Assignment 7

Due on 2021-03-10, 23:59 IST.

The due date for submitting this assignment has passed.

1. Assume that \( \text{BPP} \subseteq \text{NP} \). What can we conclude from this?
   - \( \text{P} = \text{NP} \)
   - \( \text{P} = \text{BPP} \)
   - \( \text{P} = \text{coBPP} \)
   - \( \text{NP} = \text{coNP} \)
   - No, the answer is incorrect.
   - Accepted Answers: \( \text{P} = \text{NP} \)

2. Let \( M \) be a PTIME. The expected running time of \( M \) on an input \( x \), \( \text{ETIME}(M, x) \), is the average running time of \( M \) on a taken-over all possible sequence of choices. \( M \) has expected running time \( \text{ETIME}(M) \) if for all \( x \in \{0,1\}^* \), \( \text{ETIME}(M, x) \leq \text{ETIME}(M) \).
   - \( x \) is \( \in \{0,1\}^* \).
   - \( \text{ETIME}(M) = 1 \).
   - \( \text{ETIME}(M) = 0 \).
   - \( \text{ETIME}(M) = \frac{1}{2} \).
   - \( \text{ETIME}(M) = \Omega(1) \).
   - Which of the following is/are known to be true?
     - \( \text{BPP} \) is a strict subset of \( \text{ZPP} \)
     - \( \text{ZPP} \) is a strict subset of \( \text{BPP} \)
     - \( \text{ZPP} \) is the same as \( \text{BPP} \)
     - \( \text{ZPP} \) and \( \text{BPP} \) are incomparable.
   - Accepted Answers: \( \text{ZPP} \subseteq \text{BPP} \)
   - No, the answer is incorrect.
   - Score: 0

3. Consider the following languages:
   - \( \text{DISKET} = \{ (q, g) \mid g \text{ has exactly two satisfying assignments} \} \)
   - Suppose we have a polynomial time algorithm for \( \text{DISKET} \). What can we conclude from this?
     - \( \text{NP} \) is not equal to \( \text{P} \).
     - \( \text{NP} = \text{P} \).
     - \( \text{NP} = \text{coP} \).
     - We cannot conclude anything new for \( \text{P} \) and \( \text{NP} \).
   - Accepted Answers: \( \text{NP} = \text{P} \)

4. Assume that \( \text{P} = \text{NP} \). What can we conclude from this?
   - \( \text{BPP} = \text{P} \)
   - \( \text{BPP} = \text{coP} \)
   - \( \text{P} = \text{coP} \)
   - We cannot conclude anything new for \( \text{P} \) and \( \text{BPP} \).
   - No, the answer is incorrect.
   - Score: 0

5. Which of the following is/are known to be true?
   - \( \text{BPP} \) is not equal to \( \text{PSPACE} \)
   - \( \text{BPP} = \text{PSPACE} \)
   - \( \text{PSPACE} = \text{BPP} \)
   - \( \text{PSPACE} \) and \( \text{BPP} \) are incomparable.
   - Accepted Answers: \( \text{BPP} \neq \text{PSPACE} \)
   - No, the answer is incorrect.
   - Score: 0

6. Which of the following is/are known to be true?
   - \( \text{RL} \) is a subset of \( \text{SPL} \)
   - \( \text{SPL} \) is a subset of \( \text{BPL} \)
   - \( \text{BPL} \) is a subset of \( \text{SPL} \)
   - \( \text{SPL} \) is a subset of \( \text{RL} \)
   - \( \text{NL} \) is a subset of \( \text{BPL} \)
   - No, the answer is incorrect.
   - Score: 0

7. Assume that \( \text{BPL} = \text{NL} \). What can we conclude about \( \text{L} \) and \( \text{NL} \)?
   - \( \text{L} = \text{NL} \)
   - \( \text{L} = \{1\} \)
   - \( \text{NL} = \{1\} \)
   - \( \text{L} \neq \text{NL} \)
   - Accepted Answers: \( \text{L} \neq \text{NL} \)

8. Which of the following two statements is/are known to be true?
   - \( \text{BPP} \subseteq \text{EXP} \)
   - \( \text{BPP} \subseteq \text{NEXP} \)
   - Only 1
   - Only 2
   - Both 1 and 2
   - Neither 1 nor 2
   - Accepted Answers: Neither 1 nor 2