```java
/*
 * Justin Mendes
 * November 22, 2016/Edited January 15, 2017
 * Unit 4 Activity 1 Program/Question 1
 * This program will ask the user to input a phrase and it will show them the number
of vowels their phrase contains, it will also restart based on the user input at the
end.
 */
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
public class CountVowels
{
    public static void main(String[] args) throws IOException
    {
        //Starts the first loop (without it, will not run)
        int restart = 1;
        while (restart == 1)
        {
            //Variable Declarations and Initializations
            String phrase;
            int vowelCount = 0;
            char vowel[] = {'a', 'e', 'i', 'o', 'u'};
            BufferedReader input = new BufferedReader(new InputStreamReader
(System.in));
            System.out.println("Count Vowels\n===========");
            System.out.println("Type a sentence and this program will tell
you\nhow many vowels there are (excluding 'y'):\n");
            phrase = input.readLine().toLowerCase();
            for (int i = 0; i != phrase.length(); i++)
            {
                for (int eachVowel = 0; eachVowel < 5; eachVowel++)
                {
                    if(vowel[eachVowel] == phrase.charAt(i))
                    {
                        vowelCount += 1;
                    }//end if
                }//end loop
            }//end loop
            System.out.println("There are " + vowelCount + " vowel(s) in the
phrase you've entered.\n");
            System.out.println("Press 1 to try a new phrase or press any
other number to exit.");
            restart = Integer.parseInt(input.readLine());
        }//end while
    }//end main
}//end class
```

```java
/*
 * Justin Mendes
 * November 23, 2016
 * Unit 4 Activity 1 Program/Question 2
 * This program will have the user enter a word. Using the letters of the word, it
will form the shape of a rectangle. (moving the letters to the left one position each
time)
 */
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
public class WordRectangle
{
	public static void main(String[] args) throws IOException
	{
		//Variable Declaration and Initializations
		int restart = 1;
		while(restart == 1)
		{
			String firstPart, secondPart, word;
			BufferedReader input = new BufferedReader(new InputStreamReader
(System.in));
			System.out.println("Welcome to Word
Rectangle!\n=============================");
			System.out.println("Enter a word, and this program will make a
word rectangle with it.");
			word = input.readLine();
			System.out.println("Here is the " +  word.toUpperCase() + "
rectangle:");
				for (int i = 0; i != word.length(); i++)
				{
					firstPart = word.substring(i);
					secondPart = word.substring(0, i);
					System.out.println(firstPart.toUpperCase() +
secondPart.toUpperCase());
				}//end loop
			System.out.println("Press 1 to try another word. Press anything
else to exit.");
			restart = Integer.parseInt(input.readLine());
		}//end loop
	}//end main
}//end class
```

```
Welcome to Word Rectangle!
===============================
Enter a word, and this program will make a word rectangle with it.
computers
Here is the COMPUTERS rectangle:
COMPUTERS
OMPUTERSC
MPUTERSCO
PUTERSCOM
UTERSCOMP
TERSCOMPU
ERSCOMPUT
RSCOMPUTE
SCOMPUTER
Press 1 to try another word. Press any other number to exit.
1
Welcome to Word Rectangle!
===============================
Enter a word, and this program will make a word rectangle with it.
superman
Here is the SUPERMAN rectangle:
SUPERMAN
UPERMANS
PERMANSU
ERMANSUP
RMANSUPE
MANSUPER
ANSUPERM
NSUPERMA
Press 1 to try another word. Press any other number to exit.
```

```java
/*
 * Justin Mendes
 * November 23, 2016
 * Unit 4 Activity 1 Program/Question 3
 * This program will have the user enter a compass direction and then give directions
based on the input.
 */
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
public class Compass
{
    public static void main(String[] args) throws IOException
    {
        //Variable Declarations and Initializations
        int restart = 1;
        while (restart == 1)
        {
            String direction;
            BufferedReader input = new BufferedReader(new InputStreamReader
(System.in));
            System.out.println("Compass Directions\n==============");
            System.out.println("Input a compass direction (E.g. N08E):");
            direction = input.readLine().toUpperCase();
```

```java
                        switch (direction.charAt(0))
                        {
                        case 'N': System.out.print("Start facing North. ");
                        break;
                        case 'S': System.out.print("Start facing South. ");
                        break;
                        }//end switch
                System.out.print("Turn " + direction.substring(1 , 3) + " degrees
towards ");
                        switch (direction.charAt(3))
                        {
                                case 'E': System.out.println("East.");
                                break;
                                case 'W': System.out.println("West.");
                                break;
                        }//end switch
                System.out.println("Press 1 to try again.");
                restart = Integer.parseInt(input.readLine());
            }//end loop
        }//end main
}//end class
```

