

For Loop

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Learning Object

- Repetition Statement
- For Loop
 - ❑ Flow of For Loop
 - ❑ Increase and decrease for counter
 - ❑ Step size of counter
- For each
 - ❑ Array and ArrayList

Repetition Statements

- In a program, repetition statements control a block of code to be executed for many times
- Fixed number of times
 - ❑ **“for”** loop
 - ❑ **“for each”** loop
- Until a certain condition is met
 - ❑ **“while”** loop
 - ❑ **“do-while”** loop

For Loop

- The syntax for the for loop is as follows:

```
for(initialization; condition; in/decrement){  
    statement;  
}
```

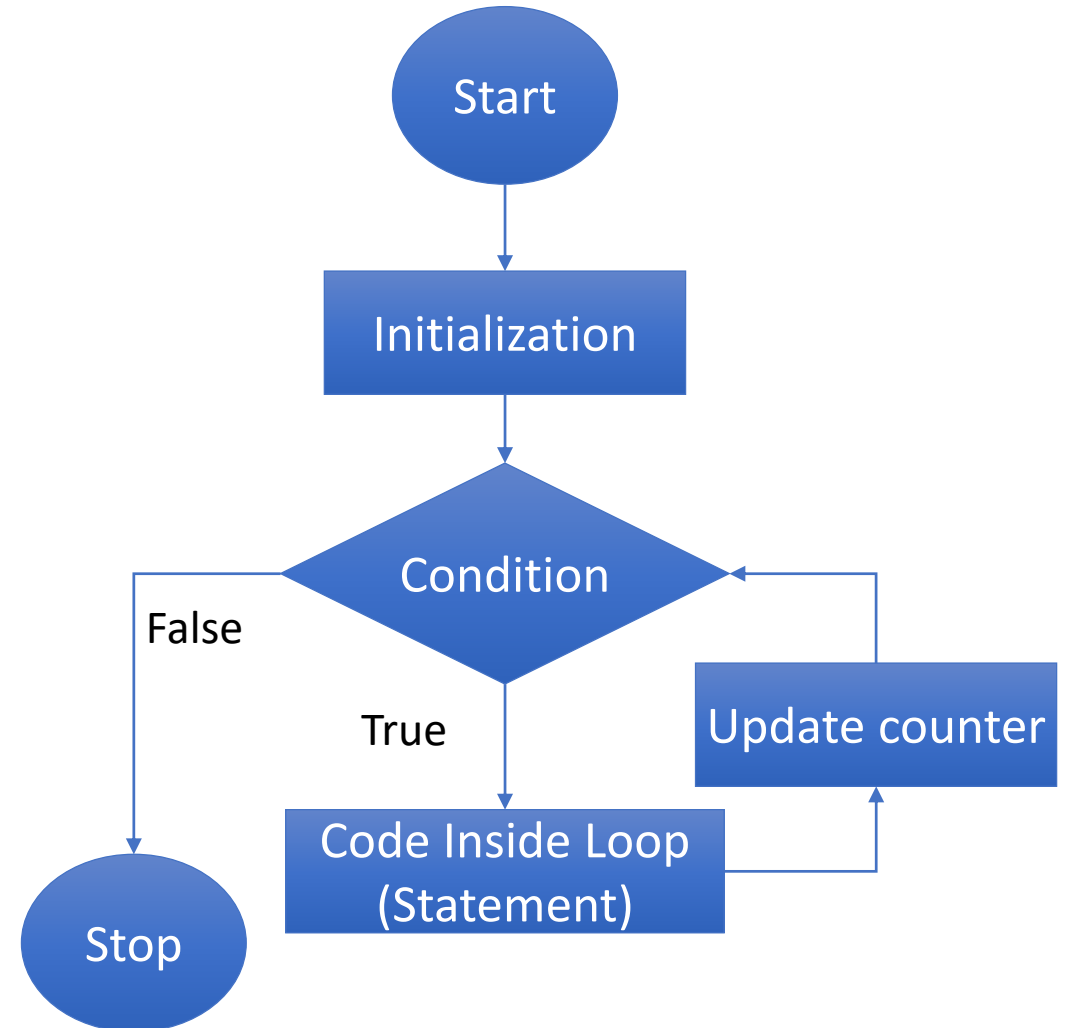
When True

- Useful for counter-controlled loop
- **No semicolon** after the update expression or after “)”
- Example:

