

Nested Repetition

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Introduction

- ❖ A **nested loop** is a logical structure used in computer programming where two repeating statements are placed in a "nested" form, i.e., one loop is situated within the body of the other.
- ❖ In a nested loop, the first iteration of the outer loop causes the inner loop to execute.
- ❖ The inner loop then repeats for as many times as is specified.
- ❖ When the inner loop completes, the outer loop is executed for its second iteration, triggering the inner loop again, and so on until the requirements for the outer loop are complete.

Example:

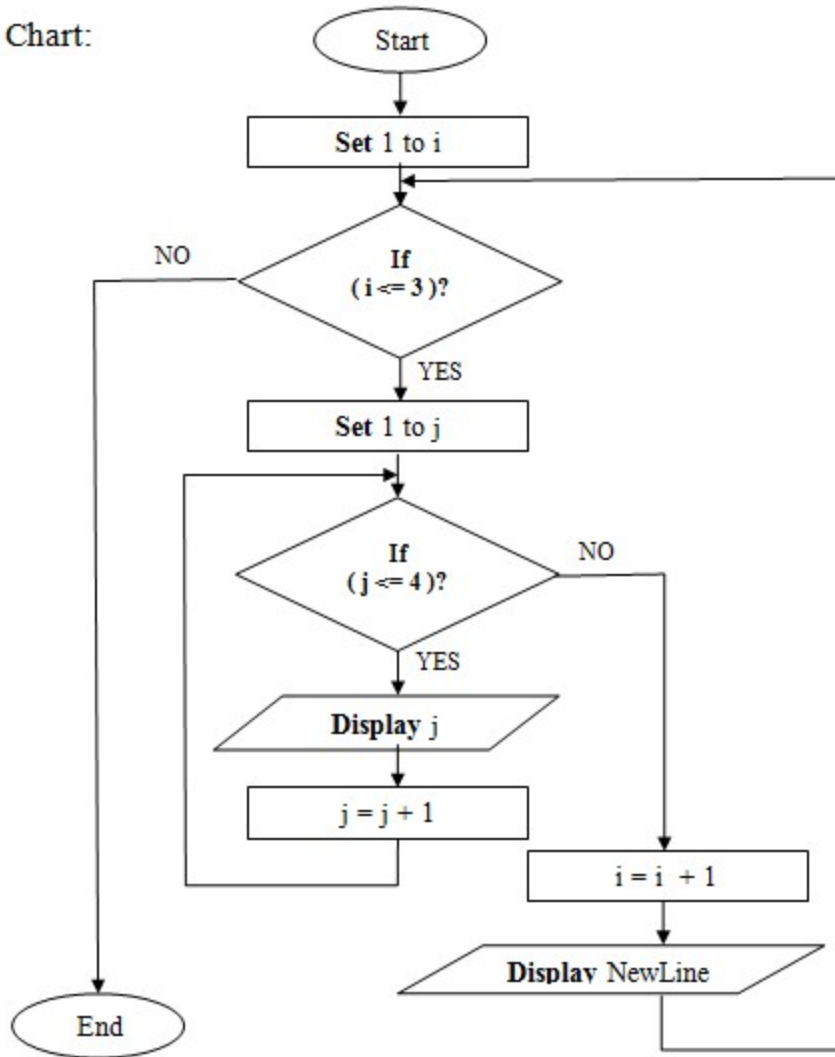
- ❖ We illustrate an example that contains two loops, the algorithm caused to the following output:

```
1 2 3 4
1 2 3 4
1 2 3 4
```

Pseudo Code:

1. **Begin**
2. **For** i = 1 to 3
 - For** j = 1 to 4
 - Display** j
 - j = j + 1
 - EndLoop**
 - i = i + 1
 - Display** NewLine
 - EndLoop**
3. **End**

Flow Chart:



How the above example works?

- ❖ The first pass of the outer loop (i) triggers the inner loop (j), which executes to completion.
- ❖ Then the second pass of the outer loop (i) triggers the inner loop (j) again.
- ❖ This repeats until the outer loop (i) finishes.

First pass of the outer loop (i) is 1

j → 1 2 3 4

Second pass of the outer loop (i) is 2

j → 1 2 3 4

Third pass of the outer loop (i) is 3

j → 1 2 3 4

Homework number (6) delivered next week

1) Write a pseudo code and draw a flow char using nested loops structure to display the following:

a)

```
1
1 2
1 2 3
1 2 3 4
```

b)

```
***
**
*
**
***
```

c)

```
1
22
333
4444
55555
```

d)

```
*?????
*?????
*?????
```

e)

```
* * * * *
* * * *
* * *
* *
*
```