**Emma Prager**

**ITMD 411**

**Lab 03**

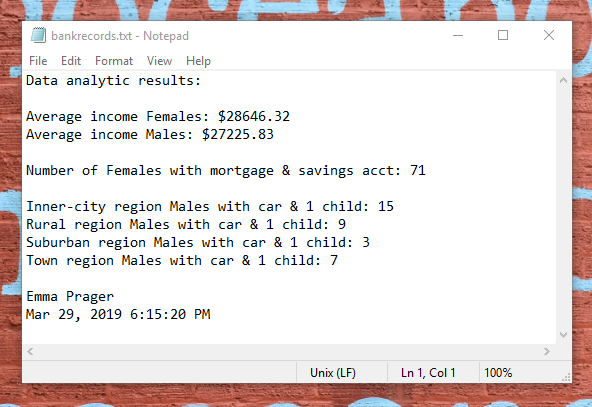
**March 30, 2019**

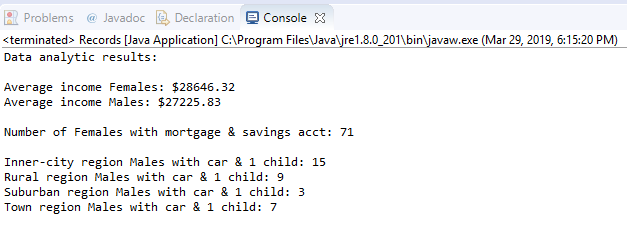
Improve the program for Bank of IIT to develop analytics from its clients for its loan application process. Currently records show 600 clients exist and the bank is hoping to expand its clientele and its potential by offering premium loans to deserved grantees.

A new class called Records.java extends the BankRecords.java class to use its instance methods and object array. Two comparators are used by implementing java.util.Comparator interface to compare various fields for data analysis requirements including:

* average income for males vs. females
* number of females with a mortgage and savings account
* number of males with both a car and 1 child per location

The results are both displayed to the console and written to bankrecords.txt.





/\*

\* Emma Prager

\* 03/30/2019

\* Records.java

\* Lab 03

\*/

**import** java.io.FileWriter;

**import** java.io.IOException;

**import** java.io.PrintWriter;

**import** java.text.DateFormat;

**import** java.util.Arrays;

**import** java.util.Date;

**public** **class** Records **extends** BankRecords {

//create formatted object to write output directly to console & file

**static** FileWriter *fw* = **null**;

**static** PrintWriter *pw* = **null**;

**public** Records() {

**try** {

*fw* = **new** FileWriter("bankrecords.txt");

*pw* = **new** PrintWriter(*fw*);

} **catch** (IOException e) {

e.printStackTrace();

}

}

**public** **static** **void** main(String[] args) {

Records br = **new** Records();

br.readData();

System.***out***.printf("Data analytic results:\n\n");

**try** {

*fw*.write("Data analytic results:\n\n");

} **catch** (IOException e2) {

// **TODO** Auto-generated catch block

e2.printStackTrace();

}

// call functions to perform analytics

*avgComp*(); // analyze average income per loc

*femsComp*(); // female count w. mortgage & savings accounts

*malesComp*(); // male counts with both car & 1 child per location

Date date= **new** Date();

String timeStamp = DateFormat.*getDateTimeInstance*().format(date);

**try** {

*fw*.write("\nEmma Prager\n");

*fw*.write(timeStamp); //put date and time here

} **catch** (IOException e1) {

// **TODO** Auto-generated catch block

e1.printStackTrace();

}

// \*\*\* close out file object \*\*\*//

**try** {

*fw*.close();

} **catch** (IOException e) {

e.printStackTrace();

}

}

**private** **static** **void** avgComp() {

Arrays.*sort*(*robjs*, **new** SexComparator());

// set up needed variables to gather counts & income by sex

// to determine average income by sex

**int** maleCt = 0, femCt = 0;

**double** maleInc =0, femInc = 0;

**for** (**int** i = 0; i < *robjs*.length; i++)

**if** (*robjs*[i].getSex().equals("FEMALE")) {

++femCt;

femInc += *robjs*[i].getIncome();

}

**else** {

++maleCt;

maleInc += *robjs*[i].getIncome();

}

// display resulting averages to console and to file

System.***out***.printf("Average income Females: $%.2f\n", (femInc/femCt));

System.***out***.printf("Average income Males: $%.2f\n\n", (maleInc/maleCt));

*pw*.printf("Average income Females: $%.2f\n", (femInc/femCt));

*pw*.printf("Average income Males: $%.2f\n\n", (maleInc/maleCt));

}

**private** **static** **void** femsComp() {

Arrays.*sort*(*robjs*, **new** SexComparator());

// set up needed variables to gather counts & income by sex

// to determine average income by sex

**int** count = 0;

**for** (**int** i = 0; i < *robjs*.length; i++)

**if** (*robjs*[i].getSex().equals("FEMALE") && *robjs*[i].getMortgage().equals("YES") && *robjs*[i].getSave\_act().equals("YES")) {

count++;

