CS 101 - HW 05

Due: 13.05.2016, 23:55 pm

In this assignment you have two separate tasks to complete.

Task #1

You will create a simple puzzle. And you are expected to write a ConsoleProgram that outputs if this puzzle is solvable or not. Details of the puzzle that you will create is provided below.

- ★ Create an array of integers.
- ★ The size of the array is determined by a variable, SIZE.
- ★ Fill the array with random numbers between [1, SIZE/2] (inclusive)
- ★ Set the last element of this array to be 0

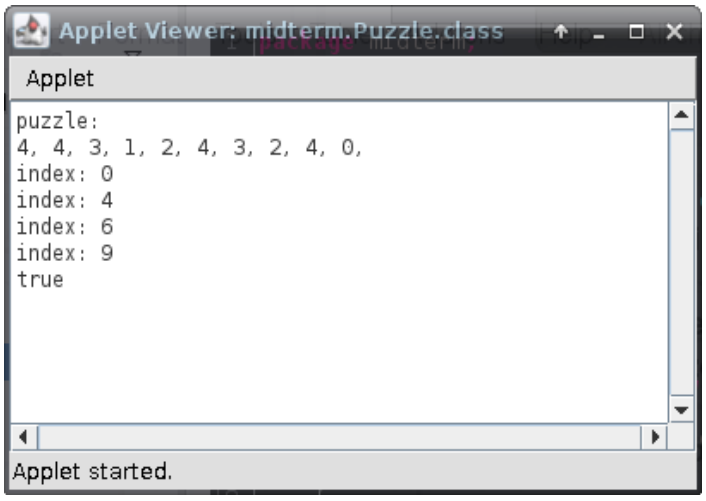
Steps to solve this puzzle:

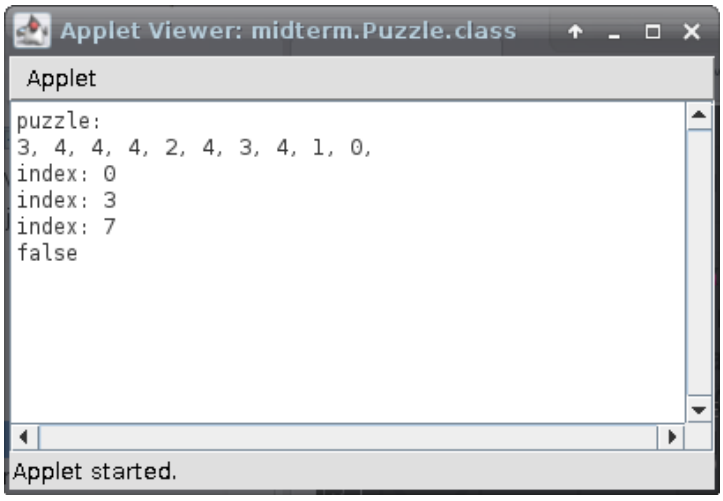
- ★ Start at index 0
- ★ At each step move right puzzle[index] elements
- ★ If you can reach the last index (which contains zero) then the puzzle is solvable since moving right 0 elements changes absolutely nothing.
- ★ If you exceed the size of the structure then the puzzle is not solvable.

An example is provided below:

[3, 4, 3, 4, 2, 2, 3, 2, 4, 0]
You start with index 0, puzzle[0] is 3, then move 3 elements to right:
puzzle[0+3] = 4. Now move 4 to right:
puzzle[3+4] = 2. Move 2 to right.
puzzle[7+2] = 9. Since puzzle[9] = 0 this puzzle is solvable.

Now, write a **recursive method** called isSolvable() that takes an index of this puzzle(index must be set to 0) and returns whether the puzzle is solvable or not. Two example outputs are provided below:





Please print the array on the screen first. Then, print the current index in solvable(), that is taken as an argument by the method. At last, print the output of the solvable method on the screen as shown in the outputs above. **Name your file as Puzzle.java**

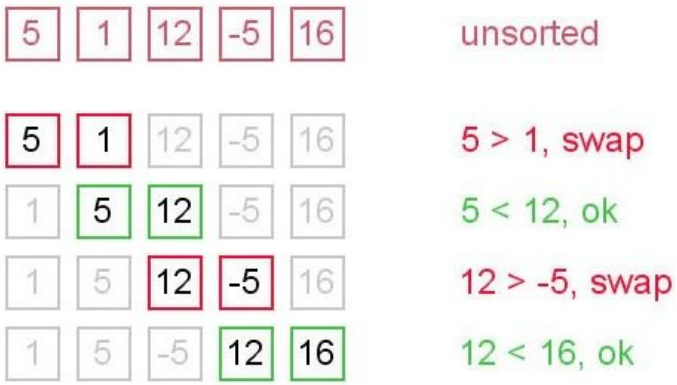
Task #2

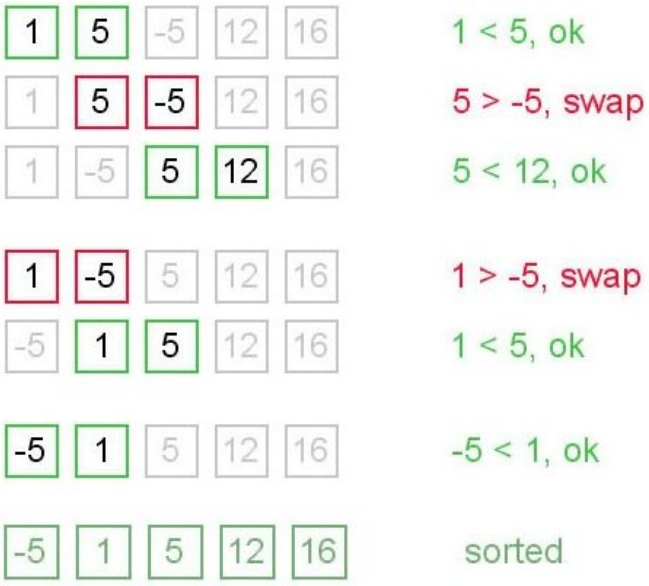
Write a ConsoleProgram that uses the **following sorting algorithm** to sort an array of integers. **Name your file as Sort.java**

Sorting Algorithm:

- ★ While there are elements to swap
  if array[i] > array[i+1]
  swap array[i] and array[i+1]

Note that this algorithm needs to make multiple passes over the whole array. In a pass, if no elements are swapped, then the algorithm stops. An illustrative example is provided below:





Coding Instructions:

- ★ Submit two files named Puzzle.java and Sort.java to the LMS submissions with different names will be disregarded!
- ★ Make sure your program compiles and runs before submitting otherwise you will get 0 from your homework (no exceptions).
- ★ The first lines of your code must include your name, surname, student number, and department as a comment. An example comment is as follows:
- ★ /* John Smith S0001 Department of Computer Science */
- ★ Submit .java files only. Do NOT submit .rar, .zip, .doc, .class, etc. files.
- ★ IMPORTANT : Add comments to your code that briefly explains what your code does such as :

```
int n;   // n holds the number of square
if ( n > 0)  // test whether the value of n is greater than zero.
```