Compass [Java Application] C:\Program Files\Java\jre1.8.0_66\bin\
```
Compass Directions
==============
Input a compass direction (E.g. N08E):
S02W
Start facing South. Turn 02 degrees towards West.
Press 1 to try again.
1
```

```java
/*
 * Justin Mendes
 * November 24, 2016/Edited January 15, 2017(did not use StringBuilder)
 * Unit 4 Activity 1 Program/Question 4
 * This program will print the user's inputted word backward and declare if the word
is a palindrome (spelt the same backwards as forward)
 */
import javax.swing.JOptionPane;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
public class Palindrome
{
        public static void main(String[] args) throws NumberFormatException,
IOException
        {
                //Variable Declarations and Initializations
                int restart = 1;
                while(restart == 1)
                {
                        String backward = "", palindrome;
```
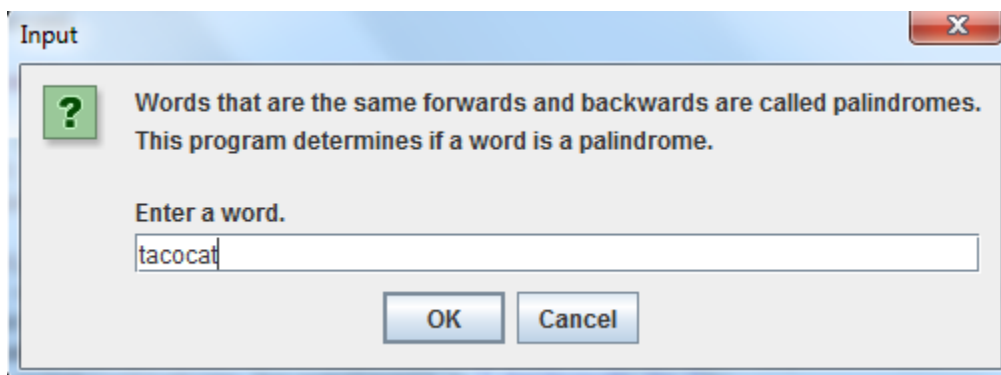
```java
                palindrome = JOptionPane.showInputDialog(null,"Words that are the
same forwards and backwards are called palindromes.\nThis program determines if a
word is a palindrome.\n\nEnter a word.", "Input", JOptionPane.QUESTION_MESSAGE);
                BufferedReader input = new BufferedReader(new InputStreamReader
(System.in));
                System.out.print(palindrome.toLowerCase() + " backwards is ");
                for (int i = palindrome.length(); i != 0; i--)
                {
                        backward = backward + palindrome.substring(i - 1, i);
                }//end for
                System.out.print(backward.toLowerCase());
                if (palindrome.length() == backward.length())
                {
                        if (palindrome.equals(backward))
                                System.out.println("\nTherefore, " +
palindrome.toLowerCase() + " IS a palindrome!");
                        else
                                System.out.println("\nClearly, " +
palindrome.toLowerCase() + " is NOT a palindrome.");
                }//end if
                System.out.println("\nPress 1 to try another word!");
                restart = Integer.parseInt(input.readLine());
        }//end while
    }//end main
}//end class
```

Input

? Words that are the same forwards and backwards are called palindromes.
This program determines if a word is a palindrome.

