CSCI-15 Lab 3, due 10/2/18

Please work in groups of exactly two, unless I clear it with you directly. Do not work alone.

Your job is to write a function `makeSpiral()` that takes a two-dimensional array and the number of rows and columns to fill. The function will fill the rows-by-columns corner of the array with the integers from 1 to (rows * columns) in a counter-clockwise spiral pattern. The pattern starts at `a[0][0]` in the upper left, and goes down, then right, then up, then left filling the elements with values; and then moves in one row and column on each side, continuing until you run out of rows and columns. For example, with a 5 by 6 array and filling a 4 by 4 corner, the result will be something like this:

row/column	0	1	2	3	4	5
0	1	12	11	10		
1	2	13	16	9		
2	3	14	15	8		
3	4	5	6	7		
4						

The top and left sides of this table just show the column and row numbers. The rest of the array (outside the corner passed into the `makeSpiral()` function) will be left unchanged by the function.

Next, write a function `printSpiral()` that takes an output file handle, a 2-d array and the number of rows and columns to print, and prints the spiral in the array in a reasonable format. Use `setw()` with the size (number of digits) of the value of (rows * columns) + 1 to set the size of each value to print. Do not skip lines, and do not print the row or column numbers, just the spiral. Print output directly to a text file.

Then write a program that declares a 15 by 20 array and opens a text file for output. The program will then loop, filling the array completely with zeroes (use a function for this task), calling `makeSpiral()` with the various values for the size of the corner to fill, and then calling `printSpiral()` to print the spiral. Run this loop to test all of the spiral corner sizes you need.

How can you pass in multiple corner sizes to the various functions without prompting for the values (or using multiple separate function calls)? Solve this problem in the lab, too. It is not hard.

In a reduced size fixed-width font, this is what a 15x20 spiral looks like:

```
 1  66  65  64  63  62  61  60  59  58  57  56  55  54  53  52  51  50  49  48
 2  67 124 123 122 121 120 119 118 117 116 115 114 113 112 111 110 109 108  47
 3  68 125 174 173 172 171 170 169 168 167 166 165 164 163 162 161 160 107  46
 4  69 126 175 216 215 214 213 212 211 210 209 208 207 206 205 204 159 106  45
 5  70 127 176 217 250 249 248 247 246 245 244 243 242 241 240 203 158 105  44
 6  71 128 177 218 251 276 275 274 273 272 271 270 269 268 239 202 157 104  43
 7  72 129 178 219 252 277 294 293 292 291 290 289 288 267 238 201 156 103  42
 8  73 130 179 220 253 278 295 296 297 298 299 300 287 266 237 200 155 102  41
 9  74 131 180 221 254 279 280 281 282 283 284 285 286 265 236 199 154 101  40
10  75 132 181 222 255 256 257 258 259 260 261 262 263 264 235 198 153 100  39
11  76 133 182 223 224 225 226 227 228 229 230 231 232 233 234 197 152  99  38
12  77 134 183 184 185 186 187 188 189 190 191 192 193 194 195 196 151  98  37
13  78 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150  97  36
14  79  80  81  82  83  84  85  86  87  88  89  90  91  92  93  94  95  96  35
15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34
```

Send me tests with at least the following corner sizes, plus several more of your own choice:

1 by 1, 1 by 2, 2 by 1, 2 by 2, 3 by 3, 4 by 4, 5 by 5, 4 by 7, 7 by 4, 4 by 8, 6 by 4, 15 by 20

Designing this **completely** before trying to code any of it will save you several hours of effort. You may write little test programs (stubs) to test specific ideas before you complete the design.