



NORTHERN UNIVERSITY
NUB
BANGLADESH
Knowledge for Innovation and Change

Department of Computer Science and Engineering

Course code: CSE 4355 Course Title: Artificial Intelligence and Expert Systems

Time: 1 hr. 50 min

Final Exam – Fall 21

Part: B

WRITTEN

(Write Answer any three of the following questions)

[10+10+10+10]

1. Mention theoretical differences between informed search and uninformed search with proper examples. How does a DFS algorithm turns into BFS algorithm? Explain it with proper example.

2.

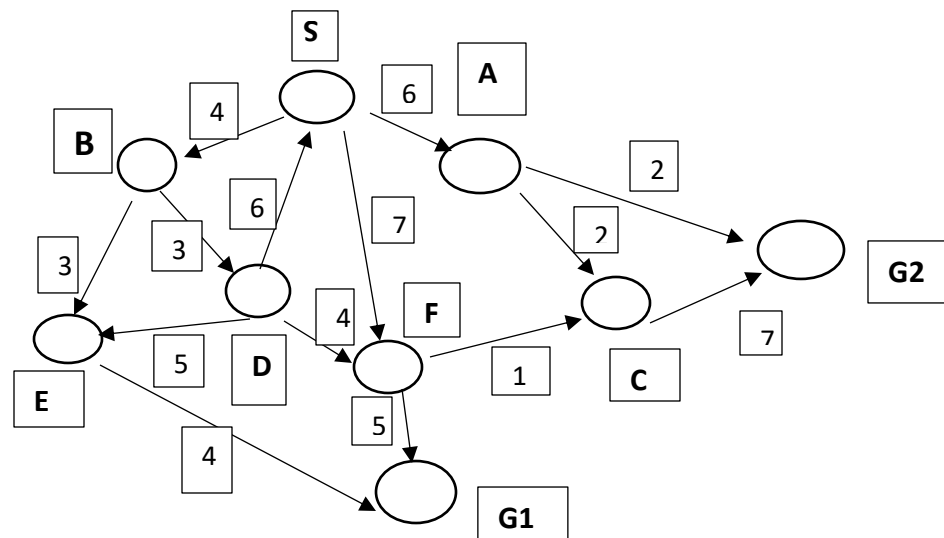
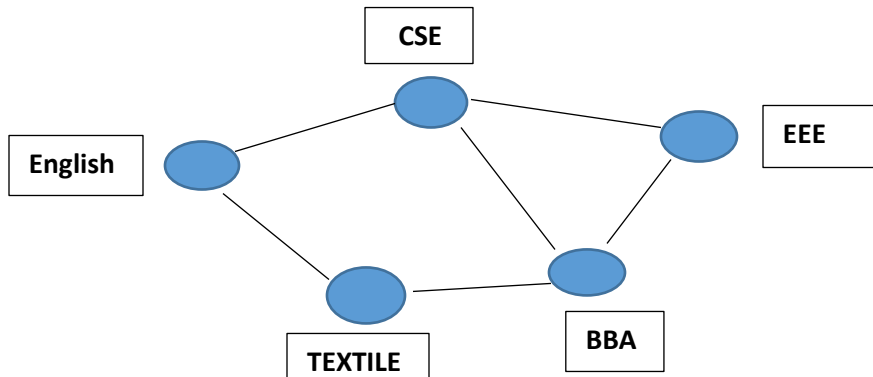


Table for Heuristic Value

S - 10	C - 2	F - 3
A - 8	D - 7	G1 - 0
B - 6	E - 3	G2 - 0

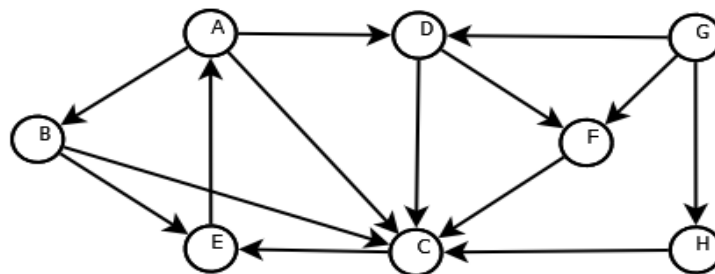
Here, G1, and G2 are the goal state. Apply A * (star) algorithm on the above graph, show the steps and find the shortest path to reach the goal state. What do you know about heuristic value? What's the deference between A * search and UCS?

3.



- I. Define: m-coloring decision problem, m-coloring optimization problem.
- II. Let, $m = \{R, G, B, Y\}$. Apply graph coloring theory for the above graph and show five solutions using state space tree.
- III. If we have six colors and five nodes like the above graph. Find the number of nodes, a state space tree have when you don't apply graph coloring theory on it.

4.



- I. Write down the modified DFS algorithm. Apply DFS algorithm on the above graph and find the solution.
- II. Mention the greedy approach with a real life example. Suppose, you have to make \$0.19 dollars with given coins in the below table. Find the optimal solution.

1 dollar = 100 cents	1 quarter = 25 cents	1 dime = 10 cents
1 nickels = 5 cents	1 penny = 1 cents	

- III. Write down two core differences between DFS and BFS. How can you improve the time complexity of DFS?

