Qn 14:

3241	3241	2219	3122	134
3241	3241	1321	134	1321
2341	2341	3122	2219	1441
2219	1321	134	3241	2219
3122	1441	3241	3241	2341
1321	3122	3241	1321	3122
1441	134	2341	2341	3241
134	2219	1441	1441	3241

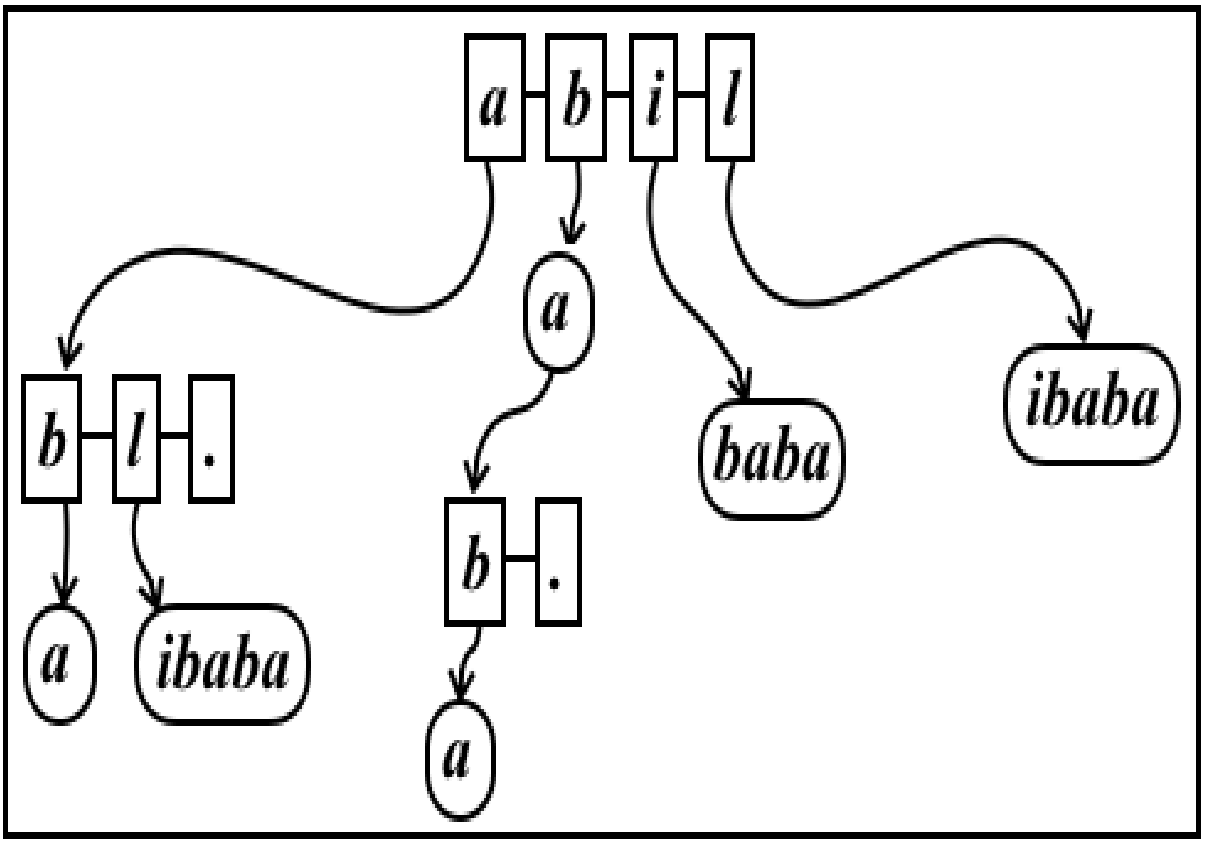
In the above solution sorting starts from LSB (Least Significant Bit).

Many people have done sorting from MSB instead of LSB. It would be incorrect if you don't do it properly.
As per the question you have to go through each digit. So consider the example {36, 42}. If you sort it from MSB then after first pass result would be {36, 42}, now you can't stop here as per the question. Now if you sort as per the next digit the final result would be {42, 36} which would be incorrect.

What's the correct way of doing it then?

for MSB, you would have to be creating buckets hierarchically – meaning after the first step all 4 buckets must be clearly shown, since they are independent bucket sort. Similarly, after the second step, there would be 1, 2, 2, and 2 buckets respectively for each.

Qn 15:- Lexicographic natural ordering scheme



Partial marks are awarded for tries which are not sorted or not compressed.

Qn 16:-

Number of nodes = Number of triangles = n

Since it is a proper mesh with no boundaries, each triangle or node is connected to 3 other triangles or nodes.
So degree of each node = 3

From graph properties,

Sum of degrees of nodes = 2 * number of edges

or, 3*n = 2*E

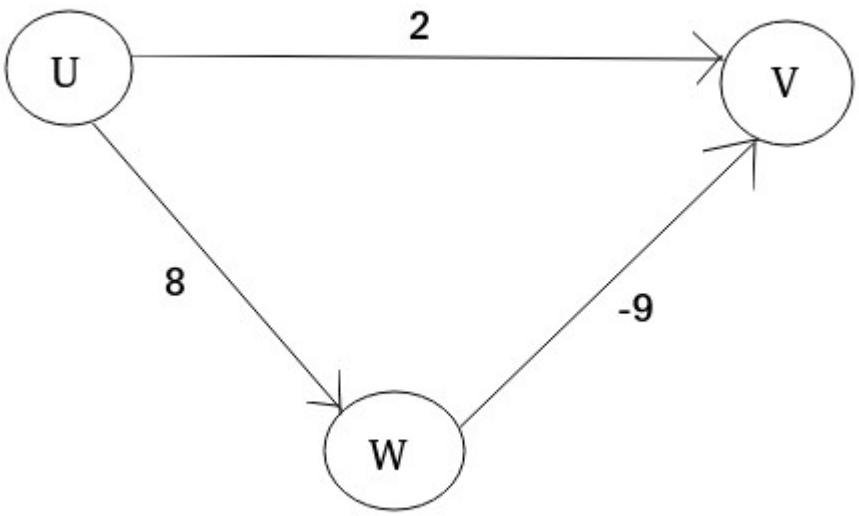
or, E = 3*n/2

Average Case Complexity = Theta(n + 3*n/2) = Theta(n)

1 marks have been awarded for all those who have written Theta(n) without any analysis done.

Qn 17:-

Counter Example:
Consider the following graph:-



Suppose we are trying to find single source shortest path from U to V using Djikstra Algorithm.

Using Djikstra's greedy strategy, node U (Source node, Dist = 0) will be picked and all it's neighbours would be relaxed, i.e. node V (Dist = 2) and node W (Dist = 8). Finally node U will be marked visited.

Next using the same greedy startegy, node V (Dist = 2) will be picked and all it's neighbours would be relaxed. No neighbours so no relaxation would be performed. Finally node V will be marked visited.

Next using the same greedy startegy, node W (Dist = 8) will be picked and all it's neighbours would be relaxed. No neighbours so no relaxation would

be performed as node V has already been marked visited. Finally node W will be marked visited.

So Djikstra algorithm would give the shortest distance from U to V is 2. But in actual we can clearly see the shortest distance is −1.

Also full marks have been awarded to those who have given proper explanation without giving any counter example.