NESTED LOOPS

zyBook 5.8

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NESTED LOOPS

A loop placed inside of another loop.

```
while (<test>) {
    <statement>;
    for (<initialization>; <continuation test>; <update>){
        <statement>;
        <statement>;
        . . .
        <statement>;
    }
    . . .
    <statement>;
}

for (<initialization>; <continuation test>; <update>){
    <statement>;
    for (<initialization>; <continuation test>; <update>){
        <statement>;
        <statement>;
        . . .
        <statement>;
    }
    . . .
    <statement>;
}
```

```java
import java.util.Scanner;

public class StringLoop {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter String (or QUIT to quit): ");
        String input = scan.nextLine();
        while (!input.equals("QUIT")) {
            // Loop through string, output one index and
            // character on each line
            for (int i = 0; i < input.length(); i++) {
                System.out.println(i + ": " + input.charAt(i));
            }
            System.out.print("Enter String (or QUIT to quit): ");
            input = scan.nextLine();
        }
    }
}
```

```
$ javac -d bin -cp bin src/StringLoop.java

$ java -cp bin StringLoop
Enter String (or QUIT to quit): Hi
0: H
1: i
Enter String (or QUIT to quit): Hello
0: H
1: e
2: l
3: l
4: o
Enter String (or QUIT to quit): QUIT
```

NESTED FOR LOOP PATTERN

```java
int n = 6;
int m = 10
// n lines of pattern
for (int i = 0; i < n; i++) {
  // m repetitions of print statement (or m columns
  // if print single character)
  for (int j = 0; j < m; j++) {
    System.out.print("*");
  }
  System.out.println();
}
```

$i = 0$
$j = 0, 1, 2, 3, \ldots, 10$

$i = 1$
$j = 0, 1 \ldots, 10$

$\ldots$

$i = 5$
$j = 0, 1 \ldots, 10$

$i = 6$

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