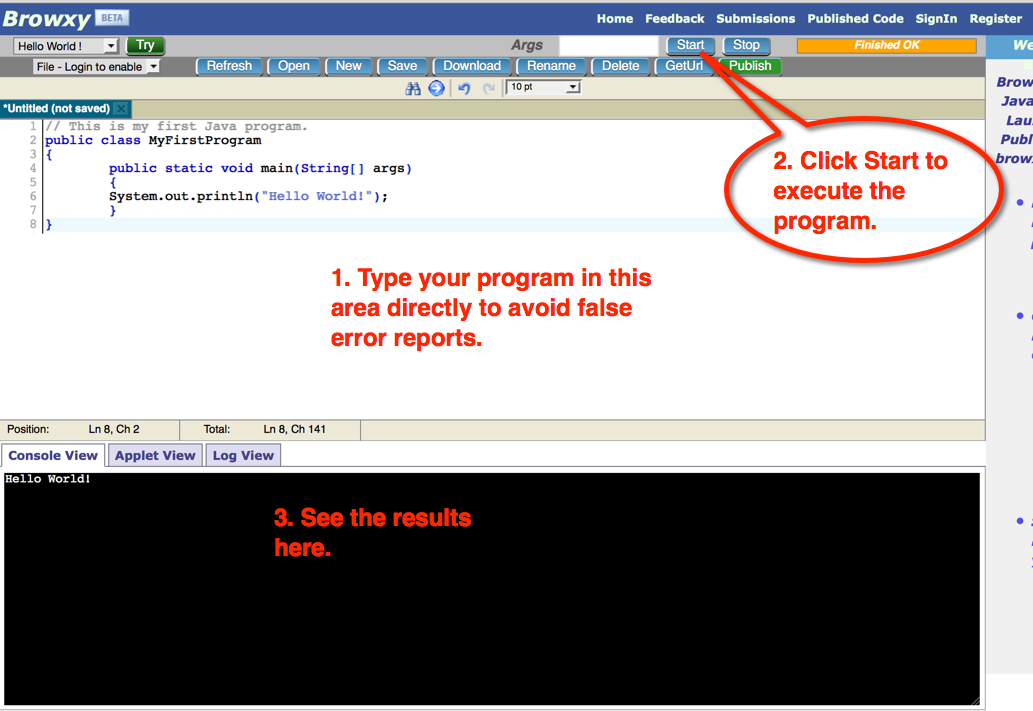
**Unit 6 Programming Project 1**

Solve the following programming problems. For each problem, you should create an algorithm either in pseudocode or as a flowchart, implement the program in Java, and then compile and execute the Java program on [Browxy.com](http://browxy.com/). Browxy.com is very intuitive. Please see the screenshot below to understand how to use the online programming environment.



For each of the four problems, you should submit the following,

* an algorithm.
* a Java program.
* a screenshot that includes your Java program and the *Console View* box. Please see the screenshot above to understand what your screenshots should look like.

# Problem 1

Your First Java Program for this assignment will help you get acquainted with the free online programming environment, [Browxy.com](http://browxy.com/). **Please note you may want to type your programs on Browxy.com directly to avoid false error reports. Don’t copy any program from a Word document and paste it on Browxy.com. Word will add extra invisible codes to the program and you will receive false error reports when you compile and execute the program on Browxy.com.**

Here is the Java program you will enter:

*// This is my first Java program.*

*public class MyFirstProgram*

*{*

*public static void main( String[] args)*

*{*

*System. out. println(“ Hello World!”);*

*}*

*}*

## Algorithm for Problem 1

## Java Program (*The Java program has been provided to you.*)

// This is my first Java program.

public class MyFirstProgram

{

    public static void main(String[] args)

