks: 1 (Budgeted Time 1 Min)**

What is the asymptotic growth of $\frac{4n^3+15n^2+11n}{6}$?

Answer (Please select your correct option)

- $\Theta\left(\frac{4n^3+15n^2+11n}{6}\right)$
- $\Theta\left(4n^3+15n^2+11n\right)$
- $\Theta\left(15n^2\right)$ ⇦ but check correct answer
- $\Theta\left(n^3\right)$

Question No : 6 of 52 **Marks: 1 (Budgeted Time 1 Min)**

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

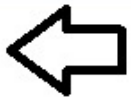
Answer (Please select your correct option)

- divide-and-conquer ⇦ correct answer solved by hadi
- decrease and conquer
- greedy nature
- 2-dimension Maxima

Question No : 7 of 52 **Marks: 1 (Budgeted Time 1 Min)**

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

Answer (Please select your correct option)

- n items 
- phases
- pointers
- constant

correct answer
solved by hadi

Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

- (log n) order
- increasing order only
- decreasing order only
- heap order

correct answer solved by hadi

Question No : 9 of 52 **Marks: 1 (Budgeted Time 1 Min)**

What is common between Bubble sort, Insertion sort, Selection sort, Quick sort, and Heap sort?

Answer (Please select your correct option)

- All are in-place algorithms ⇦ correct answer solved by hadi
- All are stable algorithms
- None of these
- All are unstable algorithms

Question No : 10 of 52 **Marks: 1 (Budgeted Time 1 Min)**

In in-place sorting algorithm is one that uses no _____ arrays for storage.

Answer (Please select your correct option)

- two dimensional
- three dimensional
- n dimensional
- additional

correct answer
solved by hadi

Question No : 11 of 52 **Marks: 1 (Budgeted Time 1 Min)**

The main shortcoming of counting sort is that it is useful for

Answer (Please select your correct option)

- Small Integers 
- Small characters
- Floats
- None of these

correct answer
solved by hadi

Question No : 12 of 52 **Marks: 1 (Budgeted Time 1 Min)**

The original recursive algorithm takes $\Theta(\Phi^n)$ time, where

Answer (Please select your correct option)

- $\Phi = 1.618$  correct answer solved by hadi
- $\Phi = 3.142$
- $\Phi = 1.816$
- $\Phi = 1.168$

Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Maximum number of edges in a Directed Graph may be

Answer (Please select your correct option)

- V
- 2V
- Approximatly $|V^2|$
- v/2

Question No : 14 of 52 **Marks: 1 (Budgeted Time 1 Min)**

The Huffman algorithm finds

Answer (Please select your correct option)

- sometime optimal some time non optimal solution
- space wise optimal and time wise non optimal solution
- a non-optimal solution
- an optimal solution

correct answer
solved by hadi

Question No : 15 of 52 **Marks: 1 (Budgeted Time 1 Min)**

The Huffman codes provide a method of encoding data which

Answer (Please select your correct option)

- is efficient and use a variable length codes
- is efficient and use fixed length codes i.e. ASCII
- is efficient and both ways of variable and fixed length codes can be used
- is efficient time wise but not space wise

correct answer
solved by hadi

Question No : 16 of 52 **Marks: 1 (Budgeted Time 1 Min)**

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

Answer (Please select your correct option)

- 10
- 16
- 32
- 8

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

In fractional knapsack we sort the

-

Answer (Please select your correct option)

- Value per unit weight in decreasing order
- Weight per unit value in decreasing order  right
- Value per unit weight in increasing order
- Weight per unit value in increasing order

Question No : 18 of 52 **Marks: 1 (Budgeted Time 1 Min)**

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

Answer (Please select your correct option)

- Larger
- Smallest 
- Balance
- Character

correct answer
solved by hadi

Question No : 19 of 52 **Marks: 1 (Budgeted Time 1 Min)**

In directed graphs the cardinality of edges |E| =

Answer (Please select your correct option)