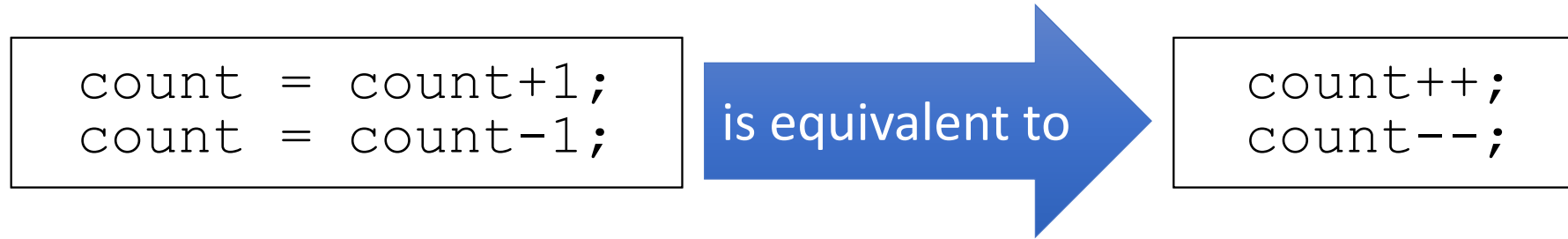
```
String[] numbers = {"one", "two", "three"};  
for(int i=0; i<numbers.length; i++) {  
    System.out.println(numbers[i]);  
}
```

Flow of For Loop

1. Perform *Initialization*
2. *Evaluate Boolean expression*
 - ❑ If *true*, execute statement
 - ❑ Update counter, then re-evaluate Boolean expression
 - ❑ If *false*, terminate loop



Increase and Decrease for counter



Operator	Meaning
<code>i++</code>	Add 1, return the old value
<code>++i</code>	Add 1, return the new value
<code>i--</code>	Sub 1, return the old value
<code>--i</code>	Sub 1, return the new value

Step Size for the Update

➤ It could be a value greater than 1

❑ Example, we need to compute summation of even numbers from 0 to 100

```
for(int i=0; i<=100; i+=2){  
    sum += i;  
}
```

➤ It could be a negative value

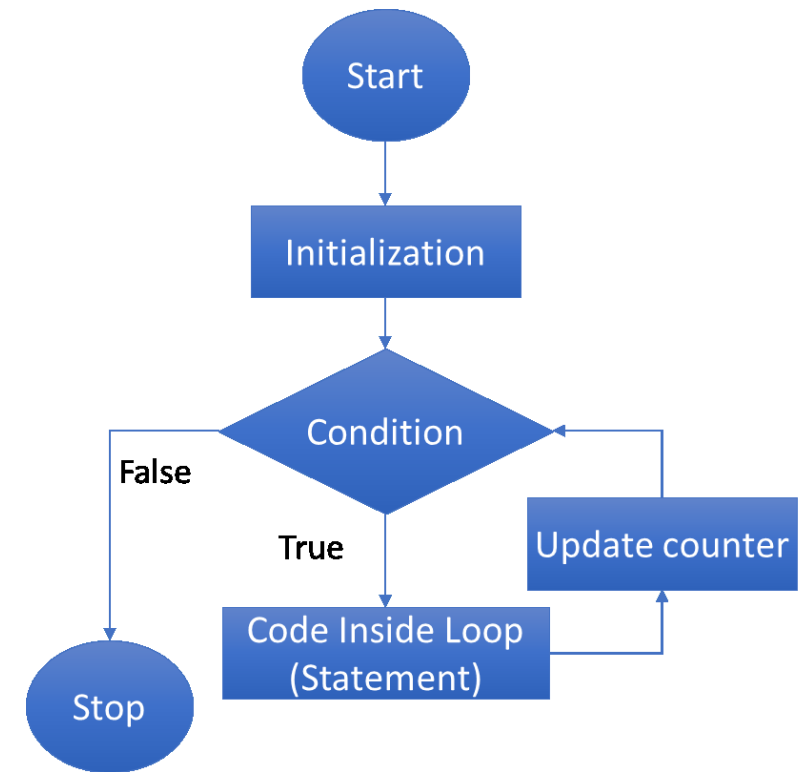
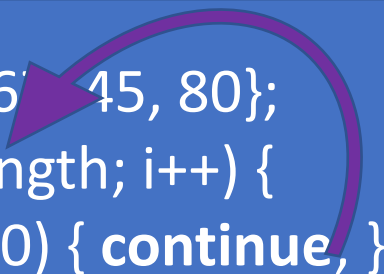
❑ Print even numbers from 0 to 100 in the decreasing order

```
for(int i=100; i>=0; i-=2){  
    sum += i;  
}
```