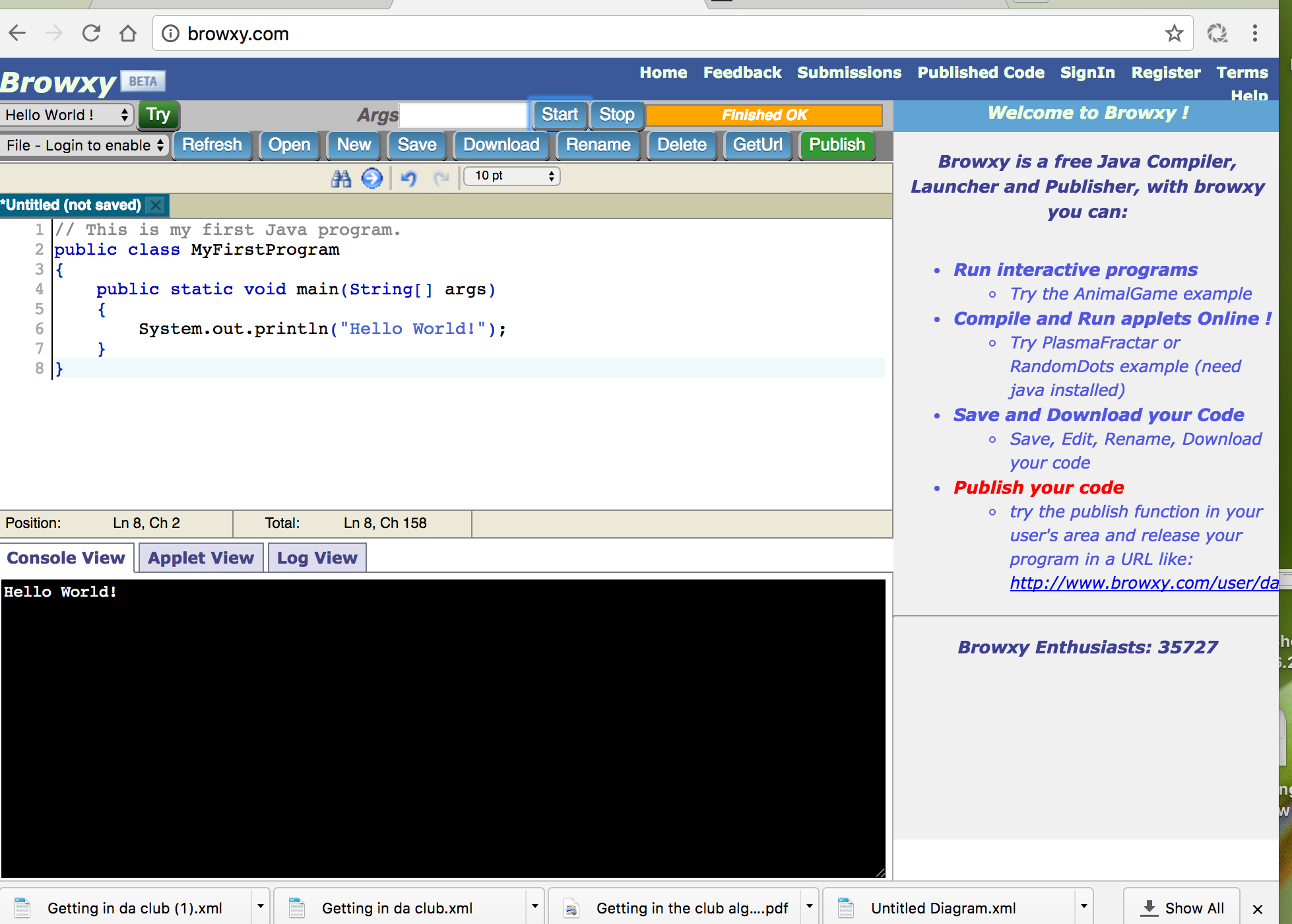
    {

        System.out.println("Hello World!");