}

// display resulting averages to console and to file

System.***out***.printf("Number of Females with mortgage & savings acct: %d\n\n", count);

*pw*.printf("Number of Females with mortgage & savings acct: %d\n\n", count);

}

**private** **static** **void** malesComp() {

Arrays.*sort*(*robjs*, **new** LocationComparator());

// set up needed variables to gather counts & income by sex

// to determine average income by sex

**int** city = 0, rural = 0, sub = 0, town = 0;

**for** (**int** i = 0; i < *robjs*.length; i++)

**if** (*robjs*[i].getSex().equals("MALE") && *robjs*[i].getChildren()==1 && *robjs*[i].getCar().equals("YES")) {

**if**(*robjs*[i].getRegion().equals("INNER\_CITY")) {

++city;

}

**else** **if**(*robjs*[i].getRegion().equals("RURAL")) {

++rural;

}

**else** **if**(*robjs*[i].getRegion().equals("SUBURBAN")) {

++sub;

}

**else** **if**(*robjs*[i].getRegion().equals("TOWN")) {

++town;

}

}

// display resulting averages to console and to file

System.***out***.printf("Inner-city region Males with car & 1 child: %d\n", city);

System.***out***.printf("Rural region Males with car & 1 child: %d\n", rural);

System.***out***.printf("Suburban region Males with car & 1 child: %d\n", sub);

System.***out***.printf("Town region Males with car & 1 child: %d\n", town);

*pw*.printf("Inner-city region Males with car & 1 child: %d\n", city);

*pw*.printf("Rural region Males with car & 1 child: %d\n", rural);

*pw*.printf("Suburban region Males with car & 1 child: %d\n", sub);

*pw*.printf("Town region Males with car & 1 child: %d\n", town);

