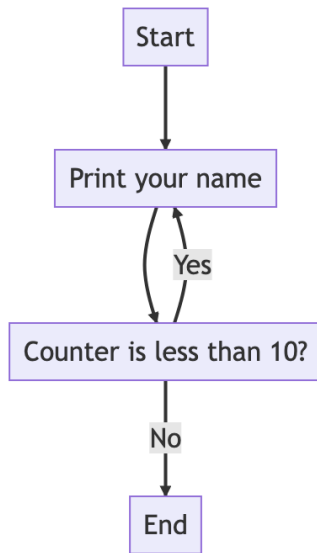# Chapter 5 Loops – Programming Exercises – `while` Loops
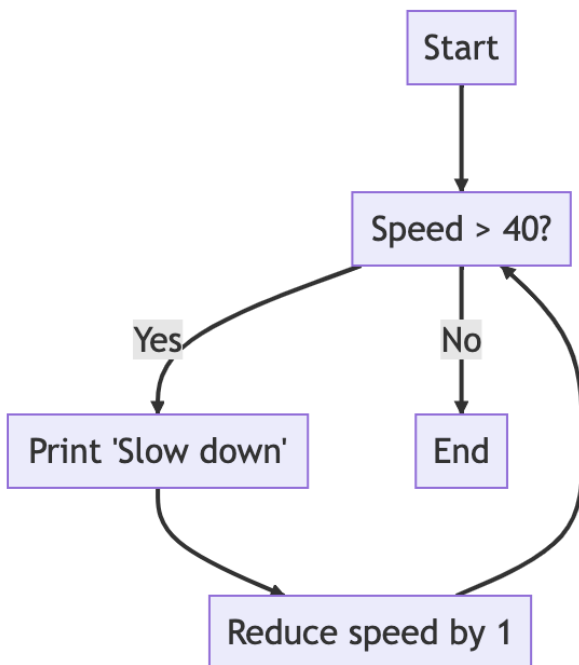
Draw a flowchart for the following scenarios, then implement the flowcharts:

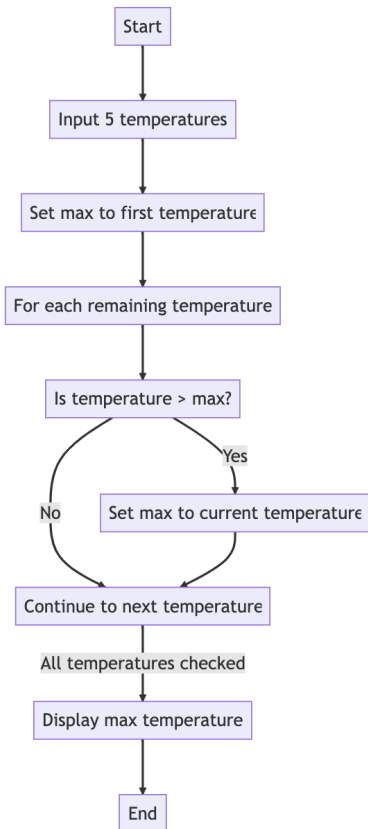1. **Print your name 10 times**

```
Start
  ↓
Print your name
  ↑ Yes
Counter is less than 10?
  ↓ No
End
```

```java
public class Main {
    public static void main(String[] args) {
        for(int i = 0; i < 10; i++) {
            System.out.println("Victor");
        }
    }
}
```

2. **When the value of speed is over 40 (the speed limit), print the words "Slow down" and reduce speed by 1 until the speed is under the speed limit**

```
Start
  ↓
Speed > 40?
Yes ↙      ↓ No
Print 'Slow down'    End
  ↓
Reduce speed by 1
```

```java
public class Main {
    public static void main(String[] args) {
        int speed = 45; // assuming initial speed is 45
        while(speed > 40) {
            System.out.println("Slow down");
            speed--;
        }
    }
}
```
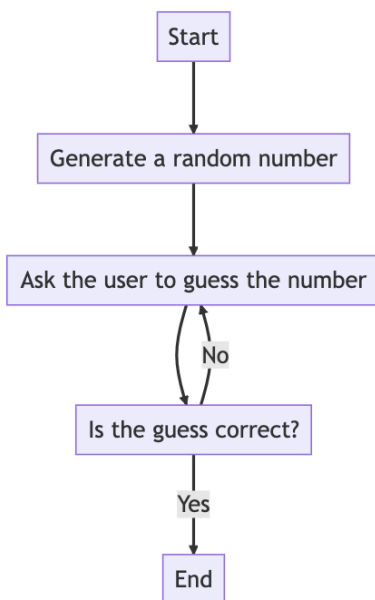
3. Ask the user for 5 temperatures, display the highest temperature entered

```
Start

Input 5 temperatures

Set max to first temperature

For each remaining temperature

Is temperature > max?
    Yes → Set max to current temperature
    No

Continue to next temperature

All temperatures checked

Display max temperature

End
```

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter 5 temperatures:");
        int max = scanner.nextInt();
        for (int i = 1; i < 5; i++) {
            int temp = scanner.nextInt();
            if (temp > max) {
                max = temp;
            }
        }
        System.out.println("The highest temperature entered is: " + max);
    }
}
```
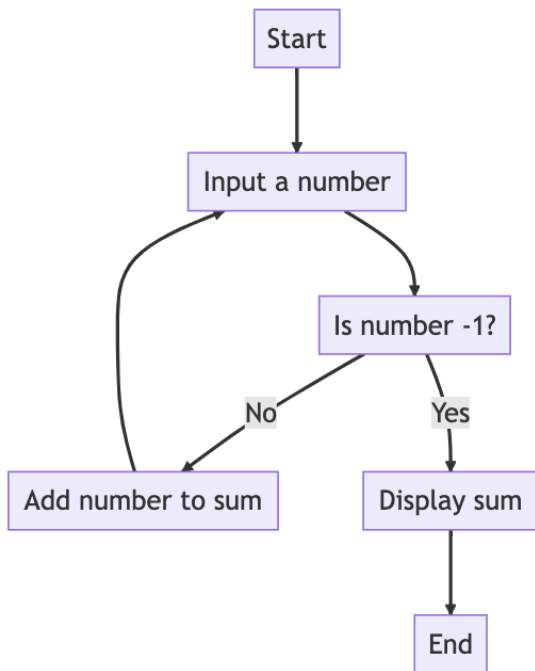
4. Generate a random number between 1 and 10. Ask the user to guess your number, stop when the user has guessed the right number

