CSE1322L Assignment 6 - Spring 2023

Intro:

In this assignment you'll be using your new skills with FileIO and Exception handling to write code that fetches information from an online API. You'll also be reading and writing text files.

This assignment shows you how you can use external services to write a program that can do more than just process user input and output. Now you can incorporate information from external sources, they can be API calls (as in this program) or databases (you'll learn about later).

Note: This assignment deals with a crypto currency Bitcoin. In no way should you make investment choices based on this program, it's for learning purposes only.

Tasks:

1) In your main driver class you'll add a bunch of methods:
2) Create a method getData which takes in no parameters and returns an ArrayList (java) or List (C#) of Strings.
    a) Open a TCP socket to api.coindesk.com on port 80
    b) Open OutputStream/PrintWriter (Java) or NetworkStream/StreamReader/StreamWriter (C#) on the socket
    c) Print or Write the string "GET http://api.coindesk.com/v1/bpi/currentprice.json HTTP/1.0\n\n" to the socket.
    d) Flush the StreamWriter/PrintWriter
    e) Read all the lines the socket gives you back and add each line to the ArrayList/List that you'll return.
    f) Return the ArrayList/List.
3) Copy the following code into your main driver class. It takes the strings you got from the socket and returns a float which is the price of bitcoin.

    What this code does: The data you got from the socket has 2 parts, a header from the web server which you don't care about, and then a line of JSON which includes the bitcoin price.

    It ignores all lines that are part of the header, then it finds the JSON line. JSON is a standard format often used on the internet where information can be passed in text. It support variables (e.g. "name":"Enda") and arrays (e.g.

“classes”:[“CSE1321”,”CSE1322”]).

It takes the JSON line, and splits it by : extracting the 19th cell which happens to be the Bitcoin price. There is some additional stuff at the end of that line, which we use string replace to remove.

Please note, this is a messy way to extract information from JSON. Both languages have libraries for working with JSON, they are the correct way to parse JSON, but since they require installing a library which you may not already have, we are doing it this messy way that works. Please note this isn’t best practices:

Java

```
  public static float getDollarPrice(ArrayList<String>
lines) {
    boolean header=true;
    String json="";
    for(String line : lines) {
      if(line.equals("")) {
        header=false;
        continue;
      }
      if(header==false) {
        json=line;
        break;
      }
    }
    //System.out.println("Json: "+json);
    String[] jsonParts=json.split(":");
    String priceLine=jsonParts[19];
    String justPrice=priceLine.replace("},\"GBP\"","");
    float price=Float.parseFloat(justPrice);
    return price;
  }
```

C#

```
  public static float getDollarPrice(List<string> lines) {
    bool header=true;
    String json="";
    foreach(string line in lines) {
      if(line.Equals("")) {
        header=false;
        continue;
      }
      if(header==false) {
        json=line;
        break;
      }
    }
    //Console.WriteLine("Json: "+json);
    String[] jsonParts=json.Split(":");
    String priceLine=jsonParts[19];
    String justPrice=priceLine.Replace("},\"GBP\"","");
    float price=Convert.ToSingle(justPrice);
    return price;
  }
```

4) Write a method buyBitCoin() It should take in a float which is the bitcoin price, and return void.
    a) Open the file initialInvestmentUSD.txt.
    b) Read in all lines of the file

i) Each line should be split on : so you get the name and the US Dollars they want to invest.
ii) Calculate how many bitcoins they get (store this in a float). Note the method took in the cost of a single bitcoin, and you know how many US dollars the client has, so you can calculate how many bitcoins they get.

c) Create a new file called clientBC.txt which should look like initialInvestmentUSD.txt but should have lines in this format: name:bitcoins
For example the file might look something like this (note the value of bitcoins changes constantly, so the exact numbers will differ):