For Loop with continue and break

- Continue: go to “condition”
- Break: go out to for loop
- Example:

```
int[] marks = {90, 25, 67, 45, 80};  
for(int i=0; i<marks.length; i++) {  
    if (marks[i] < 60) { continue, }  
    System.out.println((i+1)+" index is passed exam");  
}
```



For Each Statement

- The syntax for the for each loop is as follows:

```
for(type variable; iterate) {  
    statement;  
}
```

- Normally the iterate is array and ArrayList
- Access one by one in an array following by index order
- Example:

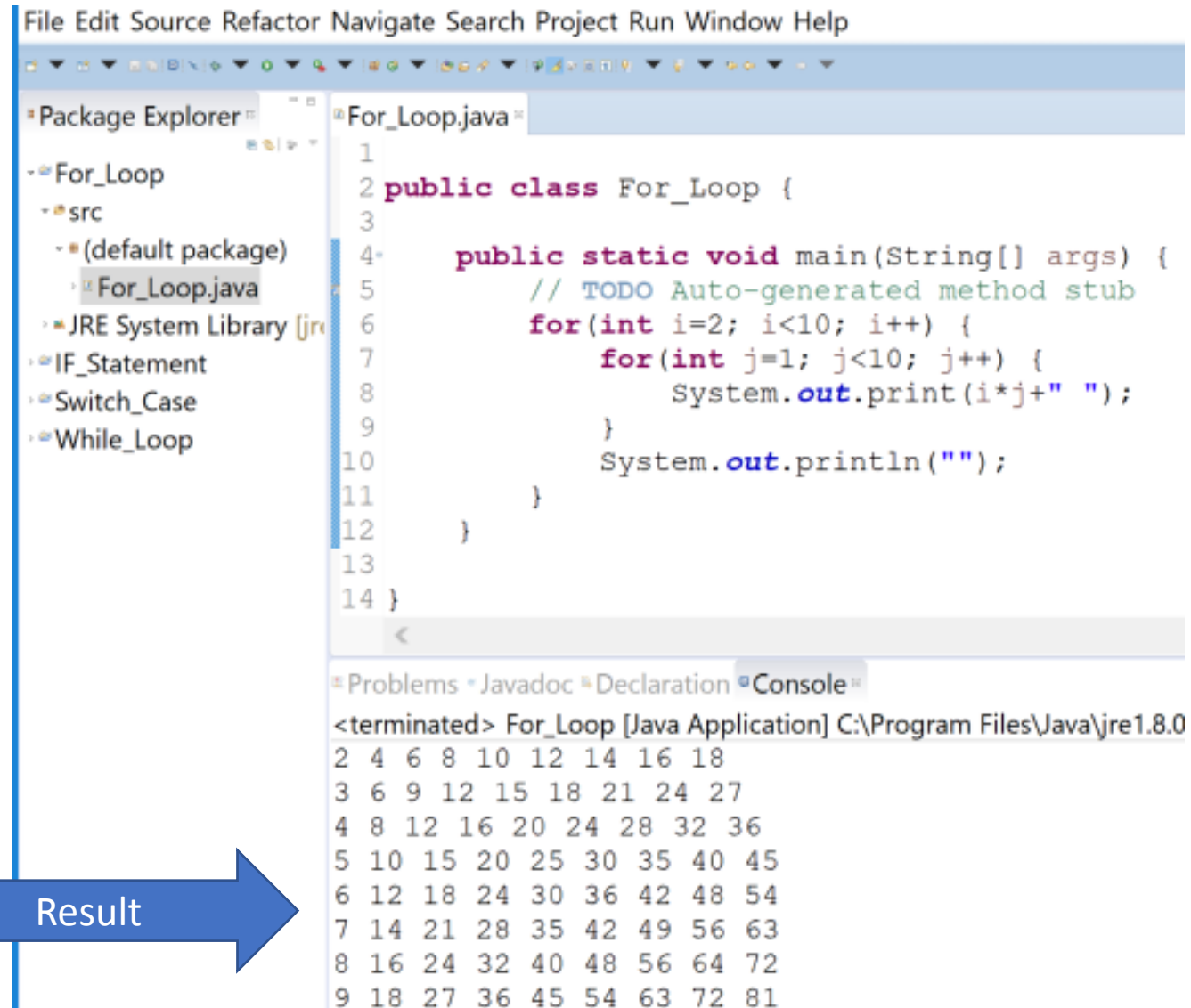
```
String[] numbers = {"one", "two", "three"};  
for(String number: numbers) {  
    System.out.println(number);  
}
```

