Exam 1 - Requires Respondus LockDown Browser + Webcam

Due Mar 2 at 11:40am   **Points** 15   **Questions** 6

Available Mar 2 at 10:30am - Mar 2 at 11:45am about 1 hour   **Time Limit** 60 Minutes

Requires Respondus LockDown Browser

This quiz was locked Mar 2 at 11:45am.

Attempt History

	Attempt	Time	Score
LATEST	**Attempt 1**	60 minutes	14 out of 15

Score for this quiz: **14** out of 15

Submitted Mar 2 at 11:33am

This attempt took 60 minutes.

Question 1	2 / 2 pts

Sudoku is a logic-based, number-placement puzzle. The objective is to fill a 9×9 grid with digits so that each column, each row, and each of the nine 3×3 boxes that compose the grid contain all of the digits from 1 to 9.

Consider an agent solving a Sudoku puzzle.

Which of the following are properties of its environment? **Check ALL that apply.**

Please note that there is a penalty for marking wrong answers

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☐ episodic

Correct!

☑ discrete

☐ nondeterministic

☐ multiagent

Correct!

☑ static

Question 2   3 / 4 pts

Consider the state space graph shown below. S is the start state and G is the goal state. The costs for each edge are shown on the graph.

Ties are resolved alphabetically (based on the last state name).475
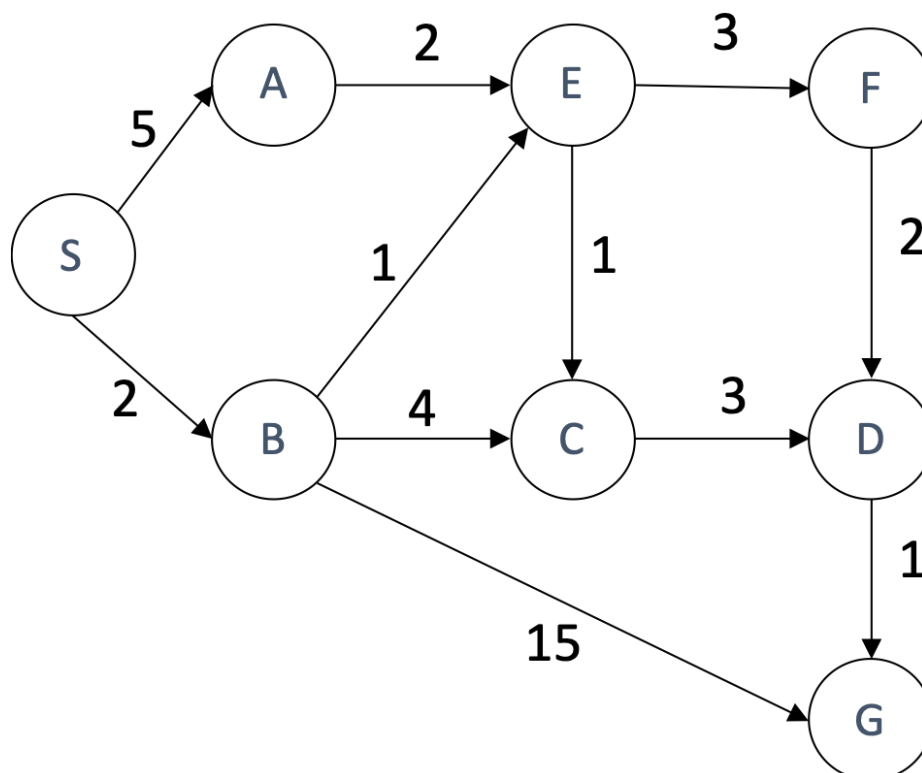
What is the solution (path) returned by Depth First Search?

> SAEFDG

What is the solution (path) returned by Breadth First Search?

SBG

What is the solution (path) returned by Uniform Cost Search?

SBECDG

What is the solution (path) returned by A* with an admissible and

consistent heuristic?   SBECDG

Answer 1:

ou Answered

SAEFDG

orrect Answer   SAECDG

Answer 2:

Correct!   SBG

Answer 3:

Correct!   SBECDG

Answer 4:

