**CS151 Spring 2020 Project 6**

**Roman numerals**

Write a program as a part of main method to ask the user repeatedly to enter a number between 1 and 999 and display corresponding Roman numeral. Stop the program when the input number is out of requested range.

You will get extra credit if you process numbers from 1 to 3999.

<https://www.mathsisfun.com/roman-numerals.html>

**The Roman Symbols**

Romans Numerals are based on the following symbols:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 5 | 10 | 50 | 100 | 500 | 1000 |
| **I** | **V** | **X** | **L** | **C** | **D** | **M** |

**Basic Combinations**

Which can be combined like this:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **I** | **II** | **III** | **IV** | **V** | **VI** | **VII** | **VIII** | **IX** |
|  |  |  |  |  |  |  |  |  |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| **X** | **XX** | **XXX** | **XL** | **L** | **LX** | **LXX** | **LXXX** | **XC** |
|  |  |  |  |  |  |  |  |  |
| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
| **C** | **CC** | **CCC** | **CD** | **D** | **DC** | **DCC** | **DCCC** | **CM** |

**Forming Numbers - The Rules**

When a symbol appears **after a larger** (or equal) symbol it is **added**

* Example: VI = V + I = 5 + 1 = 6
* Example: LXX = L + X + X = 50 + 10 + 10 = 70

But if the symbol appears **before a larger** symbol it is **subtracted**

* Example: IV = V − I = 5 − 1 = 4
* Example: IX = X − I = 10 − 1 = 9

To Remember: **A**fter Larger is **A**dded

Don't use the same symbol more than three times in a row (but IIII is sometimes used for 4, particularly on clocks)

public static void main(String[] args)

{

Scanner scan = new Scanner(System.in);

int a\_num;

System.out.print("Enter a number (0 to quit): ");

a\_num = scan.nextInt();

while ( a\_num > 0 && a\_num < 1000)

{

String r\_num = "";

int position = 1; // start with digit position 1

while (a\_num > 0)

{

int d = a\_num % 10; // extract last digit

if ( position == 1 ) // process numbers 1,2,…,9

{

if (d==1)

r\_num = "I" + r\_num;

else if (d==2)

r\_num = "II" + r\_num;

else if (d==3)

// insert your code;

else if (d==4)

// insert your code;

else if (d==5)

// insert your code;

else if (d==6)

// insert your code;

else if (d==7)

// insert your code;

else if (d==8)

// insert your code;

else if (d==9)

// insert your code;

}

else if (position == 2) // process numbers 10,20,…,90

{

if (d==1)

r\_num = "X" + r\_num;

else if (d==2)

// insert your code;

else if (d==3)

// insert your code;

else if (d==4)

// add more cases

}

else // process numbers 100,200,…,900 position 2

{

if (d==1)

r\_num = "C" + r\_num;

// add more cases

}

position++; // go to the next digit position

a\_num /= 10; // strip last digit

}

System.out.println("Roman numeral: " + r\_num);

System.out.print("Enter a number (0 to quit): ");

a\_num = scan.nextInt();

}

}

}