- Sum of out-degrees of all the vertices
- Sum of in-degrees of all the vertices
- First both are true
- There is no relation between degree of vertices and no of edges

but check it

correct answer
solved by hadi

Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

The codeword assigned to characters by the Huffman algorithm have the property

Answer (Please select your correct option)

- that no codeword is the prefix of any other ⇦ correct answer solved by hadi
- that no codeword is the postfix of any other
- that no codeword is the infix of any other
- that no codeword is neither prefix nor postfix of any other

Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

In undirected graphs there

Answer (Please select your correct option)

- are no Cross edges but have forward and back edges
- are only forward edges
- is convention of only back edges
- is convention of forward edges

correct answer
solved by hadi

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

In time stamp traversal we can calculate

Answer (Please select your correct option)

- whether the graph has Cycles

correct answer
solved by hadi

- total number of cycles on the bases of forward edges
- total number of cycles on the bases if back edges
- total no of paths of certain length

Question No : 23 of 52 **Marks: 1 (Budgeted Time 1 Min)**

In time stamp DFS for the edge (u,v) if f(u)>f(v) then

Answer (Please select your correct option)

- the edge is cross
- the edge is back
- the edge is forward
- the edge is tree or cross or forward

correct answer
solved by hadi

Question No : 24 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Precedence constraint graph is

Answer (Please select your correct option)

- non acyclic directed graph
- acyclic undirected graph
- non acyclic undirected graph
- acyclic directed graph

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

In Prim's algorithm, the additional information maintained by the algorithm is

Answer (Please select your correct option)

- the length of the shortest path from vertex v to the vertex u ⇦ correct answer solved by hadi
- the length of the shortest edge from vertex v to points already in the tree
- the dynamic programming rules
- the information about all adjacent vertices

Question No : 26 of 52 **Marks: 1 (Budgeted Time 1 Min)**

In strongly connected components the component digraph is

Answer (Please select your correct option)

- necessarily cyclic 
- necessarily acyclic
- not necessary it can be both cyclic and acyclic
- cyclic with some other constraints

correct answer
solved by hadi

Question No : 27 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Floyd-Warshall algorithm is

Answer (Please select your correct option)

- based on greedy approach and allow negative edges
- based on divide and conquer approach and allow negative edges
- based on dynamic programming approach and allow negative cycles
- based on dynamic programming approach and allow negative edges

Question No : 28 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Dijkstra's algorithm is used for

Answer (Please select your correct option)

- calculating multiple source shortest path problems
- calculating Minimum spanning tree
- shortest and Minimum Spanning tree both can be calculated by it
- single source shortest path problems

correct answe
solved by hadi

Question No : 29 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Kruskal's Algorithm has time complexity

Answer (Please select your correct option)

- overall Ø (V log E)
- overall Ø (E log V) for sparse graph Ø (V log E)
- overall Ø (E log E) and for sparse graph Ø (E log V)
- overall Ø (EV) and for sparse graph Ø (V^2)

correct answer
solved by hadi

Question No : 30 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Bellman Ford algorithm applies relaxation to every

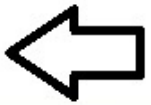
Answer (Please select your correct option)

- edge of the graph and repeats exactly v-1 times  **correct answer solved by hadi**
- vertex of the graph and repeats exactly E-1 times
- edge of the graph and repeats exactly E-1 times
- edge but use the back edges for the completion

Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

In NP-problems "NP" represents

Answer (Please select your correct option)

- Non-deterministic Polynomials 
- Null-polynomials
- Negative Polynomials
- Non-polynomials

correct answer
solved by hadi

Question No : 32 of 52 **Marks: 1 (Budgeted Time 1 Min)**

The recurrence represented by $T(n) = \sum_{i=0}^{n} 2 + \sum_{i=0}^{n} i/2$ has time complexity belongs to

Answer (Please select your correct option)

- P-Class
- NP-Class
- Co-NP Class
- Unpredictable class

Question No : 33 of 52 **Marks: 1 (Budgeted Time 1 Min)**

The function having complexity $O(n^n)$ belongs to

Answer (Please select your correct option)

