

## Homework – Nested Loop

1. Trace the following programs.

Program	Memory	Output
<pre>final int SIZE = 5; for (int i = 1; i &lt; SIZE; i++) {     for (int j = SIZE; j &gt;= i; j--) {         System.out.println(i * 2 + j);     } }</pre>	<pre>SIZE(int): 5 i(int): 1 2 3 4 5 j(int): <del>5 4 3 2 1 0 5 4 3</del> <del>2 1 5 4 3 2 5 4 3</del></pre>	<pre>7 6 5 4 3 9 8 7 6 11 10 9 13 12 &gt;</pre>
<pre>for (int j = 22; j &lt;= 25; j++) {     for (int k = 7; k &lt;= 10; k++) {         if (j % 2 == k % 2) {             System.out.println(j);         } else {             System.out.println(k);         }     }     System.out.println(); }</pre>	<pre>j(int): <del>22 23 24 25</del> 26 k(int): <del>7 8 9 10</del> 11</pre>	<pre>7 22 9 22 &gt; 23 8 23 10 &gt; 7 24 9 24 &gt; 25 8 25 10 &gt;</pre>
<pre>for (int j = 8; j &gt; 2; j-=2) {     System.out.println(j + ":");     for (int k = 2; k &lt;= j; k++) {         System.out.print(j+k);     }     System.out.println(); }</pre>	<pre>j(int): <del>8 6 4 2</del> 0 k(int): <del>2 3 4 5 6 7 8 9 2</del> <del>3 4 5 6 7 2 3 4 5 2 3</del></pre>	<pre>10 11 12 13 14 15 16</pre>

		> 8 9 10 11 12 > 6 7 8 4
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2. **Rectangle.java** Write a program that draws a rectangle with stars, given the number of rows and columns.

Sample Input	Sample Output
Enter # of rows: 5 Enter # of columns: 4	**** **** **** **** ****

3. **TableOfNumbers.java** Write a program that will prompt user for two numbers x & y then output a table of numbers with x rows and each of the rows lists number from 1 to y, separated by a space.

Sample Input	Sample Output
Enter x: 5 Enter y: 6	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6

4. **TriangleOfNumbers.java** Write a program using nested loops that prints the following pattern.

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1
12
123
1234
12345

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5. **PythagoreanTriplets.java** Three positive integers a, b, and c with  $a < b < c$  form a Pythagorean triplet if  $a^2 + b^2 = c^2$ . For example 3, 4, 5 form a Pythagorean triplet since  $3^2 + 4^2 = 5^2$ . Write a program that first prompts the user for a positive integer and then finds and prints all Pythagorean triplets whose largest member is less than or equal to that integer.