COMPLEXCITY ANALYSIS

Build Highway using DFS Algorithm having complexity of O(n+m)

- Large input size is handle by array of lists
- Declare a boolean visited array of size n and initialize all vertices as not visited.
- First find all the components of the graph store them.
- algo is as follow
- Do following for every vertex 'v'
- loop untill all the vertices are visited.
  - If 'v' is not visited before, call DFS(v)
  - Printing the node whenever it is first time visited for a component.
  - Mark 'v' as visited.
  - Do following for every adjacent 'u' of 'v'.If 'u' is not visited, then recursively call DFS(u)
- Setting/getting a vertex/edge label takes O(1) time
- Each vertex is labeled twice once as UNEXPLORED and once as VISITED.
- Each edge is labeled twice once as UNEXPLORED once as DISCOVERY or BACK
- After getting the size of all components.we are starting from first component and then adding all the components an edge due to which all the components are connected.
- we take a edge from starting component and add edge to other component and then different edge add to another component

Each edge is visited one time and vertices two times so only we are running for no of vertices and no of edges in a graph. Lets assume no of vertices is V and no of edges is E so the complexcity for running modified DFS is O(V+E)

Checking connectivity using BFS Algorithm having complexity of O(n+m)

- create a queue Q
- mark v as visited and put v into Q

- while Q is non-empty
- remove the head u of Q
- mark and enqueue all (unvisited) neighbours of u
- we have use a BFS for checking the connectivity , wheather which components are connected and which are not connected .
- after getting the components we have just traverse each components and find the minimum number of edges we need to add so that graph becomes connected.

Analysis Of a Program While Running.

- User time (seconds): 0.00
- System time (seconds): 0.00
- Percent of CPU this job got: 0
- Elapsed (wall clock) time (h:mm:ss or m:ss) 0:03.12
- Average shared text size (kbytes): 0
- Average unshared data size (kbytes): 0
- Average stack size (kbytes): 0
- Average total size (kbytes): 0
- Maximum resident set size (kbytes): 40464
- Average resident set size (kbytes): 0
- Major (requiring I/O) page faults: 0
- Minor (reclaiming a frame) page faults: 828
- Voluntary context switches: 2
- Involuntary context switches: 2
- Swaps: 0
- File system inputs: 0
- File system outputs: 48
- Socket messages sent: 0
- Socket messages received: 0
- Signals delivered: 0
- Page size (bytes): 4096
- Exit status: 0

HEAP SUMMARY:

- in use at exit: 715 bytes in 1 blocks
- total heap usage: 1 allocs, 0 frees, 715 bytes allocated
- 715 bytes in 1 blocks are still reachable in loss record 1 of 1.

LEAK SUMMARY:

- definitely lost: 0 bytes in 0 blocks
- indirectly lost: 0 bytes in 0 blocks
- possibly lost: 0 bytes in 0 blocks of 1.
- still reachable: 715 bytes in 1 blocks
- suppressed: 0 bytes in 0 blocks