Tutorial Sheet 5

1. Is there a recursively enumerable language $L$ which is not reducible to its complement? Justify your answer.

2. Show that for any recursively enumerable language $L$, there is a polynomial-time reduction from $L$ to the Halting Problem.

3. Prove that every language in $\text{NP}$ can be recognized by a deterministic Turing machine in exponential time.

4. Show that if $\text{NP} = \text{P}$, then every language in $\text{P}$ except the empty language and the language of all strings is $\text{NP}$-complete.

5. Show that the language of non-primes in binary representation is in $\text{NP}$. 

Rahul Santhanam, November 2012