

# 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

### Instructions



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.

[Take the Quiz Again](#)

## Attempt History

	Attempt	Time	Score
<b>LATEST</b>	<a href="#">Attempt 1</a>	9 minutes	8 out of 10

! Answers will be shown after your last attempt





Score for this attempt: **8** out of 10

Submitted Mar 4 at 11:04pm

This attempt took 9 minutes.

**Partial****Question 1****3 / 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. True
2.  $P=NP$  [ Select ] 
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.  
[ Select ] 

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**Answer 1:**

True

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**Answer 2:**

Unknown

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**Answer 3:**

True

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**Answer 4:**

True

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**Answer 5:**

False

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**Question 2**

1 / 1 pts

Mark True/False.

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

☒ 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

☐ Q alone

☐ Neither P nor Q

☐ P alone

☒ 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?



☐ 0.5☐ 1☐ 5☒ 2**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?

☐ None of the options☐ 2SAT☐ Circuit SAT☒ 3SAT**Quiz Score: 8 out of 10**