```
Start

Generate a random number

Ask the user to guess the number
    No
Is the guess correct?
    Yes

End
```

```java
import java.util.Scanner;
import java.util.Random;

public class Main {
    public static void main(String[] args) {
        Random rand = new Random();
        int number = rand.nextInt(10) + 1;
        Scanner scanner = new Scanner(System.in);
        int guess = 0;
        while (guess != number) {
            System.out.println("Guess the number:");
            guess = scanner.nextInt();
        }
        System.out.println("Congratulations! You guessed the number.");
    }
}
```

5. **Ask the user to enter a list of numbers, then print the sum of all the numbers entered. The user should enter a -1 to indicate they have entered all the data – the -1 is not included in the sum.**
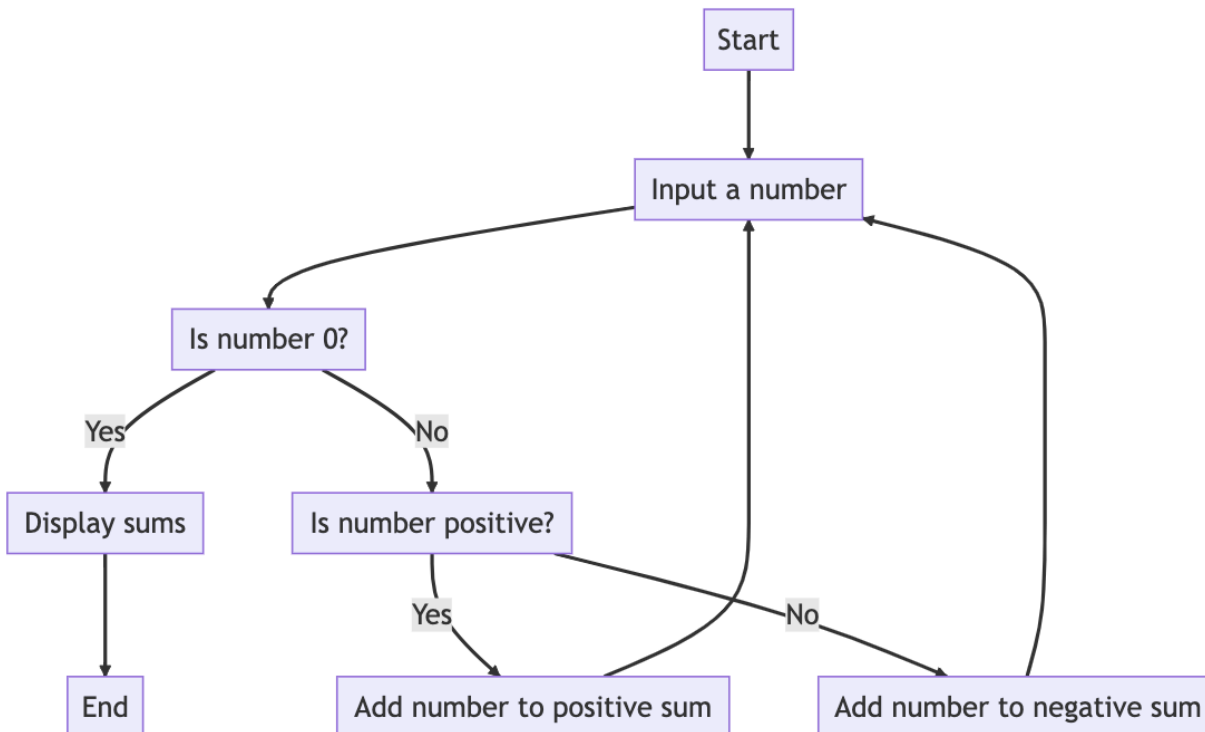
```mermaid
Start
  → Input a number
  → Is number -1?
     No → Add number to sum → (back to Input a number)
     Yes → Display sum → End
```

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int sum = 0;
        while (true) {
            System.out.println("Enter a number:");
            int num = scanner.nextInt();
            if (num == -1) {
                break;
            }
            sum += num;
        }
        System.out.println("The sum of all numbers entered is:
" + sum);
    }
}
```

6. **Ask the user to enter a list of numbers – positive and negative, entering a 0 will quit. Sum up the negative numbers and display the total, sum up the positive numbers and display the total.**

```mermaid
Start
  → Input a number
  → Is number 0?
     Yes → Display sums → End
     No → Is number positive?
        Yes → Add number to positive sum → (back to Input a number)
        No → Add number to negative sum → (back to Input a number)
```

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int sumPositive = 0;
        int sumNegative = 0;
        while (true) {
            System.out.println("Enter a number:");
            int num = scanner.nextInt();
            if (num == 0) {
                break;
            } else if (num > 0) {
                sumPositive += num;
            } else {
                sumNegative += num;
            }
        }
        System.out.println("The sum of all positive numbers entered is: " + sumPositive);
        System.out.println("The sum of all negative numbers entered is: " + sumNegative);
    }
}
```