- NP-Class
- Co-Prime Class
- P-Class
- Both P and NP Classes

check

correct answer
solved by hadi

Question No : 34 of 52 **Marks: 1 (Budgeted Time 1 Min)**

3-color problem is known as _____

Answer (Please select your correct option)

- P
- NPC
- Co-NP
- P and NP

correct answer
solved by hadi

Question No : 35 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Generalize Coloring problem arises in various partitioning problems where there is a constraint

Answer (Please select your correct option)

- that two objects can not be assigned to the same set of partitions and is belong to NP class  **correct answer solved by hadi**
- that two objects can not be assigned to the same set of partitions and is belong to P class
- of that we can organize the different partitions in P time and NP space
- of colors does not effect the classifications

Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

In the 3-coloring problem, for two vertices to be in the same group, they must be not _____to each other.

Answer (Please select your correct option)

- Apart from
- Far from
- Near to
- Adjacent to

Question No : 37 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Sieve Technique can be applied to solve _____

Answer (Please select your correct option)

- Selection problems 
- Arguement problems
- Dynamic problems
- Greedy problems

correct answer
solved by hadi

Question No : 38 of 52 **Marks: 1 (Budgeted Time 1 Min)**

If an algorithm has a complexity of $5n + \log_2(\log_2 n) + 10$ for some model of computation (some set of assumptions) and some complexity measures (such as number of comparison operations) we could say that it has complexity

Answer (Please select your correct option)

- $O(\log_2 n)$
- $O(n)$
- $O(3 + 1 + 3)$
- $O(\log_2(\log_2 n))$

no idea
but i think option
(B)

Question No : 39 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Search techniques of various algorithms look at____

Answer (Please select your correct option)

- Many possible solutions

correct answer
solved by hadi

- Maximum 2 possible solutions
- Minimum 2 possible solutions
- Sorting solutions

Question No : 40 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Usually which type of algorithm is harder to prove the correctness?

Answer (Please select your correct option)

- Dynamic programming
- Brute Force
- Greedy
- Divide and conquer

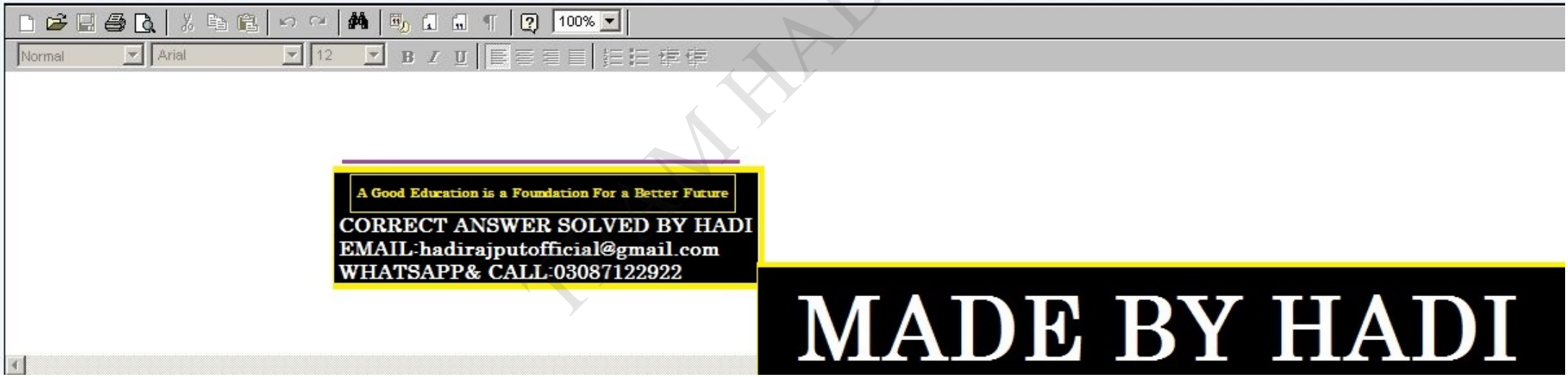
by concept

correct answer
solved by hadi

Question No : 41 of 52 Marks: 2 (Budgeted Time 4 Min)

How we Heapify?