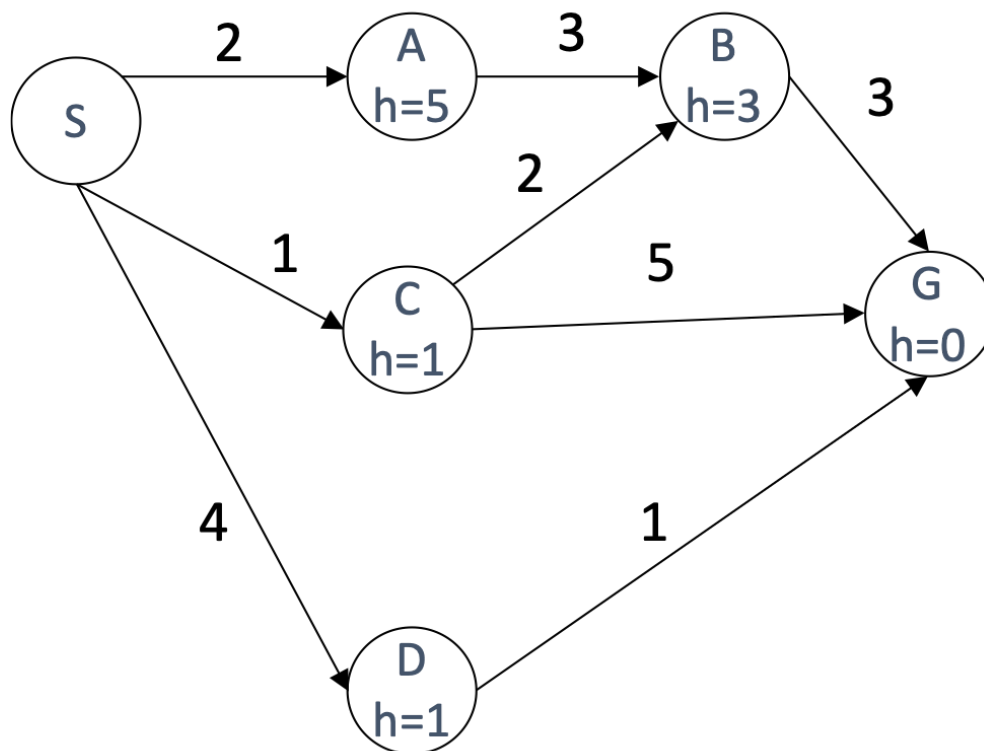Correct!   SBECDG

Question 3   5 / 5 pts

Consider the state space graph shown below. S is the start state and G is
the goal state. The costs for each edge are shown on the graph.

Ties are resolved alphabetically (based on the last state name).

Using the state space graph and the heuristic h shown, please answer the following three questions:

1. What **nodes** are expanded when applying Uniform Cost graph search (UCS)?
2. What **nodes** are expanded when applying the A* graph search?
3. What is the **solution** (path) found by greedy graph search?

For questions 1 and 2, please list the nodes **in the order they are expanded.**

**Make sure you answer ALL three questions.**

Reminder: B is a state, SAB is a node.

Your Answer:

1. nodes are expanded when applying UCS: S-SC-SA-SCB-SD-SDG

2. nodes are expanded when applying the A* graph search: S-SC-SD-SDG

3/Solution by the greedy graph search: SCG

Question 4

1.5 / 1.5 pts

Consider the following search problem where S is the start state and G is the goal state. The costs for each edge are shown on the graph.
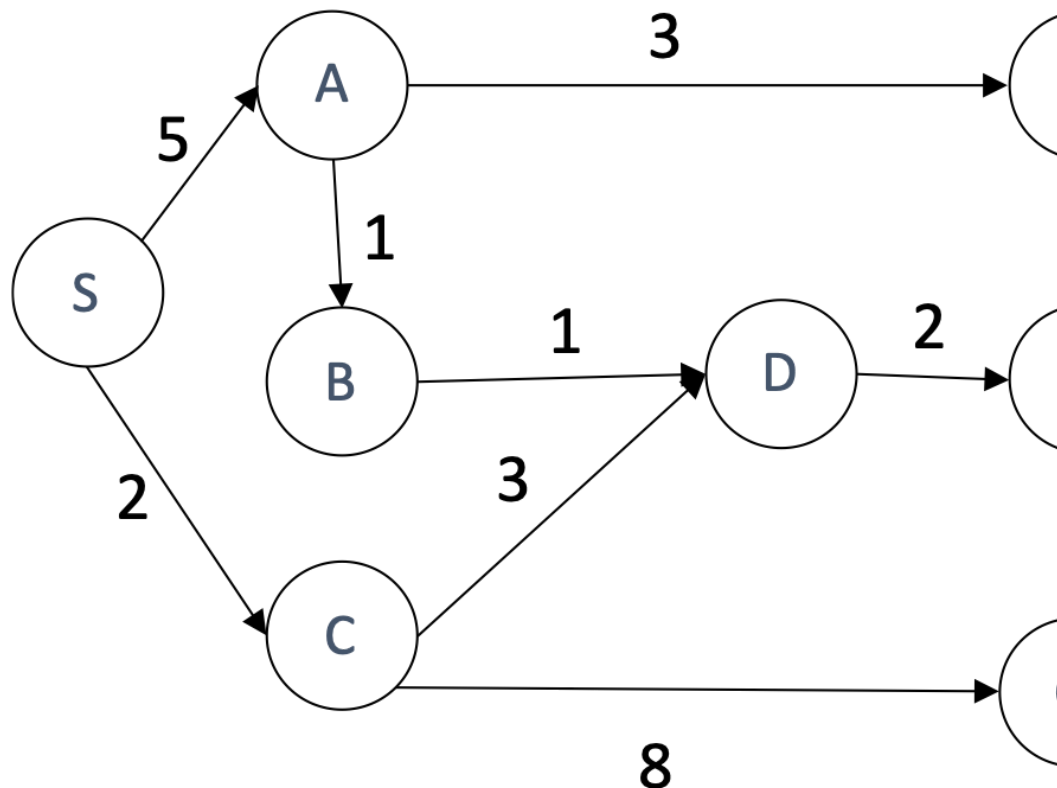
Consider a heuristic function *h* that returns the following values for the states:

