

Introduction

This resource includes several components, aimed towards teaching students to program in Java, teaching basic Object Oriented concepts, through the creation of a Snake game. The Snake game also includes an inbuilt tester program that runs a set of JUnit tests against the students' development and can provide hints and solutions for any tasks that have failed tests associated with them.

Note: It is recommended that this is only delivered to students with some previous programming experience, ideally some Object-Oriented experience. Less experienced students should be able to complete the course (given the hints and solutions aspect), but may struggle. The expected level of experience is that the students have some understanding of basic programming theory, such as variables, data types, Booleans, methods and simple loops.

In addition, the instructions are currently specific to the setup in which the lessons were originally delivered, and so only mention **Netbeans** as the Integrated Development Environment, and references to the "Engine" should be replaced with whatever service the students use to access the files.

Folder Structure

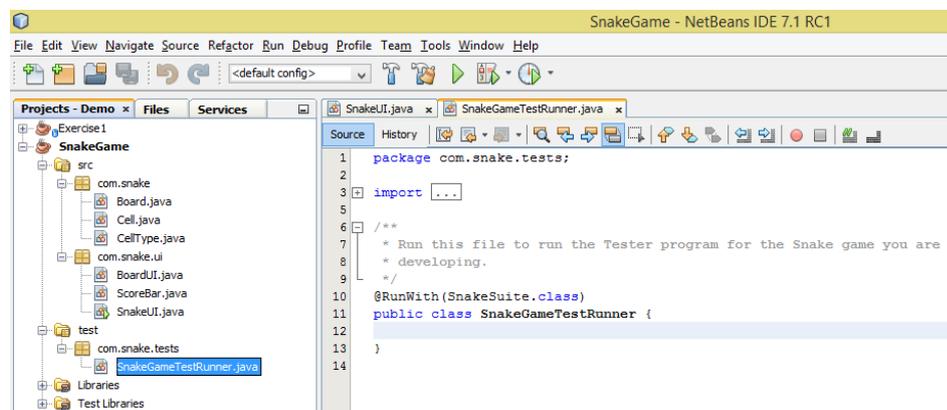
Here I will give a basic overview of the structure of the packaged resource:

- Exercises
 - This material relates to exercises given at the start of the course, covering some basic Java. It includes 2 exercise sheets that are automatically marked when the program is run. Also includes introduction slides used during the initial delivery of the lessons.
- JARs
 - A .jar file is a Java Archive. This folder contains the relevant jar files for the teaching.

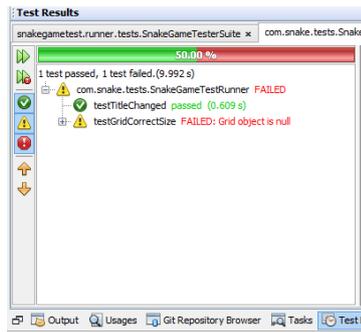
- **SnakeClientTest.jar** – A test client if using the client/server architecture.
 - **SnakeServer.jar** – The Server UI, collects Reports from students running the Tester program.
 - **Templates.jar** – Some template files, this is already included in the ‘SnakeGameSkeleton’ zip
 - **Tester.jar** – The actual tester program, this is already included in the ‘SnakeGameSkeleton’ zip
 - **Tester_NoServer.jar** – Again, the tester program, but without the code to send results to the server. If you intend to use this you will have to copy this into the SnakeGameSkeleton zip file, and rename to Tester.jar
- SnakeWorksheets
 - This covers the 3 Snake worksheets, and all the extra materials (e.g the skeleton code in the form of a Netbeans project), and also the introduction slides covering some of the concepts.
 - Please note the 3 worksheets will all likely take more than 1 session to complete, depending on the students’ abilities.
 - Solutions
 - This contains 3 archives of Netbeans projects that show the model development solution for each worksheet.

Suggested use of materials:

- Introduction slides and exercises first, as these teach basic programming concepts in Java, it can act as a good refresher for experienced Java programmers, or more of an introduction for less experienced students.
- Snake worksheets, along with the introductory slides for new concepts covered in each worksheet. These form the bulk of the solution.
- In addition to the worksheets, there is also a Tester program that is included with the skeleton code.
 - The tester program can be run by opening and running the ‘SnakeGameTestRunner’ file:



- This then brings up the ‘Test Result’ window as follows:



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- The students should be encouraged to run the tester program regularly, as the test runner framework adaptively reveals new tests as the students make progress. However this only works if students regularly run the tester to reveal the new tests relating to each task.
- If the students fail any tests, the tester also presents a new window displaying all the failed tests (and which task is associated with it) and allows the students to access hints and (after the test has failed at least 3 times) also solutions.
- If using the version of Tester.jar that has the server component, then the program will attempt to send the results of the tests to the server. **Important:** For this to work, there needs to be a file called conn.txt, located in the root of the SnakeGameSkeleton project. This is the same location as the Tester.jar and Templates.jar files.
 - It should have the following format:
 - <IPv4 address of the computer with the server running on the local network>
 - <port number>
 - E.g:
 - 0.0.0.0
 - 80
- The server can be run by executing the following from the command line:
 - “java -jar SnakeServer.jar”
- The server will look for a file called “conn.txt” in the same directory as it. The file should be the same format as mentioned above, though the server only reads the port from the second line of the file.
 - To find out the IP address of the server (once running), you can run the following from the command line, and look at the output line relating to the IPv4 address:
 - “ipconfig /all”
 - The server also contains a UI to display all the collected results, and calculates a score for each user (identified by the username of the user running the tester), allowing an extra competitive edge.

The source code for the tester program, hints and solutions reader and the server component can be found at <https://bitbucket.org/cully92/snakegametest>