Answer (Please click here to Add Answer)



Question No : 42 of 52 **Marks: 2 (Budgeted Time 4 Min)**

Define Back Edge

Answer (Please click here to Add Answer)

Question No : 43 of 52 **Marks: 2 (Budgeted Time 4 Min)**

Given an adjacency list for G, what is the time complexity to compute G^T.?

Answer (Please click here to Add Answer)

Question No : 44 of 52 **Marks: 2 (Budgeted Time 4 Min)**

What is Bellman-Ford algorithm's running time?

Answer (Please click here to Add Answer)

Question No : 45 of 52 **Marks: 3 (Budgeted Time 6 Min)**

Given a digraph G = (V, E), consider any DFS forest of G and consider any edge (u, v) ∈ E. Prove that If this edge is a tree, forward or cross edge, then f [u] > f [v] and if this edge is a back edge, then f [u] ≤ f [v].

Answer (Please click here to Add Answer)

Question No : 46 of 52 Marks: 3 (Budgeted Time 6 Min)

How the Dijkstra's algorithm works?

Answer (Please click here to Add Answer)

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Question No : 47 of 52 **Marks: 3 (Budgeted Time 6 Min)**

Modify QUICKSORT algorithm such that it sorts array into non-increasing order.

Answer (Please click here to Add Answer)

Question No : 48 of 52 **Marks: 3 (Budgeted Time 6 Min)**

What do you mean by polynomial time algorithm? Explain what kind of problem can be solved by using polynomial time algorithm?

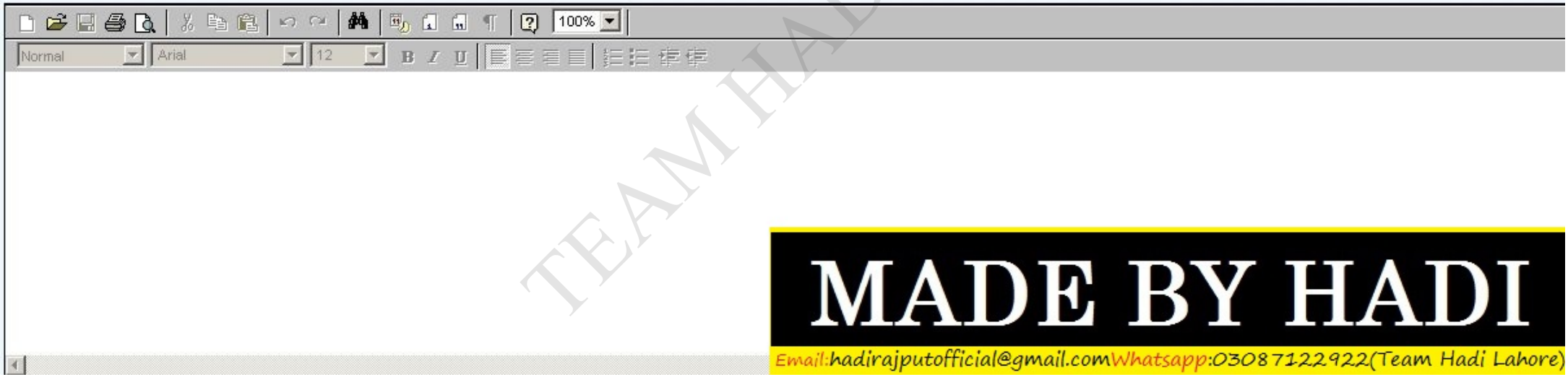
Answer (Please click here to Add Answer)