Aaliyah:1.4451238
Noah:7.966972
Jazmine:4.1583786
Juan:10.760615
Aiden:5.2960844
Sofia:1.4848613
Omar:1.5627292
…
Zayna:3.9195516
Ezequiel:11.043708
Sariyah:1.5153583

5) Write a method getCurrentValue which takes in a float for the current bitcoin value, and returns void.
   a) Open the clientBC.txt file, read in all the lines
   b) For each line, separate the line based on the :
   c) Get the name, and number of bitcoins each client owns.
   d) Multiply each client's bitcoin holdings by the current price of bitcoin and print out the list.
6) Write a new Exception called PersonNotFound
7) Write a method getPersonFromFile, which takes in 2 parameters the name of the person to search for (String) and the name of the file you'd like to search (String)
   a) Read in the file which has the name passed in as a parameter
   b) Split each line based on the : and check if the name on the line is the same as the name passed in.
      i) If it is, return that price
      ii) If you don't find the name, throw a new PersonNotFound exception.
8) In the main method:

a) Use a loop that keeps going until the user enters 4
b) Get the current bitcoin price by calling getData and getDollarPrice
    i) Print out the current price.
c) Print out the menu (see sample output below)
d) If the user chooses 1 call buyBigCoin
e) If the user chooses 2 call getCurrentValue
f) If the user chooses 3
    i) Ask them for a name
    ii) Using getPersonFromFile get the original investment in US dollars for that user
    iii) Using getPersonFromFile get the number of bitcoins that person owns
    iv) Calculate the current value (number of bitcoins * current value
    v) Calculate the change in value for that user (currentValue-OriginalInvestment)
    vi) Print the values

Sample Output:

[Note: The value of bitcoin changes all the time, so your values below will differ]

```
One BitCoin is currently worth $27289.299
1. Buy Bitcoin
2. See everyones current value in USD
3. See one persons gain/loss
4. Quit
1
One BitCoin is currently worth $27289.299
1. Buy Bitcoin
2. See everyones current value in USD
3. See one persons gain/loss
4. Quit
2
Aaliyah:$39567
Noah:$218133
Jazmine:$113855
Juan:$294622
Aiden:$145005
Sofia:$40655
Omar:$42787
Gianna:$426933
Xavier:$386290
Leilani:$215029
Amir:$465338
```

Yara:$131207
Malik:$38032
Nia:$462547.03
Andres:$18020
Saniyah:$255436
Elijah:$2482
Maya:$154944
Mateo:$269486
Amara:$139342
Adrian:$364054
Asha:$3509
Jayden:$231482.98
Kira:$228.00002
Diego:$48250
Ava:$166931
Alejandro:$459709.97
Anaya:$379045
Gabriel:$131387
Kai:$247.00002
Omarion:$386174
Mira:$49504
Josiah:$220587
Samira:$274977
Hassan:$123635
Leyla:$467468
Jaden:$451019
Nyla:$490773.03
Zaid:$159720
Emani:$269192
Jeremiah:$173432
Fatima:$144697
Micah:$371696
Nasir:$297261
Ruby:$29352.998
Zariah:$194988
Kendrick:$4899
Zayna:$107316
Ezequiel:$302373
Sariyah:$41490
One BitCoin is currently worth $27367.852
1. Buy Bitcoin
2. See everyones current value in USD
3. See one persons gain/loss
4. Quit
3
Enter a name

Mira
Mira:
Original Investment: $49504
Number of bitcoins: 1.8140444
Current Value: $49401.938
Change in value: $-102.0625
One BitCoin is currently worth $27233.037
1. Buy Bitcoin
2. See everyones current value in USD
3. See one person's gain/loss
4. Quit
4

Submission Guidelines:
You'll submit one class on gradescope as Assignment 6.

Please follow the posted submission guidelines here:
https://ccse.kennesaw.edu/fye/submissionguidelines.php

Ensure you submit before the deadline listed on the lab schedule for CSE1322L here:
https://ccse.kennesaw.edu/fye/courseschedules.php