h(S) = 8

h(A) = 4

h(B) = 3

h(C) = 5

h(D) = 2

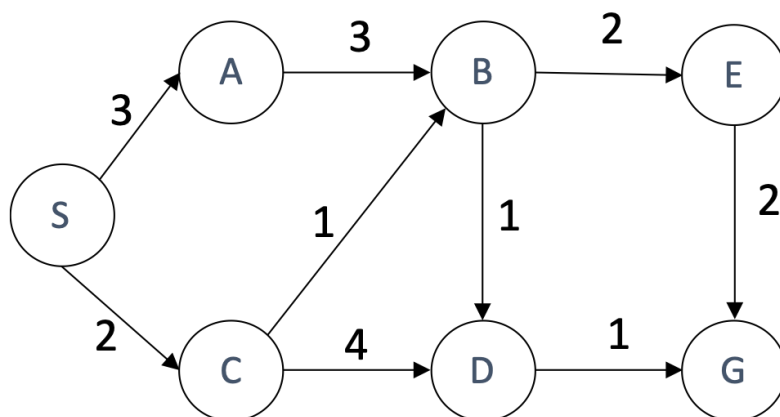h(E) = 3

h(F) = 1

h(G) = 0

Is the heuristic *h* **admissible**? Please explain.

Your Answer:

heuristic h is admissible because h(A) < actual ABDFG , h(B) < actual cost BDFG, h(C) < actual cost CG, h(D) <actual cost DFG, h(E) < actuat cost EFD, h(F) < actual cost FG.

Question 5   **1.5 / 1.5 pts**

Consider the following search problem where S is the start state and G is the goal state. The costs for each edge are shown on the graph.

Consider a heuristic function *h* that returns the following values for the states:

h(S) = 6

h(A) = 4

h(B) = 2

h(C) = 4

h(D) = 1

h(E) = 1

h(G) = 0

Is the heuristic *h* **consistent**? Please explain.

Your Answer:

S->A h(s)-h(A) = 2 < actual cost (3)

A-> B h(a)-H(b) = 2 < actual cost from a->b(3)

B->E h(B-)h(E) = 1 < actual cost from B-E (2)

E-G h(e)-h(G) = 1 < actual cost from E-G (2)

S-C h(s)-h(c) = 6-4 =2<= actual cost from S-C

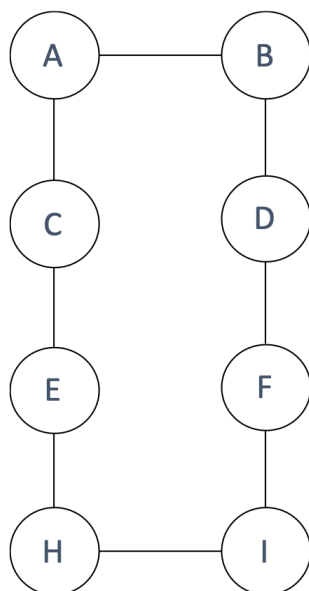C-D h(s)-h(d)= 3 < actual cost from C-D(4)

C-B h(C)-h(B) = 2 > actual cost from C-B

== > the heuristic h is not consistent

Question 6   1 / 1 pts

Consider the search problem represented by the state space graph below. The undirected arcs (edges) connect neighboring states.

We would like to solve the problem using hill climbing.

We use the objective function f shown below:

State	f

A	5
B	7
C	6
D	8
E	8
F	9
H	12
I	8

What final state do we end up with when we apply the hill climbing algorithm to completion starting from state A?

Correct!

F

orrect Answers   F

Quiz Score: **14** out of 15