Question No : 49 of 52 **Marks: 5 (Budgeted Time 10 Min)**

You are given the task of laying down new railway lines which will connect all *n* cities. Thus for any pair of cities, you will end up with track connecting them. Note that two routes may share the same track; track laid between Lahore and Islamabad can be used to travel in both directions. Your goal is to use the minimum amount of track. How would you achieve the goal now? (Note : consider the scenario carefully and name only the best suited algorithm)

1 Dijkstra's algorithm
2 Prims Algorithm
3 Folloyed Warshal Agorithm

Answer (Please click here to Add Answer)



Question No : 50 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Considering the recursive version of depth-first traversal implementing Timestamp Structure in pseudo code format, only write DFSVISIT routine in pseudo code format

Answer (Please click here to Add Answer)

Question No : 50 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Considering the recursive version of depth-first traversal implementing Timestamp Structure in pseudo code format, only write DFSVISIT routine in pseudo code format

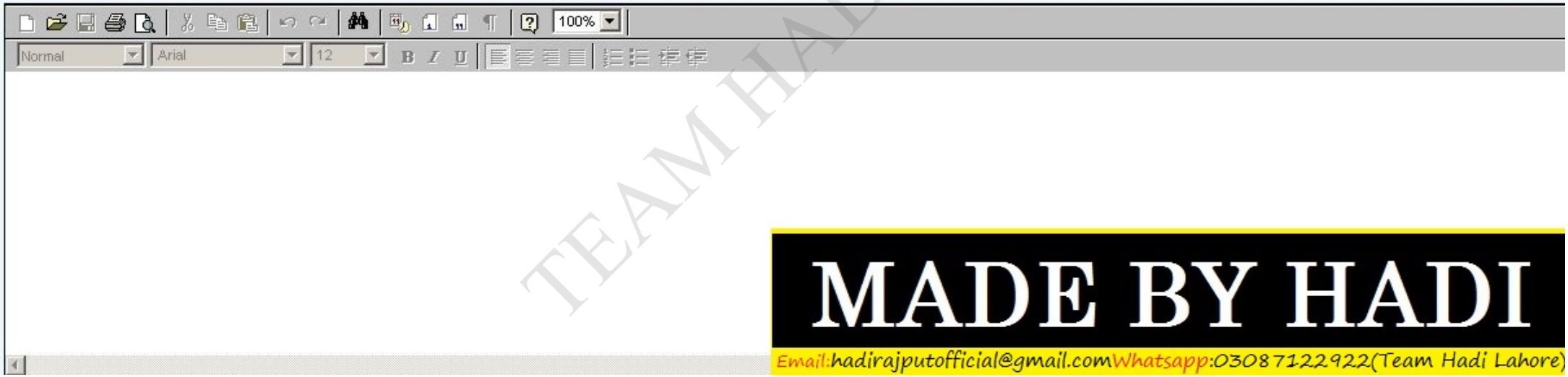
Answer (Please click here to Add Answer)

Question No : 51 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Develop the running time complexity analysis for the following piece of code. Adopt step wise approach along with asymptotic notation at the end.

```
i=1
while (i < n) {
   i++
}
for ( i=1;i <= n ;i=i*2 )
```

Answer (Please click here to Add Answer)



Question No : 51 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Develop the running time complexity analysis for the following piece of code. Adopt step wise approach along with asymptotic notation at the end.

```
i=1
while (i < n) {
   i++
}
for ( i=1;i <= n ;i=i*2 )
for ( j = 1; j <= i; ++j )
```

Answer (Please click here to Add Answer)

Question No : 52 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Write pseudo code for Kruskal's algorithm.

Answer (Please click here to Add Answer)

Question No : 49 of 52 **Marks: 5 (Budgeted Time 10 Min)**

track; track laid between Lahore and Islamabad can be used to travel in both directions. Your goal is to use the minimum amount of track. How would you achieve the goal now? (Note : consider the scenario carefully and name only the best suited algorithm)

1 Dijkstra's algorithm
2 Prims Algorithm
3 Folloyed Warshal Agorithm
4 Bellman Ford Algorithm.

Answer (Please click here to Add Answer)