    }

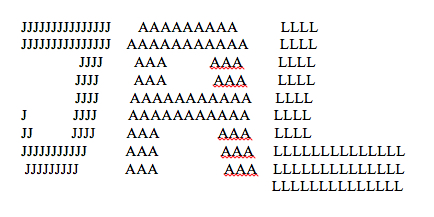
}

## Screenshot of the result on Browxy.com

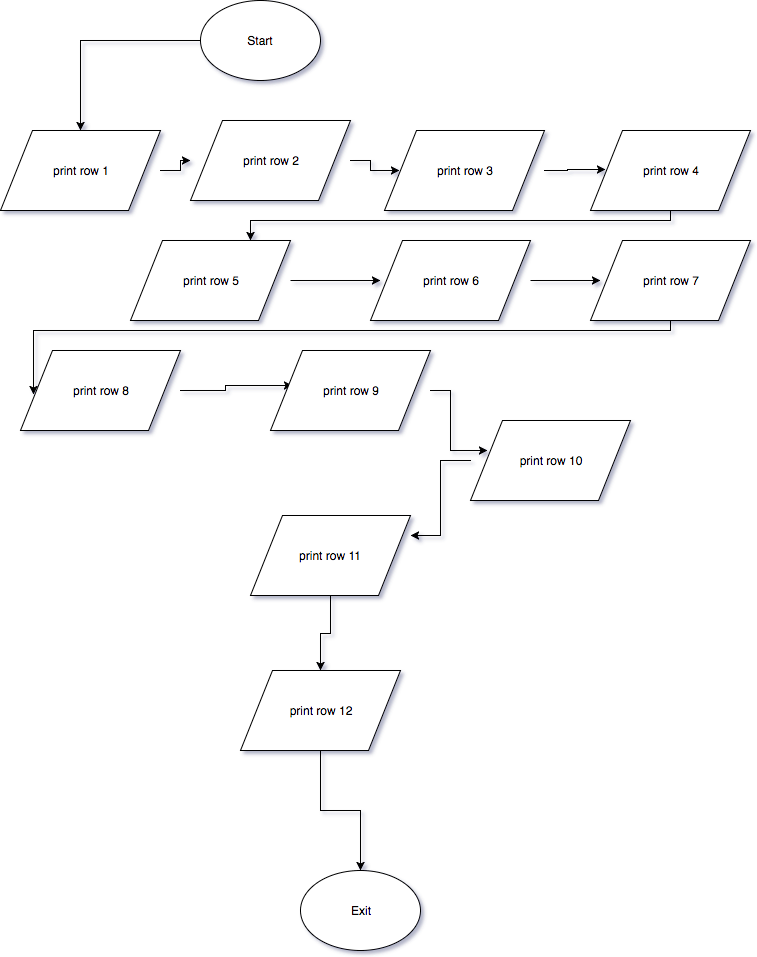


# Problem 2

Write an application that displays your initials in large block letters. Make each large letter out of the corresponding regular character. For example:



