Exercise 1. Prove that $L \subseteq P$. 

Definition 1. We define $\text{DP}$ to be the following complexity class: 

$$\text{DP} = \{ A \cap B \mid A \in \text{NP}, B \in \text{coNP} \}.$$ 

Exercise 2. 

(a) Explain the difference between $\text{DP}$ and the class $\text{NP} \cap \text{coNP}$. 

(c) Prove that $\text{NP} \cup \text{coNP} \subseteq \text{DP}$. 

(d) Prove that $P = \text{DP}$ if and only if $P = \text{NP}$. 