CS200 - Programming Assignment 2

Due: Monday, September 25. Must be uploaded to Canvas before the beginning of class.

Please read the sections of the syllabus on programming assignments and honor code before starting this homework. I would also recommend reading the rubric for programming grading, so that you know how we will be grading this assignment.

1. **[30 Points]** Both python and java have built-in functionality for sets. In this assignment, you will learn and apply that functionality. Let $A$, $B$, and $C$ be the following sets:

\[
A = \{ x : x \text{ in an integer, } 0 \leq x \leq 10^6, \text{ the remainder of } x \text{ when divided by 7 is 2} \}
\]

\[
B = \{ x : x \text{ in an integer, } 0 \leq x \leq 10^6, \text{ the remainder of } x \text{ when divided by 14 is 2} \}
\]

\[
C = \{ x^2 : x \text{ in an integer, } 0 \leq x^2 \leq 10^6 \}
\]  \hspace{1cm} (1)

Write a program using the built-in functions whose output is the following (with “xxx” filled in with the appropriate numbers and either true or false is printed on the last line:

The size of the intersection of $A$ and $B$ is xxx.
The size of the intersection of $A$ and $C$ is xxx.
The size of $A \setminus B$ is xxx.
The size of $B \setminus C$ is xxx.
The size of the union of $A$, $B$, and $C$ is xxx.
The size of the union of $C$ and $(A \setminus B)$ is xxx.
It is (true/false) that $B \setminus A$ is contained in $C$.

Put a multi-line comment at the beginning of your program. It should contain:

- Your name
- “Programming Assignment 2”
- The name of anyone you worked with
- Sample output from your program
- The amount of time (approximately) that you spent on this assignment