Software Workshop – Exercises

1 December 2015

Submissions must be made using Canvas, in the following format.

SUBMISSIONS NOT COMPLYING WITH THESE GUIDELINES WILL HAVE 2 MARKS DEDUCTED.

Uploaded file must be: studentid.zip
in the zip format. Rar or tar.gz will not be accepted.

Archive must contain: BoardView.java, ControlPanel.java, MineComponent.java, MineModel.java, MineSweeper.java, and MineSweeperGUI.java. Also include any other classes used (e.g. for testing).

Don't forget to javadoc your classes.

All submissions must be made by midnight Sunday. Submissions after this time WILL NOT BE MARKED and will receive ZERO.

Minesweeper is a classic one-player computer game. The game has a grid of squares. Some mines are hidden behind some of the squares. The player clicks on squares one at a time. If the player clicks on a square with a hidden mine, the game is over and the player loses. If the player clicks on a square with no hidden mine, the square displays the total number of mines in neighbouring squares (up to a maximum of 8). The player wins if all the squares with no hidden mines are clicked.

You can find an article about the game here:
http://en.wikipedia.org/wiki/Minesweeper_(computer_game)

and you can find a version of the game here:
http://minesweeperonline.com

Your task is to implement the minesweeper game on a 10 by 10 grid. There should be three difficulty levels: easy (10 hidden mines), normal (15 hidden mines) and hard (20 hidden mines).

You do NOT have to implement a timer.
You only need reveal the cell that is clicked – you don't have to reveal any of the surrounding cells, in the case there are no neighbouring mines.

Question 1 [8 marks]

Create a class **`MineSweeper`** to represent the state of the game. Include any methods you will need for playing the game with a given board size and number of mines. Create a class **`MineModel`** as an observable model of the **`MineSweeper`** class. Test your code.

Question 2 [8 marks]

Create a class **`BoardView`** to display the game, and respond correctly to the player clicking the squares.

Question 3 [8 marks]

Write a class **`ControlPanel`** to add some controls. These should include controls to: exit the game; restart the game; reveal where the mines are; set the difficulty level (try using radio buttons for this). Create **`MineComponent`** to contain the **`BoardView`** and **`ControlPanel`**. Write **`MineSweeperGUI`** with a main method to run this in a frame.

Challenge 1

Add a counter that keeps track of how many clicks the user has taken.

Challenge 2

In the original game, if someone clicks on a square with no neighbouring mines, the whole space around it is cleared automatically – that is, all neighbours with no neighbouring mines are revealed, and so on with their neighbours. Implement this version.