}

}

/\*

\* Emma Prager

\* 03/30/2019

\* SexComparator.java

\* Lab 03

\*/

**import** java.util.Comparator;

**public** **class** SexComparator **implements** Comparator<BankRecords>{

@Override

**public** **int** compare(BankRecords o1, BankRecords o2) {

// use compareTo to compare strings

**int** result = o1.getSex().compareTo(o2.getSex());

**return** result;

}

}

/\*

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\* 03/30/2019

\* LocationComparator.java

\* Lab 03

\*/

**import** java.util.Comparator;

**public** **class** LocationComparator **implements** Comparator<BankRecords>{

@Override

**public** **int** compare(BankRecords o1, BankRecords o2) {

// use compareTo to compare strings

**int** result = o1.getRegion().compareTo(o2.getRegion());

**return** result;

}

}

/\*

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\* 03/30/2019

\* BankRecords.java

\* Lab 03

\*/

**import** java.io.BufferedReader;

**import** java.io.File;

**import** java.io.FileNotFoundException;

**import** java.io.FileReader;

**import** java.io.IOException;

**import** java.util.ArrayList;

**import** java.util.Arrays;

**import** java.util.List;

**public** **class** BankRecords {

**static** BankRecords *robjs* [] = **new** BankRecords[600];

**static** ArrayList<List<String>> *array* = **new** ArrayList<>();

**private** String id;

**private** **int** age;

**private** String sex;

**private** String region;

**private** **double** income;

**private** String married;

**private** **int** children;

**private** String car;

**private** String save\_act;

**private** String current\_act;

**private** String mortgage;

**private** String pep;

/\*\*

\* **@return** the id

\*/

**public** String getId() {

**return** id;

}

/\*\*

\* **@param** id the id to set

\*/

**public** **void** setId(String id) {

**this**.id = id;

}

/\*\*

\* **@return** the age

\*/

**public** **int** getAge() {

**return** age;

}

/\*\*

\* **@param** age the age to set

\*/

**public** **void** setAge(**int** age) {

**this**.age = age;

}

/\*\*

\* **@return** the sex

\*/

**public** String getSex() {

**return** sex;

}

/\*\*

\* **@param** sex the sex to set

\*/

**public** **void** setSex(String sex) {

**this**.sex = sex;

}

/\*\*

\* **@return** the region

\*/

**public** String getRegion() {

**return** region;

}

/\*\*

\* **@param** region the region to set

\*/

**public** **void** setRegion(String region) {

**this**.region = region;

}

/\*\*

\* **@return** the income

\*/

**public** **double** getIncome() {

**return** income;

}

/\*\*

\* **@param** income the income to set

\*/

**public** **void** setIncome(**double** income) {

**this**.income = income;

}

/\*\*

\* **@return** the married

\*/

**public** String getMarried() {

**return** married;

}

/\*\*

\* **@param** married the married to set

\*/

**public** **void** setMarried(String married) {

**this**.married = married;

}

/\*\*

\* **@return** the children

\*/

**public** **int** getChildren() {

**return** children;

}

/\*\*

\* **@param** children the children to set

\*/

**public** **void** setChildren(**int** children) {

**this**.children = children;

}

/\*\*

\* **@return** the car

\*/

**public** String getCar() {

**return** car;

}

/\*\*

\* **@param** car the car to set

\*/

**public** **void** setCar(String car) {

**this**.car = car;

}

/\*\*

\* **@return** the save\_act

\*/

**public** String getSave\_act() {

**return** save\_act;

}

/\*\*

\* **@param** save\_act the save\_act to set

\*/

**public** **void** setSave\_act(String save\_act) {

**this**.save\_act = save\_act;

}

/\*\*

\* **@return** the current\_act

\*/

**public** String getCurrent\_act() {

**return** current\_act;

}

/\*\*

\* **@param** current\_act the current\_act to set

\*/

**public** **void** setCurrent\_act(String current\_act) {

**this**.current\_act = current\_act;

}

/\*\*

\* **@return** the mortgage

\*/

**public** String getMortgage() {

**return** mortgage;

}

/\*\*

\* **@param** mortgage the mortgage to set

\*/

**public** **void** setMortgage(String mortgage) {

**this**.mortgage = mortgage;

}

/\*\*

\* **@return** the pep

\*/

**public** String getPep() {

**return** pep;

}

/\*\*

\* **@param** pep the pep to set

\*/

**public** **void** setPep(String pep) {

**this**.pep = pep;

}

**public** **void** readData() {

BufferedReader br = **null**;

//initialize reader object and set file path to root of project

**try** {

br = **new** BufferedReader(**new** FileReader(**new** File("bank-Detail.csv")));

} **catch** (FileNotFoundException e2) {

// **TODO** Auto-generated catch block

e2.printStackTrace();

}

String line;

//read each record in csv file

**try** {

**while** ((line = br.readLine()) != **null**) {

//parse each record in csv file by a comma ( , )

//into a list stored in the arraylist-> Arrays

*array*.add(Arrays.*asList*(line.split(",")));

}

} **catch** (IOException e1) {

// **TODO** Auto-generated catch block

e1.printStackTrace();

}

**try** {

br.close();

} **catch** (IOException e) {

// **TODO** Auto-generated catch block

e.printStackTrace();

}

processData(); //call function for processing record data

}

**public** **void** processData() {

//create index for array while iterating thru arraylist

**int** idx=0;

//create for each loop to cycle thru arraylist of values

//and PASS that data into your record objects' setters

**for** (List<String> rowData: *array*) {

//initialize array of objects

*robjs*[idx] = **new** BankRecords();

//call setters below and populate them, item by item

*robjs*[idx].setId(rowData.get(0)); //get 1st column

*robjs*[idx].setAge(Integer.*parseInt*(rowData.get(1))); //get 2nd column

/\*continue processing arraylist item values into each

array object-> robjs[ ] by index\*/

*robjs*[idx].setSex(rowData.get(2));

*robjs*[idx].setRegion(rowData.get(3));

*robjs*[idx].setIncome(Double.*parseDouble*(rowData.get(4)));

*robjs*[idx].setMarried(rowData.get(5));

*robjs*[idx].setChildren(Integer.*parseInt*(rowData.get(6)));

*robjs*[idx].setCar(rowData.get(7));

*robjs*[idx].setSave\_act(rowData.get(8));

*robjs*[idx].setCurrent\_act(rowData.get(9));

*robjs*[idx].setMortgage(rowData.get(10));

*robjs*[idx].setPep(rowData.get(11));

idx++;

}

//printData(); //call function to print objects held in memory

}

**public** **void** printData() {

//1. Set appropriate headings for displaying first 25 records

//2. Create for loop and print each record objects instance data

//3. Within for loop use appropriate formatting techniques to print

// output record detail

System.***out***.println("ID\t\tAGE\t\tSEX\t\tREGION\t\tINCOME\t\tMORTGAGE");

**int** i = 0;

**for**(i=0; i<25; i++) {

System.***out***.print(*robjs*[i].getId()+"\t\t"+

*robjs*[i].getAge() + "\t\t" +

*robjs*[i].getSex() + "\t\t");

**if**(*robjs*[i].getRegion().contentEquals("TOWN")| *robjs*[i].getRegion().contentEquals("RURAL")){

System.***out***.print(*robjs*[i].getRegion()+ "\t\t");

}

**else** {

System.***out***.print(*robjs*[i].getRegion()+ "\t");

}

String income = "" + *robjs*[i].getIncome();

**if**(income.length() >= 8) {

System.***out***.print(*robjs*[i].getIncome() + "\t");

}

**else** {

System.***out***.print(*robjs*[i].getIncome() + "\t\t");

}

System.***out***.println(*robjs*[i].getMortgage());

}

}

}

/\*

\* Emma Prager

\* 03/30/2019

\* BankRecordsTest.java

\* Lab 03

\*/

/\*

public class BankRecordsTest {

public static void main(String[] args) {

// **TODO** Auto-generated method stub

BankRecords test = new BankRecords();

test.readData();

}

}

\*/

/\*

\* Emma Prager

\* 02/28/2019

\* Client.java

\* Lab 03

\*/

**public** **abstract** **class** Client {

**public** **abstract** **void** readData(); //read file detail

**public** **abstract** **void** processData(); //process file detail

**public** **abstract** **void** printData(); //print file detail

}