CSE216 – Programming Abstractions
Recitation 3

Goals:

1. Revise the concepts of object-oriented programming in Java.
2. Create a Java project in NetBeans that uses external library Opencsv for reading CSV files.

Part 1:

1. Download the following repository files from Github repository:

   https://github.com/RameshMF/object-oriented-design/

2. Open the following project in Netbeans:

   OOPS concepts:

   This project has programs which explain following common object oriented programming principles:

   Abstraction refers to hiding lower-level details and exposing only the essential and relevant details to the users.

   Encapsulation refers to combining data and associated methods as a single unit.

   Inheritance - IS-A relationship between a superclass and its subclasses.

   Polymorphism allows a programmer to define one interface and have multiple implementations. Using polymorphism, we can create functions or reference variables which behaves differently in different programmatic context.

   Association is a relation between two separate classes which establishes through their Objects. Association can be one-to-one, one-to-many, many-to-one, many-to-many.

   Composition is an association represents a part of a whole relationship where a part cannot exist without a whole.

   Aggregation is an association represents a part of a whole relationship where a part can exist without a whole. It has a weaker relationship.

   Coupling refers to the degree to which one class knows about another class. If one class uses another class, that is coupling.

   Cohesion is a measure of how the methods of a class or a module are meaningfully and strongly related and how focused they are in providing a well-defined purpose to the system.

Part 2:

(Steps for NetBeans 8.2)

1. Opencsv is an easy-to-use CSV (comma-separated values) parser library for Java. Visit the Opencsv users guide at the following site: http://opencsv.sourceforge.net/.
2. Download the Opencsv library opencsv-4.6.jar file from https://sourceforge.net/projects/opencsv/.

3. Download Apache Commons common-lang3.jar file from http://www.java2s.com/Code/Jar/c/Downloadcommonlang3jar.htm. Apache Commons Lang provides a host of helper utilities for String manipulation methods, basic numerical methods and System properties.
4. Create an empty java Application project named Csvutils in NetBeans.
5. Create a main class named csvmain in package edu.sunyk.cse216.csvmain.
6. Place the opencsv-4.6.jar and common-lang3.jar files in lib folder of Csvutils project.
7. Open project properties and add opencsv-4.6.jar and common-lang3.jar files in compile-time libraries.
8. Create a folder resources in the project and add gdp_csv.csv file (provided together with recitation) in this folder.
9. Write a function readCSVFile that takes as input path to the csv file, reads the csv file and print the contents of csv file.
10. Test the readCSVFile function using gdp_csv.csv file.
11. Modify your program to accept any csv file as a command line input.
12. Build executable project jar following the instructions given at https://netbeans.org/kb/articles/javase-deploy.html.
13. Run executable jar using csv file name as command line argument. E.g. on my computer I do it as follows:

```
C:\pravinp\SUNYK\Fall2019\CSE216\recitations\Recitation3\Csvutils\dist>java -jar Csvutils.jar ../resources/gdp_csv.csv
```

(Steps for Apache NetBeans 11.x)

1. Go through the following tutorial to know about Apache Maven build tool: https://maven.apache.org/guides/introduction/introduction-to-the-pom.html.
2. Download Csvutils.zip.
3. Select File -> Import Project(s) from ZIP -> Csvutils.zip.
4. Select Run -> Build project.
5. Select Run -> Run project

   This should print the following output:

   --- exec-maven-plugin:1.5.0:exec (default-cli) @ Csvutils ---

   Arguments are: resources/gdp_csv.csv

   Reading file resources/gdp_csv.csv
6. Complete your implementation of readCSVFile() function to read the records in csv file.

7. Select Run -> Build project to create executable jar. The executable jar should appear in target folder with name Csvutils-1.0-SNAPSHOT-jar-with-dependencies.
8. Run executable jar using csv file name as command line argument. E.g. on my computer I do it as follows:

   ```
   C:\Csvutils\target>java -jar Csvutils-1.0-SNAPSHOT-jar-with-dependencies.jar ../resources/gdp_csv.csv
   ```

   It produces output as follows (First few lines):

   ```
   Arguments are: ../resources/gdp_csv.csv
   Reading file ../resources/gdp_csv.csv
   Reading line 1
   Country Name:Arab World
   Year:1968
   Value:25760683041.0857
   Country Code:ARB
   Reading line 2
   Country Name:Arab World
   Year:1969
   Value:28434203615.4829
   Country Code:ARB
   ```

(Submission)

1. Select File -> Export Project to Zip and save project as a zip file.
2. Submit the exported zip, executable jar (`Csvutils-1.0-SNAPSHOT-jar-with-dependencies.jar`) and csvreader output (in a separate text file) as a proof that you have completed this recitation.