

CS300 Homework #9

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Total 100 points

Due: 2020-06-19 23:59:00 KST

- Write in English or Korean.
1. Suppose that X and Y are decision problems and $X \leq_p Y$. Give **true** or **false** for each of the following statements. Briefly justify your answer in one or two sentences.
 - (a) If X is NP-complete, then Y is NP-complete. (10 points)
 - (b) If Y is NP-complete, then X is NP-complete. (10 points)
 - (c) If X is NP-complete and Y is in NP, then Y is NP-complete. (10 points)
 - (d) If Y is NP-complete and X is in NP, then X is NP-complete. (10 points)
 2. Suppose that $P \neq NP$. Give **true** or **false** for each of the following statements. Briefly justify your answer in one or two sentences.
 - (a) If X is NP-complete, then X cannot be solved in polynomial time. (10 points)
 - (b) If X is in NP, then X cannot be solved in polynomial time. (10 points)
 - (c) If X is in P, then X is not NP-complete. (10 points)
 - (d) If X is in P, then X is not NP. (10 points)
 3. Give a satisfying input to the boolean circuit below. Just write three boolean values. No partial credit will be given. (20 points)

Check your email inbox. If you have any technical issues, please email Hyeonguk Ryu or post it on the course page.

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