Homework #5
RELEASE DATE: 05/21/2013
DUE DATE: 06/06/2013, noon

As directed below, you need to submit your code to the designated place on the course website.

Any form of cheating, lying or plagiarism will not be tolerated. Students can get zero scores and/or get negative scores and/or fail the class and/or be kicked out of school and/or receive other punishments for those kinds of misconducts.

Discussions on course materials and homework solutions are encouraged. But you should write the final solutions alone and understand them fully. Books, notes, and Internet resources can be consulted, but not copied from.

Since everyone needs to write the final solutions alone, there is absolutely no need to lend your homework solutions and/or source codes to your classmates at any time. In order to maximize the level of fairness in this class, lending and borrowing homework solutions are both regarded as dishonest behaviors and will be punished according to the honesty policy.

You need to write your homework report in English. For programming, we only allow Java. *Note that this is the last homework of this semester and is therefore your last chance of using the MEDALs, if you still have any!*

> *This homework set comes with* 200 *points and* 40 *bonus points. In general, every homework set of ours would come with a full credit of* 200 *points.*

1   Description

In Homework 1, we asked you to implement a highway simulator to simulate the traffic jam that happens in every lunar-new-year vacation. The idea of the homework comes from this interesting description.

<div align="center">

http://disp.cc/b/27-3ple

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Now, after almost a semester of learning Java, you should be able to do better than what you did in Homework 1, which would be the goal of this homework. The purpose here is to let you experience three things:

- re-design a program that you had some experience with

- learn to use Java Applet for a GUI-based demo program

- practice about multi-threading in Java

We do not have any particular specs for this homework. For the "re-design" part, the basic requirement is to do something similar to (or more complicated than) the first task of Homework 1.

2   Requirements

- (90 points) Re-design a high-way simulator program; write a short report with at **most** four A4 pages that contains the following items:

  (1) your name and school ID

  (2) the relations between the classes that you design

  (3) the advantages of your design in terms of software engineering (say, co-development)

  (4) the disadvantages of your design in terms of software engineering (say, co-development)

  (5) the advantages of your design in terms of the interestingness of the game

  (6) the disadvantages of your design in terms of the interestingness of the game

- (50 points) Write a Java Applet as the demo part of the high-way simulator

- (10 points) Pack your program in a `jar` file

- (50 points) Use multi-thread in your high-way simulator in some way (say, each car is an active thread?)

- (Bonus 40 points) Other than the basic tasks above, you can use your creativity to design a better program. We reserve 40 points for anything "additional" to the task described above. If you write anything worth getting the bonus, you are allowed to explain it with at **one** additional A4 page in English.

  You should submit your report in **PDF** format. See `http://jsc.cc.ntu.edu.tw/ntucc/pcroom/manual/Word2Pdf.htm` for some possible instructions for converting from Word to PDF. You may get no points for submitting a non-PDF report.

If you want to use third-party libraries other than those in the standard edition of Java 7, please ask the TAs for permission first.

3   Submission File

Similar to homework 4, we will ask you to use some GIT service to allow you to learn to manage your codes for the homework. Your GIT repository should contain the following items:

- `src/*.java`, which represent any other classes that you implemented, you can use sub-directories for organizing the source code if you want

- `Makefile`, where the TAs can use `make` on CSIE R217 linux machines to compile your code and get the `jar` file

- `index.html`, where the TAs can open it in the browser and see (play with) your simulator

- `.gitignore` and `.gitkeep`: the former for ignoring some files from version control, the latter for keeping an empty directory

- any other non-Java files (say, image) needed for your program, in appropriate directories

- a PDF file `report.pdf`, which is your report file written in English

- an optional text file `MEDAL`, in case you want to use the gold medals, with the number of medals listed as a single number in the first line of the file. Use your medals wisely—usage cannot be retracted

Please do not include any other files (e.g. class files) in the GIT repository.