Practice

1. Make a new project (Reference: Create Project and Class File)
 - ❑ Project name: For_Loop
2. Create a new Class File
 - ❑ Class name: For_Loop
3. Coding: (times table)

```
public class For_Loop {  
    public static void main(String[] args) {  
        for(int i=2; i<10; i++) {  
            for(int j=1; j<10; j++) {  
                System.out.print(i*j+" ");  
            }  
            System.out.println("");  
        }  
    }  
}
```

Practice – Code and Result



The screenshot shows an IDE with the following components:

- Package Explorer:** Shows a project structure with a package `For_Loop` containing a source file `For_Loop.java`.
- Editor:** Displays the code for `For_Loop.java`. The code is as follows:

```
1  
2 public class For_Loop {  
3  
4     public static void main(String[] args) {  
5         // TODO Auto-generated method stub  
6         for(int i=2; i<10; i++) {  
7             for(int j=1; j<10; j++) {  
8                 System.out.print(i*j+" ");  
9             }  
10            System.out.println("");  
11        }  
12    }  
13  
14 }
```
- Console:** Shows the output of the program, which is a 9x9 grid of numbers (excluding 1) representing the product of two nested loops. The output is:

```
<terminated> For_Loop [Java Application] C:\Program Files\Java\jre1.8.0  
2 4 6 8 10 12 14 16 18  
3 6 9 12 15 18 21 24 27  
4 8 12 16 20 24 28 32 36  
5 10 15 20 25 30 35 40 45  
6 12 18 24 30 36 42 48 54  
7 14 21 28 35 42 49 56 63  
8 16 24 32 40 48 56 64 72  
9 18 27 36 45 54 63 72 81
```

Result

Summary

➤ Repetition Statement

➤ For Loop

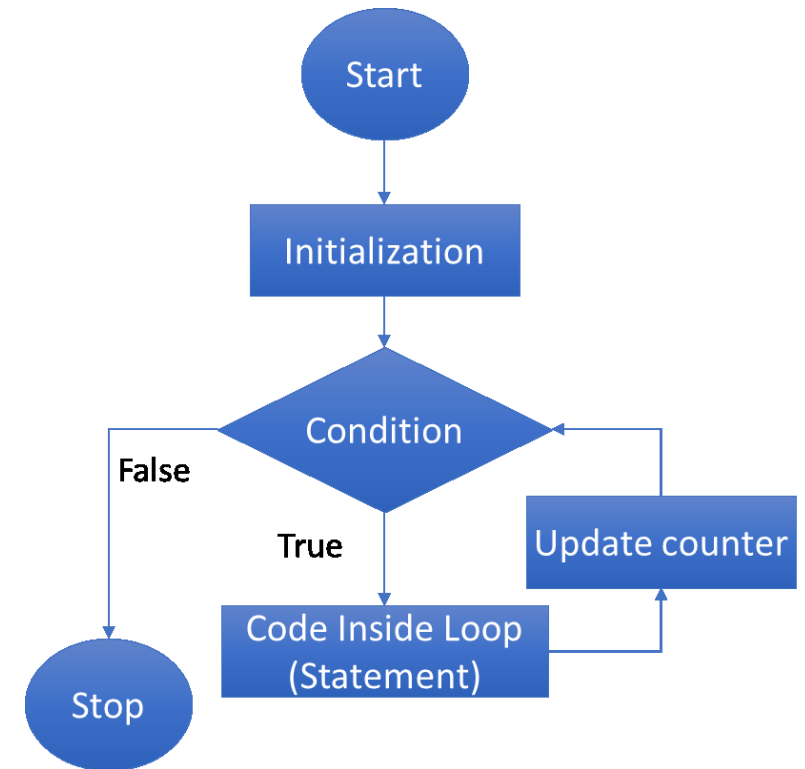
- ❑ Flow of For Loop

- ❑ Increase and decrease for counter

- ❑ Step size of counter

➤ For each

- ❑ Array and ArrayList



```
1 public class For_Loop {  
2     public static void main(String[] args) {  
3         // TODO Auto-generated method stub  
4         for(int i=2; i<10; i++) {  
5             for(int j=1; j<10; j++) {  
6                 System.out.print(i*j+" ");  
7             }  
8             System.out.println("");  
9         }  
10    }  
11 }  
12 }
```