Open Problem Set I

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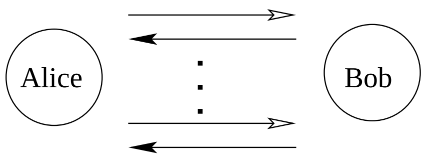
TWO PARTY COMMUNICATION

Definition 1 There is a universal set $U = \{1, 2, 3, \cdots 2n - 1\}$. Two *computational unlimited* parties, Alice and Bob. Before the game they have subset S and T respectively and only know that $|S| = |T| = n$. They want to decide one common element in $S \cap T$. by sending binary bit each other. The communication complexity is defined as the number of bits they required to achieve the aim.



Existence Protocol There exist a protocol which can complete the task by $5.3log_2n$bits.

Open Problem Does there exist protocol which can complete the task using only $2.001log_2n$ or $2log_2n + \omega(1)$ bits?

Hint Refer to Majority function and monotone circuit

Scribed by *Li Yunpeng*