## Algorithm for Problem 2

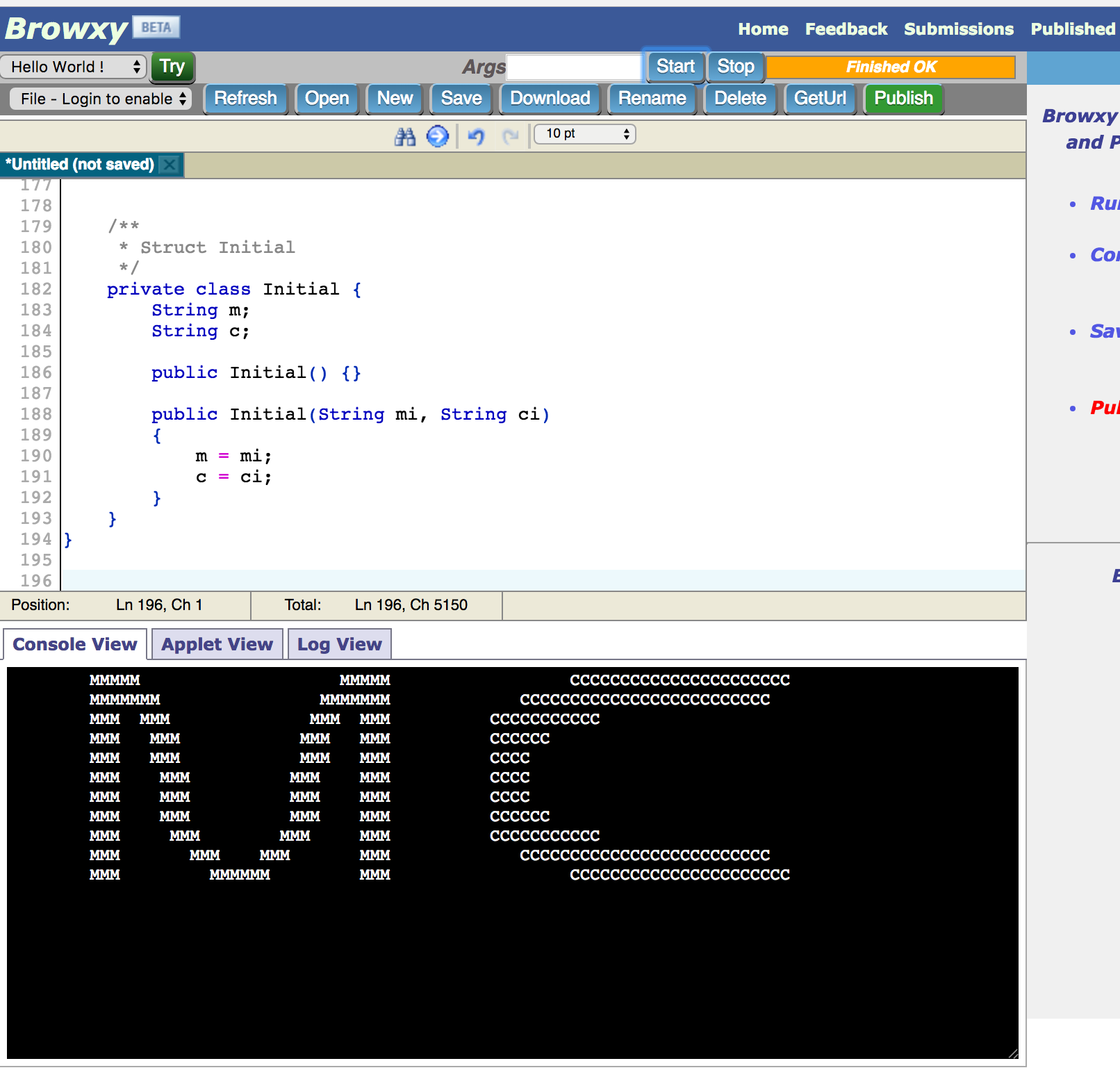


## Java Program

https://github.com/mauricext4fs/CSC110/blob/master/Programming%20Project%201/Problem2/Problem2.java

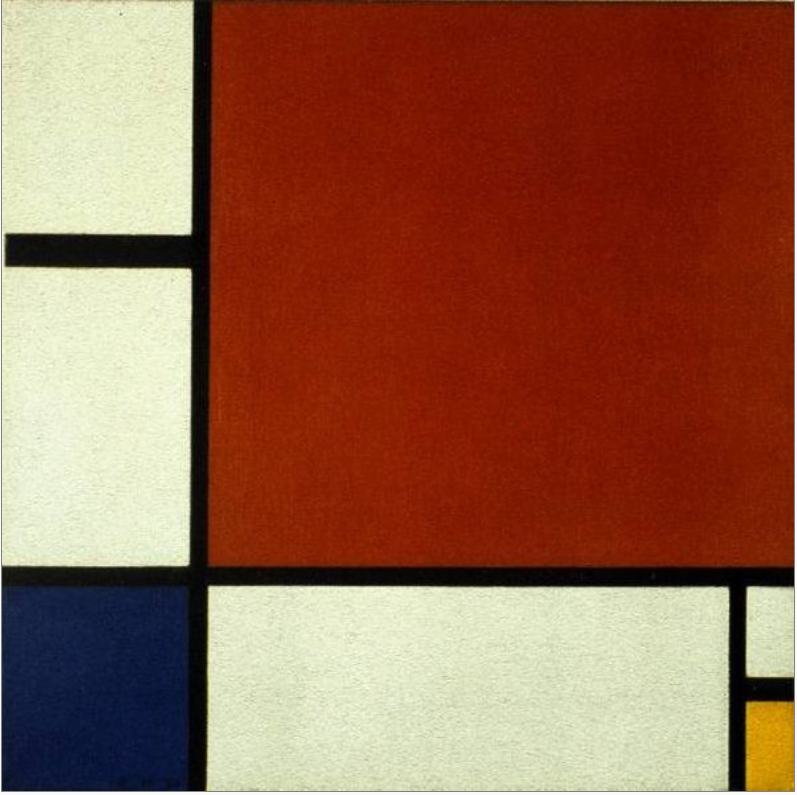
public class Problem2 {  
 private static final int WIDTH\_OF\_TEXT = 30;  
 private static final String MYINITIAL\_LAST = "C";  
  
 public static void main(String[] args)  
 {  
 Problem2 problem = new Problem2();  
 problem.printFirstRow();  
 for (int i = 2; i <= 15; i++) {  
 problem.printRow(i);  
 }  
 }  
  
 public void printFirstRow()  
 {  
 Initial initial = formatFirstRow();   
 System.out.printf("\t%s\t\t%s\n", initial.m, initial.c);  
 }  
  
