Introduction to Artificial Intelligence Quiz

TOTAL POINTS 10

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1. **Suppose that there are two random variables X and Y that have joint probability. The joint probabilities of X and Y are provided in the table:**

	Y = 2	Y = 4	Y = 5
X = 1	1/12	1/24	1/24
X = 2	1/6	1/12	1/8
X = 3	1/4	1/8	1/12

Table: Joint probability of X and Y

What is P(X ≤ 3, Y ≤ 2)? *(Give your answer as a decimal to the tenths place.)*

> .5

2. **Let h1(s) be an admissible A* heuristic. Also let h2(s) = 2h1(s). Given this information, what which conclusion is *most accurate*?**

- ○ None

- ○ The solution found by A* tree search with h2 is guaranteed to have a cost at most twice as much as the optimal path

- ⦿ The solution found by A* graph search with h2 is guaranteed to be an optimal solution

- ○ The solution found by A* tree search with h2 is guaranteed to be an optimal solution.
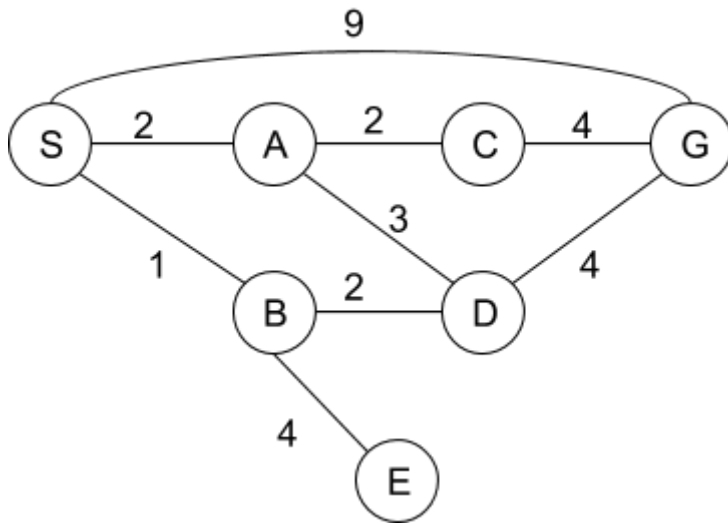
3.

Diagram 1

Review *Diagram 1*, which shows a network of nodes connected by lines. In*Diagram 1*, node S is the starting point and node G is the goal. The lines connecting nodes indicate the paths, and each path has an associated cost, indicated by the numbers.

Which path will greedy search return?

- ● S-B-D-G
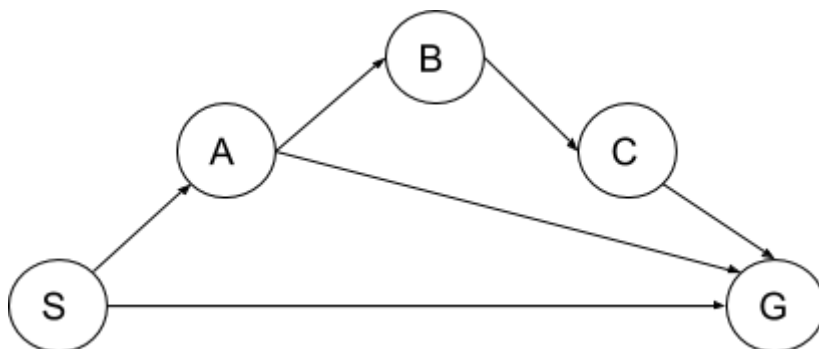- ○ S-A-C-G
- ○ S-G
- ○ S-A-D-G

4.

Diagram 1

Review *Diagram 1*, which shows a network of nodes connected by lines. In*Diagram 1*, node S is the starting point and node G is the goal. The lines connecting nodes indicate the paths.

Which path would breadth-first-search return for the graph in *Diagram 1*?

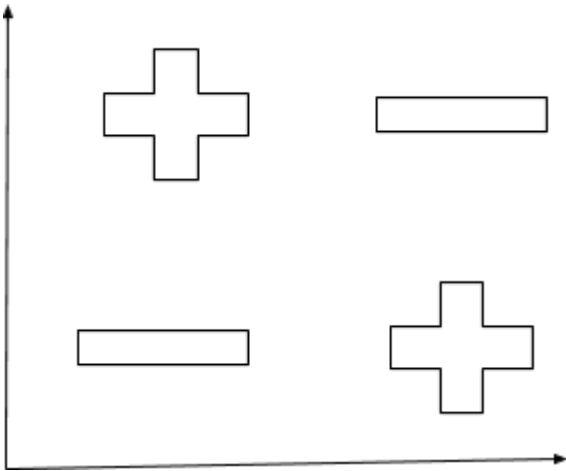- ◉ S-G
- ○ S-A-B-C-G
- ○ S-A-C-G
- ○ S-A-G

5.

Figure 1

Review *Figure 1*, which represents some data. Which classifier can perfectly classify the data in *Figure 1*?

- ○ Logistic Regression
- ○ Decision Tree
- ○ Linear Regression
- ◉ Gaussian Naive Bayes

6. **A, B and C are three Boolean random variables. Which equality holds without any assumptions on the joint distribution P(A, B, C)?**

- ○ P(A|B) = P(A|B, C = 0)P(C = 0) + P(A|B, C = 1)P(C = 1)
- ○ P(A|B) = P(A| C = 0)P(C = 0) + P(A|C = 1)P(C = 1)
- ○ P(A|B) = P(A|B)P(C = 0) + P(A|B)P(C = 1)
- ◉ P(A|B) = P(B, C = 0) + P(B, C = 1)

7. **Suppose that two Boolean random variables A and B have a joint distribution. The joint distribution of A and B is provided in the table:**

A	B	P(A,B)
0	0	0.48
0	1	0.32
1	1	0.12
1	0	0.08

Table: Joint distribution of A and B

What is P(B = 1)? *(Give your answer as a decimal to the hundredths place.)*

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8. **Suppose that two Boolean random variables A and B have a joint distribution. The joint distribution of A and B is provided in the table:**

A	B	P(A,B)
0	0	0.48
0	1	0.32
1	1	0.12
1	0	0.08

Table: Joint distribution of A and B

What is P(A = 1| B = 1)? *(Give your answer as a decimal to the hundredths place.)*

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9. **Suppose that two Boolean random variables A and B have a joint distribution. The joint distribution of A and B is provided in the table:**

A	B	P(A,B)
0	0	0.48
0	1	0.32

1	1	0.12
1	0	0.08

Table: Joint distribution of A and B

What is P(B = 0)? *(Give your answer as a decimal to the hundredths place.)*

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10. **Suppose that two Boolean random variables A and B have a joint distribution. The joint distribution of A and B is provided in the table:**

A	B	P(A,B)
0	0	0.48
0	1	0.32
1	1	0.12
1	0	0.08

Table: Joint distribution of A and B

What is P(A = 0 | B = 1)? *(Give your answer as a decimal to the thousandths place.)*

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