

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

week 5

week 6

Week 7

Week 8

week 9

Week 10

Week 11

Week 12

 Lecture 38 : Circuits with Counters

 Lecture 39 : Communication Complexity - I

 Lecture 40 : PCP Theorem

 Lecture 41 : Communication Complexity - II

 Quiz : Assignment 12

 Feedback for Week 12

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Assignment 12

The due date for submitting this assignment has passed.

Due on 2021-04-14, 23:59 IST.

As per our records you have not submitted this assignment.

 1) Can $MAX - 3SAT$ have a polynomial time α -approximation algorithm for every $\alpha < 1$?

4 points

 Yes if $P \neq NP$

 Yes if $P = NP$

 No if $P \neq NP$

 No if $P = NP$
No, the answer is incorrect.
Score: 0
Accepted Answers:
 Yes if $P = NP$

 No if $P \neq NP$

2) Which of the following statements are known to be true?

4 points

 $PCP(\log n, 1) \subseteq NP$

 $PCP(\log^3 n, \log n) \subseteq NP$

 $PCP(poly(n), 1) \subseteq NEXP$

 $PCP(1, exp(n)) \subseteq NEXP$
No, the answer is incorrect.
Score: 0
Accepted Answers:
 $PCP(\log n, 1) \subseteq NP$
 $PCP(poly(n), 1) \subseteq NEXP$
 $PCP(1, exp(n)) \subseteq NEXP$

3) Consider the following statements:

2 points

 1. If $NP \subseteq PCP(\log n, 1)$ then $1/2 - GAPqCSP$ is NP-hard for some constant q .

 2. If $\rho - GAPqCSP$ is NP-hard for some constants $\rho, q < 1$, then $NP \subseteq PCP(\log n, 1)$

Which of the following holds?

Only statement (1) is true

Only statement (2) is true

Both the statements are true

Both the statements are false

No, the answer is incorrect.
Score: 0
Accepted Answers:
 Both the statements are true

 4) Which of the following is true? Note: $C(f)$ is the communication complexity of f .

2 points

 $C(EQ) \leq \log n + 1$

 $C(EQ) \geq \log n$

 $C(EQ) \leq n + 1$

 $C(EQ) \geq n$
No, the answer is incorrect.
Score: 0
Accepted Answers:
 $C(EQ) \geq \log n$
 $C(EQ) \leq n + 1$
 $C(EQ) \geq n$

5) Which of the following is true?

4 points

 The function: $PARITY(x, y)$ that computes the parity of the $2n$ bits, has communication complexity 2

 The disjointness function: $DISJ(x, y) = 1$ iff x and y are disjoint (when viewed as subsets of $[n]$), has communication complexity $O(\log n)$

 The majority function $MAJ(x, y) = 1$ iff the hamming weight of xy is greater than n , has communication complexity atleast n .

No, the answer is incorrect.
Score: 0
Accepted Answers:
 The function: $PARITY(x, y)$ that computes the parity of the $2n$ bits, has communication complexity 2

 6) Consider the problem $MEDIAN$: Alice and Bob are both given their own lists of numbers ranging from 1 to m .

6 points

 The length of both the lists together is n .

What is the communication complexity of finding the median of this combined list after it has been sorted?

 $O(1)$

 $o(\log m)$

 $O(\log m \cdot \log n)$.

 $O(m + n)$
No, the answer is incorrect.
Score: 0
Accepted Answers:
 $O(\log m \cdot \log n)$.

 $O(m + n)$

 7) Which of the following classes is/are known to not be contained in ACC^0 ?

2 points

 NP

 $NEXP$

 $NEXPSPACE$.

 $PSPACE$
No, the answer is incorrect.
Score: 0
Accepted Answers:
 $NEXP$
 $NEXPSPACE$.

8) Which of the following is/ are known to be true?

6 points

 1. $ACC^0[7] \neq ACC^0[13]$

 2. $ACC^0[4] \subseteq ACC^0[2]$

Only 1 is known to be true

Only 2 is known to be true

Both 1 and 2 are known to be true.

Neither 1 nor 2 is known to be true

No, the answer is incorrect.
Score: 0
Accepted Answers:
 Both 1 and 2 are known to be true.