 public Initial formatFirstRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;  
 String c;  
 m = template;  
 c = template;  
 m = String.format("MMMMM MMMMM");  
 c = String.format(" CCCCCCCCCCCCCCCCCCCCCC");  
 return new Initial(m, c);  
 }  
  
  
 public Initial formatSecondRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMMMMMM MMMMMMM");  
 c = String.format(" CCCCCCCCCCCCCCCCCCCCCCCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatThirdRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format("CCCCCCCCCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatFourthRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format("CCCCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatFifthRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format("CCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatSixthRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format("CCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatSeventhRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format("CCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatEighthRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format("CCCCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatNinthRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format("CCCCCCCCCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatTenthRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMM MMM MMM");  
 c = String.format(" CCCCCCCCCCCCCCCCCCCCCCCCC ");  
 return new Initial(m, c);  
 }  
  
 public Initial formatEleventhRow()  
 {  
 String template = "%0" + WIDTH\_OF\_TEXT + "d";  
 String m;   
 String c;  
 c = template;  
 m = String.format("MMM MMMMMM MMM");  
 c = String.format(" CCCCCCCCCCCCCCCCCCCCCC");  
 return new Initial(m, c);  
 }  
  
 public void printRow(int numRow)  
 {  
 // Empty struct  
 Initial initial = new Initial();  
 if (numRow == 1) {  
 initial = formatFirstRow();   
 } else if (numRow == 2) {  
 initial = formatSecondRow();   
 } else if (numRow == 3) {  
 initial = formatThirdRow();   
 } else if (numRow == 4) {  
 initial = formatFourthRow();   
 } else if (numRow == 5) {  
 initial = formatFifthRow();   
 } else if (numRow == 6) {  
 initial = formatSixthRow();   
 } else if (numRow == 7) {  
 initial = formatSeventhRow();   
 } else if (numRow == 8) {  
 initial = formatEighthRow();   
 } else if (numRow == 9) {  
 initial = formatNinthRow();   
 } else if (numRow == 10) {  
 initial = formatTenthRow();   
 } else if (numRow == 11) {  
 initial = formatEleventhRow();   
 }  
  
  
  
 if (initial.m != null) {  
 System.out.printf("\t%s\t\t%s\n", initial.m, initial.c);  
 }  
 }  
  
  
 */\*\*  
 \* Struct Initial  
 \*/* private class Initial {  
 String m;  
 String c;  
  
 public Initial() {}  
  
 public Initial(String mi, String ci)  
 {  
 m = mi;  
 c = ci;  
 }  
 }   
}

## Screenshot of the result on Browxy.com

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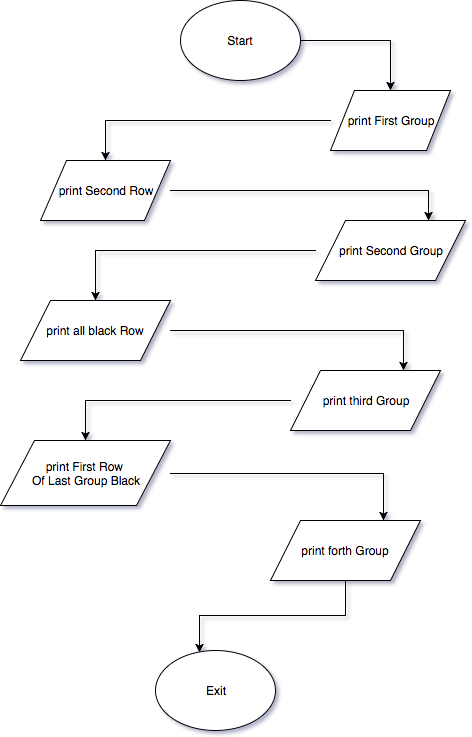
# Program 3

Write a program that prints an imitation of the Composition II in Red, Blue, and Yellow created in 1930 by Piet Mondrian painting, illustrated below.



Use character sequences such as @@@ or ::: to indicate different colors and use – and | to form the black lines.

