

Foundations of Computer Science (COMP109)

Tutorial IV (bring solutions between 23.10.2017 – 27.10.2017)

IV.1. List the elements of the following sets:

- $A = \{x \mid x \in \mathbb{Z} \text{ and } 1 \leq x \leq 7\}$;
- $B = \{x \mid x \in \mathbb{R} \text{ and } x \times x = 2\}$;
- $C = \{x \mid x \in \mathbb{N} \text{ and } x < 5 \text{ and } x^2 > 30\}$.

IV.2. Write the following sets in the form $\{x \mid P(x)\}$:

- $A = \{4, 9, 16, 25, \dots\}$;
- $B = \{0, 2, 0, 2, 0, 2, \dots\}$;
- $C = \{2, 4, 6, 8, 10, \dots\}$.

IV.3. Which statements are true:

- $\{3, 4\} \subseteq \{4, 3\}$?
- $\{\text{Leeds, Leeds}\} \subseteq \{\text{Leeds}\}$?
- $\emptyset \in \{\text{Leeds, Liverpool}\}$?
- $\emptyset \subseteq \{\text{Leeds, Liverpool}\}$?
- $\emptyset \in \{\emptyset\}$?
- $\emptyset = \{\emptyset\}$?

IV.4. In this question the universal set U is $\{1, 2, 3, 4, 5, 6, 7, 8\}$. Let $A = \{1, 2, 3, 4\}$, $B = \{3, 5, 7\}$ and $C = \{1, 4, 5, 6\}$. Find the elements of

- $A \cap B$,
- $A \cup C$,
- $\sim C$,
- $\sim\sim A$,
- $A \cap B \cap C$,
- $\sim(A \cup B)$,
- $B - C$,
- $B \Delta C$.

IV.5. Let S be the following ordered sequence of elements $S = \{1, 2, 3, 4, 5, 6\}$. Write down the characteristic vectors of

- $A = \{1, 2, 4, 5\}$;
- $B = \{3, 5\}$;
- \emptyset ;
- $A \cup B$;
- $A \cap B$;
- $A \cup \sim B$;
- $A \Delta B$.