**Homework – Nested Loop**

1. Trace the following programs.

| Program | Memory | Output |
| --- | --- | --- |
| final int SIZE = 5;  for (int i = 1; i < SIZE; i++) {  for (int j = SIZE; j >= i; j--) {  System.out.println(i \* 2 + j);  }  } | SIZE (final int): 5  i (int):  ~~1 2 3 4~~ 5  j (int):  ~~5 4 3 2 1 0~~  ~~5 4 3 2 1~~  ~~5 4 3 2~~  ~~5 4~~ 3 | 7  6  5  4  3  9  8  7  6  11  10  9  13  12 |
| for (int j = 22; j <= 25; j++) {  for (int k = 7; k <= 10; k++) {  if (j % 2 == k % 2) {  System.out.println(j);  } else {  System.out.println(k);  }  }  System.out.println();  } | j (int):  ~~22 23 24 25~~ 26  k (int):  ~~7 8 9 10 11~~  ~~7 8 9 10 11~~  ~~7 8 9 10 11~~  ~~7 8 9 10~~ 11 | 7  22  9  22  23  8  23  10  7  24  9  24  25  8  25  10 |
| for (int j = 8; j > 2; j-=2) {  System.out.println(j + “:”);  for (int k = 2; k <= j; k++) {  System.out.print(j+k);  }  System.out.println();  } | j (int):  ~~8 6 4~~ 2  k (int):  ~~2 3 4 5 6 7 8 9~~  ~~2 3 4 5 6 7~~  ~~2 3 4~~ 5 | 8:  1013141516  6:  89101112  4:  678 |

1. **Rectange.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 | \*\*\*\*  \*\*\*\*  \*\*\*\*  \*\*\*\*  \*\*\*\* |

1. **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 |

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

1

12

123

1234

12345

1. **PythagoreanTriples.java** Three positive integers a, b, and c with a < b < c form a Pythagorean triplet if a2 + b2 = c2. For example 3, 4, 5 form a Pythagorean triplet since 32 + 42 = 52. 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.