## Algorithm for Problem 3

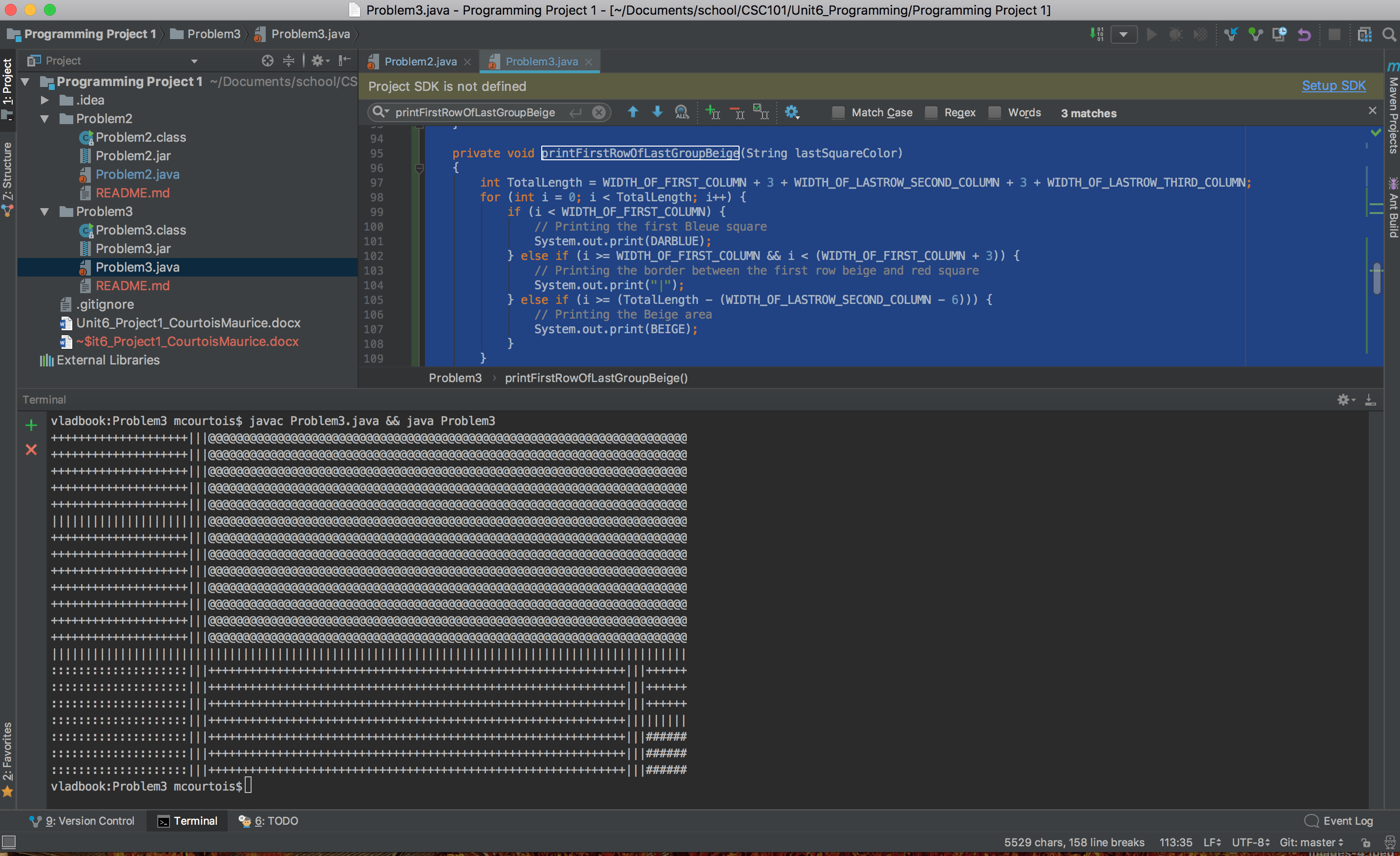


## Java Program

https://github.com/mauricext4fs/CSC110/blob/master/Programming%20Project%201/Problem3/Problem3.java

public class Problem3 {  
 private static final int WIDTH\_OF\_FIRST\_COLUMN = 20;  
 private static final int WIDTH\_OF\_SECOND\_COLUMN = 70;  
 private static final int WIDTH\_OF\_LASTROW\_SECOND\_COLUMN = 67;  
 private static final int WIDTH\_OF\_LASTROW\_THIRD\_COLUMN = 6;  
 private static final int HEIGHT\_OF\_ROWA1 = 60;  
 private static final int HEIGHT\_OF\_ROWA2 = 160;  
 private static final int HEIGHT\_OF\_ROWB1 = 80;  
 private static final int HEIGHT\_OF\_ROWC1 = 60;  
 private static final int HEIGHT\_OF\_ROWC2 = 29;  
 private static final String BEIGE = "+";  
 private static final String DARKRED = "@";  
 private static final String DARBLUE = ":";  
 private static final String YELLOW = "#";  
  