Enter a word.

tacocat

OK   Cancel

Palindrome [Java Application] C:\Program Files\
tacocat backwards is tacocat
Therefore, tacocat IS a palindrome!

Press 1 to try another word!
1

```java
/*
 * Justin Mendes
 * December 20, 2016
 * Unit 4 Activity 1 Program/Question 5
 * This program will check the validation of a SIN number with the check digit
 */
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
```

```java
public class SINChecker
{
    public static void main(String[] args) throws IOException
    {
        //Variable Declarations and Initializations
        String SIN;
        int checkDigit, step1, evenDigit = 0, oddDigit = 0, sum = 0;
        BufferedReader input = new BufferedReader(new InputStreamReader
(System.in));
        System.out.println("Social Insurance Number\n=====================");
        System.out.println("Enter a Social Insurance Number (no spaces): ");
        SIN = input.readLine();
        //Separate the checkDigit and the rest of the eight digits
        checkDigit = Character.getNumericValue(SIN.charAt(8));
        SIN = SIN.substring (0,8);
        for (int i = 1; i != SIN.length() + 1; i += 2)
        {
            //Step 1: Multiply the digits in the even positions of the SIN
            step1 = Character.getNumericValue(SIN.charAt(i)) * 2;
            //Step 2: Separate the digits individually, this can be done by
leaving single digits (already multiplied) and separating the multi-digit numbers
(multiplied)
            if(step1 >= 10)
            {
                step1 = (step1 % 10) + Math.round((step1 / 10));
            }//end if
            evenDigit += step1;
            //Step 3: Add together all of the odd position digits that have
not been multiplied by 2.
            //(which means if the odd number is not the same value as an even
number in the SIN then add it to oddDigit)
            if (Character.getNumericValue(SIN.charAt(i)) !=
Character.getNumericValue(SIN.charAt(i - 1)))
            {
                oddDigit += Character.getNumericValue(SIN.charAt(i - 1));
            }//end if
            sum = evenDigit + oddDigit;
        }//end loop
        if (Math.round(((sum / 10) + 0.5)) * 10 - sum == checkDigit)
        {
            System.out.println("The check digit of this SIN is correct.");
        }//end if
        else
        {
            System.out.println("The check digit of this SIN is NOT
correct.");
        }//end else
    }//end main
}//end class
```

```
Social Insurance Number
=======================
Enter a Social Insurance Number (no spaces):
130692544
The check digit of this SIN is correct.
```

```java
/*
 * Justin Mendes
 * December 20, 2016
 * Unit 4 Activity 1 Program/Question 6
 * This program will convert a binary number into its decimal form
 */
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
public class BinaryConverter
{
	public static void main(String[] args) throws IOException
	{
		//Variable Declarations and Initializations
		String binary;
		int value = 0, exponent = 0, sum = 0;
		BufferedReader input = new BufferedReader(new InputStreamReader
(System.in));
		System.out.println("Binary Number Converter\n==================");
		System.out.println("Binary numbers only contain the values 0 and 1
(hence BI-nary)");
		System.out.println("Enter a binary number to be converted from binary to
decimal (8 characters of 0 or 1):");
		binary = input.readLine();
		for (int i = binary.length() - 1; i != - 1; i--)
		{
			value = (int)
Math.round((Character.getNumericValue(binary.charAt(i)) * Math.pow(2, exponent)));
			exponent++;
			sum = value + sum;
		}//end for
		System.out.println("The binary number " + binary + " = " + sum);
	}//end main
}//end class
```

```
Binary Number Converter
==================
Binary numbers only contain the values 0 and 1 (hence BI-nary)
Enter a binary number to be converted from binary to decimal (8 characters of 0 or 1):
11010101
The binary number 11010101 = 213
```