CSC236 Worksheet 3

Hyungmo Gu

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Question 1

> **Rough Work:**
>
> Predicate Logic: $\forall A \subseteq \mathbb{N},\ A \neq \emptyset \Rightarrow (\exists a \in A,\ \forall a' \in A,\ a \leq a')$
>
> Negation of Predicate Logic: $\exists A \not\subseteq \mathbb{N},\ A \neq \emptyset \land (\forall a \in A,\ \exists a' \in A,\ a > a')$

Notes:

- **Principle of Well-Ordering:** Any nonempty subset A of $\mathbb{N}$ contains a minimum element; i.e. for any $A \subseteq \mathbb{N}$ such that $A \neq \emptyset$, there is some $a \in A$ such that for all $a' \in A$, $a \leq a'$.

- examples of well-ordered sets

    1. $\mathbb{N} \cup \{0\}$
    2. $\mathbb{N} \cup \{1, 2\}$
    3. $\{n \in \mathbb{N} : n > 5\}$

- examples of non-well-ordered sets

    1. $\mathbb{R}$ and the open interval $(0, 2)$
    2. $\mathbb{Z}$

Question 2

Question 3