 public static void main(String[] args)  
 {  
 Problem3 problem = new Problem3();  
  
 problem.printFirstGroup();  
 problem.printSecondRow();  
 problem.printSecondGroup();  
 problem.printAllBlackRow();  
 problem.printThirdGroup();  
 problem.printFirstRowOfLastGroupBlack();  
 problem.printForthGroup();  
 }  
  
 private void printFirstGroup()  
 {  
 for (int i = 0; i < 5; i++) {  
 printFirstRow();  
 }  
 }  
  
 private void printSecondGroup()  
 {  
 for (int i = 0; i < 7; i++) {  
 printFirstRow();  
 }  
 }  
  
 private void printThirdGroup()  
 {  
 for (int i = 0; i < 3; i++) {  
 printFirstRowOfLastGroupBeige(BEIGE);  
 }  
 }  
  
 private void printForthGroup()  
 {  
 for (int i = 0; i < 3; i++) {  
 printFirstRowOfLastGroupBeige(YELLOW);  
 }  
 }  
  
 private void printFirstRow()  
 {  
 int TotalLength = WIDTH\_OF\_FIRST\_COLUMN + 3 + WIDTH\_OF\_SECOND\_COLUMN;  
 for (int i = 0; i < TotalLength; i++) {  
 if (i < WIDTH\_OF\_FIRST\_COLUMN) {  
 // Printing the first Beige square  
 System.out.print(BEIGE);  
 } else if (i >= WIDTH\_OF\_FIRST\_COLUMN && i < (TotalLength - WIDTH\_OF\_SECOND\_COLUMN)) {  
 // Printing the border between the first row beige and red square  
 System.out.print("|");  
 } else if (i >= (TotalLength - WIDTH\_OF\_SECOND\_COLUMN)) {  
 // Printing the border between the first row beige and red square  
 System.out.print(DARKRED);  
 }  
 }  
 System.out.println(" ");  
  
 }  
  
 private void printSecondRow()  
 {  
 int TotalLength = WIDTH\_OF\_FIRST\_COLUMN + 3 + WIDTH\_OF\_SECOND\_COLUMN;  
 for (int i = 0; i < TotalLength; i++) {  
 if (i < WIDTH\_OF\_FIRST\_COLUMN) {  
 // Printing the first Beige square  
 System.out.print("|");  
 } else if (i >= WIDTH\_OF\_FIRST\_COLUMN && i < (TotalLength - WIDTH\_OF\_SECOND\_COLUMN)) {  
 // Printing the border between the first row beige and red square  
 System.out.print("|");  
 } else if (i >= (TotalLength - WIDTH\_OF\_SECOND\_COLUMN)) {  
 // Printing the border between the first row beige and red square  
 System.out.print(DARKRED);  
 }  
 }  
 System.out.println(" ");  
  
 }  
  
 private void printFirstRowOfLastGroupBeige(String lastSquareColor)  
 {  
 int TotalLength = WIDTH\_OF\_FIRST\_COLUMN + 3 + WIDTH\_OF\_LASTROW\_SECOND\_COLUMN + 3 + WIDTH\_OF\_LASTROW\_THIRD\_COLUMN;  
 for (int i = 0; i < TotalLength; i++) {  
 if (i < WIDTH\_OF\_FIRST\_COLUMN) {  
 // Printing the first Bleue square  
 System.out.print(DARBLUE);  
 } else if (i >= WIDTH\_OF\_FIRST\_COLUMN && i < (WIDTH\_OF\_FIRST\_COLUMN + 3)) {  
 // Printing the border between the first row beige and red square  
 System.out.print("|");  
 } else if (i >= (TotalLength - (WIDTH\_OF\_LASTROW\_SECOND\_COLUMN - 6))) {  
 // Printing the Beige area  
 System.out.print(BEIGE);  
 }  
 }  
 // Last bits  
 // Printing the border  
 for (int i = 0; i<3; i++) {  
 System.out.print("|");  
 }  
 // Printing the last square  
 for (int i = 0; i<WIDTH\_OF\_LASTROW\_THIRD\_COLUMN; i++) {  
 System.out.print(lastSquareColor);  
 }  
 System.out.println(" ");  
  
