Infinite Spiral of Numbers (due 05 April 2013)

Consider the natural numbers laid out in a square spiral, with 1 occupying the center of the spiral. The central 11 x 11 subset of that spiral is shown in the table below.

111	112	113	114	115	116	117	118	119	120	121
110	73	74	75	76	77	78	79	80	81	82
109	72	43	44	45	46	47	48	49	50	83
108	71	42	21	22	23	24	25	26	51	84
107	70	41	20	7	8	9	10	27	52	85
106	69	40	19	6	1	2	11	28	53	86
105	68	39	18	5	4	3	12	29	54	87
104	67	38	17	16	15	14	13	30	55	88
103	66	37	36	35	34	33	32	31	56	89
102	65	64	63	62	61	60	59	58	57	90
101	100	99	98	97	96	95	94	93	92	91

This spiral has several interesting features. The southeast diagonal has several prime numbers (3, 13, 31, 57, and 91) along it. The southwest diagonal has a weaker concentration of prime numbers (5, 17, 37) along it.

To construct the spiral we start with 1 at the center, with 2 to the right, and 3 below it, 4 to the left, and so on. A part of the problem for this assignment is to figure out the rule to fill the spiral for an arbirary size. Once you have that rule you can complete the rest of the assignment.

You will read your input from the file *spiral.txt*. You will hard code the name of your file in your program. The file will have just two lines. For example:

```
57
42
```

The first line indicates the dimension of the square spiral. This number should be an odd number. If it is not then choose the dimension to be the next *higher* odd number. The second number must be in the range 1 and the square of the dimension. If the second number is not in that range, print an error message *Number not in Range*.

You will write the neigboring numbers of the second number in three lines. Each line will have three integers separated by a single white space. If the second number was 42, then this should be your output:

```
72 43 44
71 42 21
70 41 20
```

If the second number was 64, then this should be your output:

```
66 37 36
65 64 63
```

```
100 99 98
```

What if that second number was on the outer edge of the spiral, then print *Number on Outer Edge*. You will write the neigboring numbers of the second number in two / three lines. Each line will have two / three integers separated by a single white space. If the second number was 97, then should should be your output:

```
Number on Outer Edge
63 62 61
98 97 96
```

The file that you will be turning in will be called **Spiral.java**. You will follow the standard Java coding convention that I have appended below. The file will have a header of the following form:

```
/*
  File: Spiral.java

  Description:

  Student Name:

  Student UT EID:

  Course Name: CS 312

  Unique Number:

  Date Created:

  Date Last Modified:

*/
```

You will follow the standard Java Coding Conventions. You can either view the HTML page or download the PDF or Postscript and print it out. There is a modification that I would like to make to the standard coding conventions. Please align the opening and closing braces vertically so that you can easily make out the blocks of code. For example:

```
Do this:
if ( x > 5 )
{
  a = b + c;
}

Not this:
if ( x > 5 ) {
  a = b + c;
}
```

Use the turnin program to submit your **Spiral.java** file. We should receive your work by 11 PM on Friday, 05 April 2013. There will be substantial penalties if you do not adhere to the guidelines.

- You must submit the .java file and not the .class file.
- Your .java file should have the header with the proper documentation.

- You should be submitting your .java file through the web based *turnin* program. We will not accept files e-mailed to us.
- Compile and run your code on the command line.
- Your code must compile before submission.
- Here is the Grading Criteria.