Quiz 9 - NP-completeness and Heuristic Algorithms

Due Mar 8 at 11:59pm   **Points** 10   **Questions** 5

Available until Mar 9 at 11:59pm   **Time Limit** None   **Allowed Attempts** 2

Instructions

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This quiz will test your understanding of the material covered so far this week (**MLOs**).

This is an online quiz. There will be no time limit to the quiz. You can attempt the quiz twice and the best of the scores will be retained. This is open notes and open internet quiz but refrain from discussing with anybody during the exam.

Note that this test cannot be taken past the due date for any credit.

This quiz is worth 10 points.

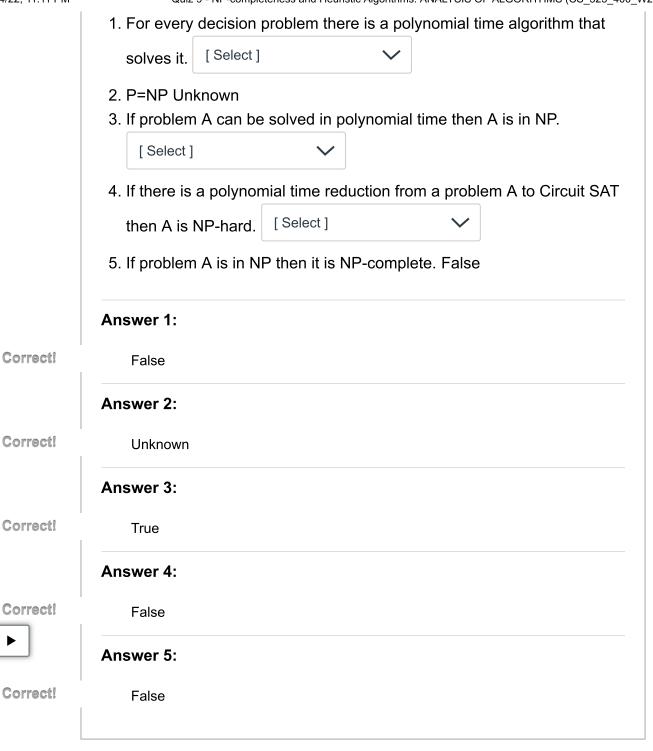You can view the correct answers here after the due date.

Attempt History

	Attempt	Time	Score
KEPT	**Attempt 2**	5 minutes	10 out of 10
▶ EST	**Attempt 2**	5 minutes	10 out of 10
	Attempt 1	9 minutes	8 out of 10

Score for this attempt: **10** out of 10
Submitted Mar 4 at 11:10pm
This attempt took 5 minutes.

Question 1	**5 / 5 pts**

Mark each of the following questions as True/False/Unknown:

1. For every decision problem there is a polynomial time algorithm that solves it. [Select] ⌄

2. P=NP Unknown

3. If problem A can be solved in polynomial time then A is in NP.

   [Select] ⌄

4. If there is a polynomial time reduction from a problem A to Circuit SAT then A is NP-hard. [Select] ⌄

5. If problem A is in NP then it is NP-complete. False

Answer 1:

Correct!

   False

Answer 2:

Correct!

   Unknown

Answer 3:

Correct!

   True

Answer 4:

Correct!

   False

▶

Answer 5:

Correct!

   False

Question 2	1 / 1 pts

Mark True/False.

Removing the maximum weighted edge from a Hamiltonian cycle will result in a Spanning Tree

Correct!

⦿ True

◯ False

Question 3   2 / 2 pts

We use reduction to prove that NP-Completeness of a problem X from A. As a part of reduction we must prove which of the following statements?

Assume A is a NP-Hard problem.

Statement P: A can be transformed to X in a polynomial time

Statement Q: We can obtain solution to A from X in polynomial time

☐ P alone

☐ Q alone

☐ Neither P nor Q

Correct!

☑ Both P and Q

▶

Question 4   1 / 1 pts

If the solution obtained by an approximation algorithm is : 10

The optimal solution is : 5

What will be the value of the approximation ratio?

◯ 5

Correct!

⦿ 2

○ 1

○ 0.5

Question 5   1 / 1 pts

In the exploration to show that the independent set problem is NP-Complete we have used which of the following NP-Hard problems?

○ 2SAT

○ None of the options

○ Circuit SAT

Correct!

◉ 3SAT

Quiz Score: 10 out of 10

▶