 }  
  
 private void printFirstRowOfLastGroupBlack()  
 {  
 int TotalLength = WIDTH\_OF\_FIRST\_COLUMN + 3 + WIDTH\_OF\_LASTROW\_SECOND\_COLUMN + 3 + WIDTH\_OF\_LASTROW\_THIRD\_COLUMN;  
 for (int i = 0; i < TotalLength; i++) {  
 if (i < WIDTH\_OF\_FIRST\_COLUMN) {  
 // Printing the first Bleue square  
 System.out.print(DARBLUE);  
 } else if (i >= WIDTH\_OF\_FIRST\_COLUMN && i < (WIDTH\_OF\_FIRST\_COLUMN + 3)) {  
 // Printing the border between the first row beige and red square  
 System.out.print("|");  
 } else if (i >= (TotalLength - (WIDTH\_OF\_LASTROW\_SECOND\_COLUMN - 6))) {  
 // Printing the Beige area  
 System.out.print(BEIGE);  
 }  
 }  
 // Last bits  
 // Printing the border  
 for (int i = 0; i<3 + WIDTH\_OF\_LASTROW\_THIRD\_COLUMN; i++) {  
 System.out.print("|");  
 }  
 System.out.println(" ");  
  
 }  
  
 private void printAllBlackRow()  
 {  
 int TotalLength = WIDTH\_OF\_FIRST\_COLUMN + 3 + WIDTH\_OF\_SECOND\_COLUMN;  
 for (int i = 0; i < TotalLength; i++) {  
 System.out.print("|");  
 }  
 System.out.println(" ");  
  
 }  
  
}

## Screenshot of the result on Browxy.com



# Program 4

In the United States there is no federal sales tax, so every state may impose its own sales taxes. Look on the Internet for sales tax charged in five US states, then write a program that prints the tax rates for five states of your choice. For example,

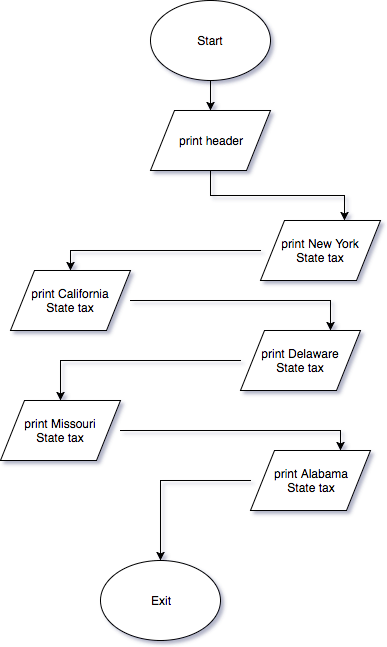
Sales Tax Rates

----------------------

Alaska: 0%

Hawaii: 4%

## Algorithm for Problem 4



## Java Program

https://github.com/mauricext4fs/CSC110/blob/master/Programming%20Project%201/Problem4/Problem4.java

import java.lang.reflect.Field;  
public class Problem4 {  
  
 private static final double NewYork = 0.08875;  
 private static final double California = 0.1025;  
 private static final double Delaware = 0;  
 private static final double Missouri = 0.04225;  
 private static final double Alabama = 0.04;  
  
 public static void main(String[] args)  
 {  
 Problem4 problem = new Problem4();  
 problem.printHeader();  
 problem.printStateTax("NewYork");  
 problem.printStateTax("California");  
 problem.printStateTax("Delaware");  
 problem.printStateTax("Missouri");  
 problem.printStateTax("Alabama");  
 }  
  
 private void printHeader()  
 {  
 System.out.println("Sales Tax Rates");  
 System.out.println(" ");  
 System.out.println("===================");  
 System.out.println(" ");  
 }  
  
 private void printStateTax(String state)  
 {  
 Double value = 0.000;  
 try {  
 Field f = this.getClass().getDeclaredField(state);  
 f.setAccessible(true);  
 value = (Double)f.get(this);  
 } catch (NoSuchFieldException | IllegalAccessException ex) {  
  
 }  
  
 String output = String.format("%s: %f %%", state, value \* 100);  
 System.out.println(output);  
 }  
  
}

## Screenshot of the result on Browxy.com