



Experiment No.1
Aim: Basic programming constructs like branching and looping
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## Department of Artificial Intelligence & Data Science

**Aim :-** To apply programming constructs of decision making and looping.

**Objective :-** To apply basic programming constructs like Branching and Looping for solving arithmetic problems like calculating factorial of a no entered by user at command prompt .

### Theory :-

Programming constructs are basic building blocks that can be used to control computer programs. Most programs are built out of a fairly standard set of programming constructs. For example, to write a useful program, we need to be able to store values in variables, test these values against a condition, or loop through a set of instructions a certain number of times. Some of the basic program constructs include decision making and looping.

Decision Making in programming is similar to decision making in real life. In programming also, we face some situations where we want a certain block of code to be executed when some condition is fulfilled. A programming language uses control statements to control the flow of execution of a program based on certain conditions. These are used to cause the flow of execution to advance, and branch based on changes to the state of a program.

- if
- if-else
- nested-if
- if-else-if
- switch-case
- break, continue

These statements allow you to control the flow of your program's execution based upon conditions known only during run time.

A loop is a programming structure that repeats a sequence of instructions until a specific condition is met. Programmers use loops to cycle through values, add sums of numbers, repeat functions, and many other things. ... Two of the most common types of loops are the while loop and the for loop. The different ways of looping in programming languages are

- while
- do-while



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- for loop
- Some languages have modified for loops for more convenience eg :- Modified for loop in java.

For and while loop is entry-controlled loops. Do-while is an exit-controlled loop.

### Code: -

```
public class spring {
```

```
    public static void main(String[] args) {
```

```
        // Example of a for loop
```

```
        System.out.println("using For Loop:");
```

```
        for (int i = 0; i < 5; i++) {
```

```
            if (i == 3) {
```

```
                System.out.println("Breaking out of the loop at i = " + i);
```

```
                break; // Exiting the loop when i == 3
```

```
            }
```

```
            System.out.println("i = " + i);
```

```
        }
```

```
        // Example of a while loop
```

```
        System.out.println("\nusing While Loop:");
```

```
        int j = 0;
```

```
        while (j < 5) {
```

```
            if (j == 2) {
```

```
                System.out.println("Skipping the print statement when j = " + j);
```

```
                j++; // Incrementing j without using 'continue'
```

```
                continue; // Skips the rest of the loop body, not recommended but using to demonstrate
```

```
            }
```

```
            System.out.println("j = " + j);
```

```
            j++;
```

```
        }
```

```
        // Example of a do-while loop
```



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```
System.out.println("\nusing Do-While Loop:");
```

```
int k = 0;
```

```
do {
```

```
    if (k == 4) {
```

```
        System.out.println("Exiting the program at k = " + k);
```

```
        return; // Exiting the method using return
```

```
    }
```

```
    System.out.println("k = " + k);
```

```
    k++;
```

```
} while (k < 5);
```

```
// If this point is reached, it means the return statement was not executed
```

```
System.out.println("End of the program");
```

```
}
```

```
}
```

### Output:

```
x5credhat.java\x5cjdwt_ws\x5cmini project_34e65f4b\x5cbin 'spring' ;c37059ad-9f57-4e4d-b281-96dea1d80ecfusing For Loop:
i = 0
i = 1
i = 2
Breaking out of the loop at i = 3

using While Loop:
j = 0
j = 1
Skipping the print statement when j = 2
j = 3
j = 4

using Do-While Loop:
k = 0
k = 1
k = 2
k = 3
Exiting the program at k = 4
```



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### **Conclusion:**

In summary, branching and looping are powerful tools that enhance the capability of programs to handle a variety of scenarios, improve code efficiency, and simplify complex problem-solving processes. They allow developers to create responsive, adaptable, and maintainable applications, making them indispensable in programming.