

Nested Loops

- Just as one selection structure can be nested inside another (nested if/else)
 - a selection structure can be nested inside a loop (several examples we've already seen)
 - a loop can be nested inside another (last example – do/while loops – illustrated this)
- More examples:
 - Print a multiplication table (like the one below):

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
11	22	33	44	55	66	77	88	99	110	121	132	143	154	165
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
13	26	39	52	65	78	91	104	117	130	143	156	169	182	195
14	28	42	56	70	84	98	112	126	140	154	168	182	196	210
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225

- Code: MTable
- Compute & print out summary information from a file; starting with data like this:

```
3027 3 171 182 115
6213 2 101 124
7629 2 168 150
9529 5 174 173 135 185 117
2279 2 146 131
3973 4 166 150 179 115
...
```

Show results like this:

ID Number	Average		
3027	156.00	...	
6213	112.50	5354	144.50
7629	159.00	5911	157.00
9529	156.80	1229	151.60
2279	138.50	3649	164.67
...		Total of 25 records were processed.	

- Code: NestLoopAvgFileExample

Tracing Nested Loops

- Show loop in progress
- Keep track of each loop control variable & output produced for each specific value
- Examples:

Code	x	y	output	
<pre>public class Draw5x5Square { public static void main(String [] args) { for (int x=0; x<5; x++) { for (int y=0; y<5; y++) { System.out.print("* "); } System.out.println(); } } }</pre>	0 1 2 3 4 5	0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5	* *	
Code	x	y	z	output
<pre>public class DrawTriangle { public static void main(String [] args) { for (int x=0; x<5; x++) { for (int y=0; y<x; y++) { System.out.print(" "); } for (int z=5; z>x; z--) { System.out.print("* "); } System.out.println(); } } }</pre>	0 1 2 3 4 5	0 0 1 0 1 2 0 1 2 3 0 1 2 3 4	5 4 3 2 1 0 5 4 3 2 1 5 4 3 2 5 4 3 5 4	* * * * * * * * * * * * * * *
Code	x	y	z	output
<pre>public class DrawRhombus { public static void main(String [] args) { for (int x=0; x<5; x++) { for (int y=5; y>x; y--) { System.out.print(" "); } for (int z=0; z<5; z++) { System.out.print("* "); } System.out.println(); } } }</pre>	0 1 2 3 4 5	5 4 3 2 1 0 5 4 3 2 1 5 4 3 2 5 4 3 5 4	0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5	* *