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CS343 CBS Third Year Project

Source Code CD

This CD contains all the Java source code and run files related to the Third Year Project titled "Implementation and Evaluation of Algorithms for Solving Mean-Payoff and Energy Games" created by Stanimir Vichev.

The actual source code is in the folder "src" and split up into 7 packages (or folders) explained below. The files in ".java" format can be opened in Notepad:

- "algorithms" contains the code of all the algorithms tested and used in this study:
  - BCDGR for solving Energy Games
  - SIEG for solving Energy Games
  - SI/PI for solving Mean-Payoff Games
  - Bellman Ford for finding shortest paths
  - Karp for finding minimum mean cycles
  - Modified Dijkstra for finding longest paths
- "graph" contains the code that implements a complete graph data structure and all its functionality:
  - Graph class with relevant methods
  - Vertex class with relevant methods
  - Edge class with relevant methods
  - IncidenceCollection class for use in vertices
- "rand" contains the code for the graph generators for the RAND5, RANDL and RANDP graph families. Please note that the code for the RAND5 generator is in the file called "Rand4.java". Also, note that the file called "SPRandGenerator.java" is an old unused file, and is just there for completion.
- "grid" contains the code for the graph generators for the GRIDS and GRIDL graph families. Please note that the file called "SPGrid.java" is an old unused file, and is just there for completion.
- "circuit" contains the code for the reader which converts circuit design to graphs. It can be used on any ".netD" file (see http://vlsicad.ucsd.edu/UCLAWeb/cheese/ispd98.html for more details).

It also contains the file "ibm01.netD" which was used in the tests. Please note that the code needs to be edited to point to the correct directory where the .netD file is stored.

- "help" contains functionality that is common and helpful for all graph generators:
    - "NegCycleFilter.java" implements the Negative Cycle Filter, which is used to add different numbers of negative cycles to graphs.
    - "VertexNameGenerator.java" generates random names for vertices.
    - "Helper.java" contains the values for some of the common dependent variables of graph generators, such as weight ranges, multipliers, etc. It also contains methods for generating vertices, generating Hamiltonian cycles, generating random weights, and applying potential transformations.
- "test" contains the files used for running tests on graphs and recording their running time in milliseconds. Please note that the file "TestRunner.java" is an old unused file that is just added for completion.
    - "TestRand5.java" is the code for running tests on RAND5 graphs.
    - "TestRandL.java" is the code for running tests on RANDL graphs.
    - "TestRandP.java" is the code for running tests on RANDP graphs.
    - "TestGridS.java" is the code for running tests on GRIDS graphs.
    - "TestGridL.java" is the code for running tests on GRIDL graphs.
    - "TestCircuit.java" is the code for running tests on Circuit graphs. Please note that the code needs to be edited to point to the correct directory where the .netD file is stored.
    - "ibm01.netD" is the file containing the circuit specification used in "TestCiruit.java".

The Excel file "Results.xlsx" contains the raw data collected from all the tests.

The folder "Run Code" contains files that run some of the code above, which are stored in ".jar" format. Please follow the instructions below if you want to run them:

1. Go to <http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html> and download and install the relevant version of the Java Runtime Environment that is for your system. This is required to be able to run the programs.

2. Open windows command prompt (cmd) by going to Windows-> Start-> search for cmd-> click Enter.
3. Navigate to the folder in which the ".jar" file you want to run is located
4. Type "java -jar <jar-file-name>.jar" and click Enter
5. The jar file will run and the results will be displayed on the screen. Please note that some tests may take a long time to complete.
6. If you want to cancel a run, type Ctrl+C.

If you need further information, please contact me at stassyvichev@gmail.com.