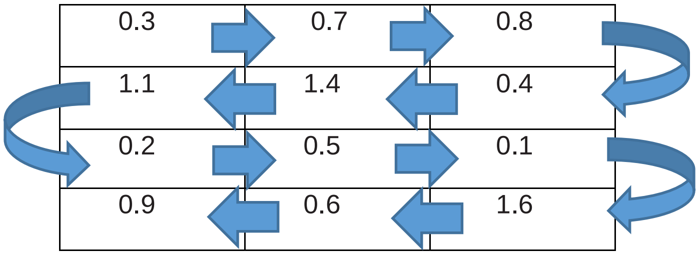
Telescope Lab

Create a new project named telescope_lab. Copy SkyClass.java and into your project. You will implement code in empty routines

Make sure you use correct java conventions.

A telescope scans a rectangular area of the night sky and collects the data into a 1 dimensional array. Each data value scanned is a number representing the amount of light detected by the telescope. The telescope scans back and forth across the sky (alternating between left to right and right to left) in the pattern indicated below by the arrows. The back-and-forth ordering of the values received from the scan is called telescope order.



0.3	0.7	0.8
1.1	1.4	0.4
0.2	0.5	0.1
0.9	0.6	1.6

The telescope records the data in telescope order into a 1 dimensional array of double values. This 1 dimensional array of information received from a single scan will be transferred into a 2 dimensional array, which reconstructs the orginal view of the rectangular area of the sky. This 2 dimensional array is part of the SkyClass class.

(a) Write the constructor of the SkyClass class. The constructor initializes the view instance variable to a 2-dimensional array with numRows rows and numCols columns. The information from scanned, which is stored in the telescope order, is copied into view to reconstruct the sky view as originally seen by the telescope. The information in scanned must be rearranged as it is stored into view so that the sky view is oriented properly.

For example, suppose scanned contains values, as shown in the following array:

0	1	2	3	4	5	6	7	8	9	10	11
0.3	0.7	0.8	0.4	1.4	1.1	0.2	0.5	0.1	1.6	0.6	0.9

Using the scanned array above, a SkyClass object created with new SkyClass (4, 3, scanned), would have view initialized with the following values.

view

0.3	0.7	0.8
1.1	1.4	0.4
0.2	0.5	0.1
0.9	0.6	1.6

For another example, suppose scanned contains the following values.

scanned

0.3	0.7	0.8	0.4	1.4	1.1

A SkyClass object created with new SkyClass (3, 2, scanned), would have view initialized with the following values.

view

0.3	0.7
0.4	0.8
1.4	1.1

(b) Write the SkyClass method getAverage, which returns the average of the elements of the section of view with row indexes from startRow through endRow, inclusive, and column indexes from startCol through endCol, inclusive.

For example, if nightSky is a SkyClass object where view contains the values shown below, the call nightSky.getAverage (1, 2, 0, 1) should return 0.8. (The average (1.1 + 1.4 + 0.2 + 0.5) / 4 which equals 0.8). The section being averaged is indicated by red in the table below.

view

0.3	0.7	0.8
1.1	1.4	0.4
0.2	0.5	0.1
0.9	0.6	1.6