

Set

In mathematics, a set is a well-defined collection of distinct objects, considered as an object in its own right. For example, the numbers 2, 4, and 6 are **distinct** objects when considered separately, but when they are considered collectively they form a single set of size three, written $\{2, 4, 6\}$. Sets are one of the most fundamental concepts in mathematics. Developed at the end of the 19th century, set theory is now a ubiquitous part of mathematics, and can be used as a foundation from which nearly all of mathematics can be derived.

Equality

Examples:

$$\{1, 2, 3\} = \{2, 3, 1\} = \{3, 2, 1\} = \{1, 3, 2\} = \{2, 1, 3\} = \{3, 1, 2\}$$

*** The order is **NOT** a matter. ***

Unions

The union of A and B, denoted **$A \cup B$**

Two sets can be "added" together. The union of A and B, denoted by $A \cup B$, is the set of all things that are members of either A or B.

Examples:

$$\{1, 2\} \cup \{1, 2\} = \{1, 2\}$$

$$\{1, 2\} \cup \{2, 3\} = \{1, 2, 3\}$$

$$\{1, 2, 3\} \cup \{3, 4, 5\} = \{1, 2, 3, 4, 5\}$$

Intersections

The intersection of A and B, denoted **$A \cap B$** .

Examples:

$$\{1, 2\} \cap \{1, 2\} = \{1, 2\}$$

$$\{1, 2\} \cap \{2, 3\} = \{2\}$$

Complements

Two sets can also be "subtracted". The relative complement of B in A (also called the set-theoretic difference of A and B), denoted by $A - B$, is the set of all elements that are members of A but not members of B. Note that it is valid to "subtract" members of a set that are not in the set, such as removing the element green from the set $\{1, 2, 3\}$; doing so has no effect.

Examples:

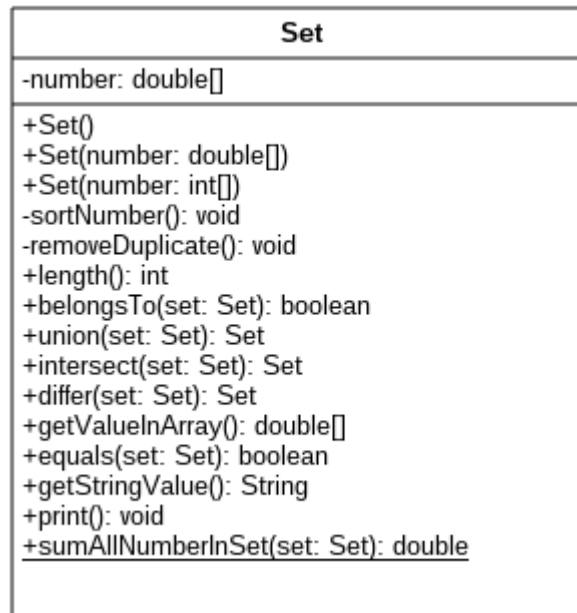
$$\{1, 2\} - \{1, 2\} = \{\}$$

$$\{1, 2, 3, 4\} - \{1, 3\} = \{2, 4\}$$

Reference: [https://en.wikipedia.org/wiki/Set_\(mathematics\)](https://en.wikipedia.org/wiki/Set_(mathematics))

All of CS@SIT students have to study CSC165 Discrete Mathematics, which comprise Set theory, in second semester of first year. As of now, you are a freshman who needs to prepare yourself before passing this first semester. Hence, you will implement the class so that it can be solved the set problem appropriately.

Implement the class following by the given UML:



Instructions:

- You are **NOT ALLOWED** to modify any code in **Driver Class** and **some areas of Set Class**.
- **ArrayList class** and every helper method in **Arrays class** are **FORBIDDEN**.
- You have to implement your own algorithm being able to solve the problem.
- Submission must be done by packing all files in to a folder named "src" then zip the folder, and submitting it into the system.

*****If you do not comply with instructions above,
any points from this problem will not be given in all cases.*****

Materials are provided at: <http://csprog-in.sit.kmutt.ac.th/file/SET.zip>