Name of the Course : Learning Java 9 - Object Oriented Programming

Level : Difficult

Tool Stack : Java9 and Junit4

Problem Statement : Provide a code solution to calculate the grade of a student based on his/her performance in both half-yearly (which is already in flat file ) and annual examination (whose marks are needed to accept), finally update the file, based on Java 9 code solution of List, forEach() and Lambda expression.

Description : ***The Great Variety Stores*** declares annual performance grade of students based on performance of both half-yearly total and annual exam total. The Student roll number, name and half-yearly total are already in a file “StudentResult.txt” in “-“ separate format. The columns of the file are Roll, Name, HalfYearlyTotal, AnnualTotal, Grade. At present every student’s roll, name and halfyearlytotal columns have data. The application will asks to enter roll number. If Roll number not found then display message “Student Not found” else track down that student record from file then ask to enter annual exam’s marks for English, Language, Mathematics, Science, Social Study, calculate the annual total, add half-yearly and annual total, calculate percentage- ((half-yearly total + annual total)/1000)\*100, based on percentage assign grades which are E->90% and above, V-> between 75%-89%, G-> between 60% and 74% , P-> between 45% and 59% and F-> 0 to 44%. Finally update the StudentResult.txt i.e fill the annualtotal and grade columns for that student.

You need create

1. class StudentResult with private member data

String rollNumber;

String studentName;

Double halfYearlyTotal;

Double annualTotal;

String grade;

Create getter/setter methods and constructors.

override toString() in String.format("%-5s %-20s %-20s %-20s %-5s").

1. class ResultService with member function

public static String gradeCalcultion(StudentResult result): It will calculate grade of a student based on above formula.

1. class Main with methods

a. private static List<StudentResult> convertToList(String roll) : It will extract all records from file then store them in a list. If the matching roll is found then it will return list else returns null.

b. method public static void main(String [] arg): It will accepts a roll , if the record found then asks to enter marks of English, Language, Mathematics, Science, Social Study respectively. Finally update the file. If roll not found then display error message.

**Sample Data for File StudentResult.txt**

**10-Aveek Sharma-325.00**

**11-Saranya Ishawran-415.00**

**12-Aneek Chouhan-225.00**

**13-Rajesh Murugan-295.00**

**14-Bobita Ghosh-375.00**

**15-Neha Kulkarni-315.00**

**16-Reema Krishnamurthy-350.00**

Code:

**import** lombok.AllArgsConstructor;

**import** lombok.Data;

**import** lombok.NoArgsConstructor;

@Data

@AllArgsConstructor

@NoArgsConstructor

**public** **class** StudentResult {

**private** String rollNumber;

**private** String studentName;

**private** Double halfYearlyTotal;

**private** Double annualTotal;

**private** String grade;

**public** StudentResult(String rollNumber, String studentName, Double halfYearlyTotal) {

**super**();

**this**.rollNumber = rollNumber;

**this**.studentName = studentName;

**this**.halfYearlyTotal = halfYearlyTotal;

}

@Override

**public** String toString() {

String output=String.*format*("%-5s %-20s %-20s %-20s %5s",rollNumber,studentName,halfYearlyTotal,annualTotal,grade);

**return** output;

}

}

**public** **class** ResultService {

**public** **static** String gradeCalculation(StudentResult result)

{

String grade="";

**double** totalPercentage=((result.getHalfYearlyTotal()+result.getAnnualTotal())/1000.00)\*100.00;

**if**(totalPercentage>=90)

grade="E";

**else** **if**(totalPercentage>=75)

grade="V";

**else** **if**(totalPercentage>=60)

grade="G";

**else** **if**(totalPercentage>=45)

grade="P";

**else**

grade="F";

**return** grade;

}

}

**import** java.io.BufferedReader;

**import** java.io.BufferedWriter;

**import** java.io.FileReader;

**import** java.io.FileWriter;

**import** java.util.ArrayList;

**import** java.util.List;

**import** java.util.Scanner;

**public** **class** Main {

**private** **static** List<StudentResult> convertToList(String roll) **throws** Exception

{

FileReader fileReader=**new** FileReader("f:/StudentResult.txt");

BufferedReader bufferedReader=**new** BufferedReader(fileReader);

List<StudentResult> resultList=**new** ArrayList<StudentResult>();

**boolean** flag=**false**;

**while**(**true**)

{

String str=bufferedReader.readLine();

**if**(str==**null**)

**break**;

String []arr=str.split("-");

**if**(arr[0].equals(roll))

flag=**true**;

StudentResult result=**null**;

**if**(arr.length==3)

result=**new** StudentResult(arr[0],arr[1],Double.*parseDouble*(arr[2]));

**else** **if**(arr.length==5)

result=**new** StudentResult(arr[0],arr[1],Double.*parseDouble*(arr[2]),Double.*parseDouble*(arr[3]),arr[4]);

resultList.add(result);

}

fileReader.close();

**if**(flag)

**return** resultList;

**else**

**return** **null**;

}

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

Scanner scanner=**new** Scanner(System.***in***);

System.***out***.println("Enter student roll number");

String roll=scanner.nextLine();

List<StudentResult> resultList=*convertToList*(roll);

**if**(resultList==**null**)

{

System.***out***.println("Student not found");

System.*exit*(0);

}

FileWriter fileWriter=**new** FileWriter("f:/StudentResult.txt");

BufferedWriter bufferedWriter=**new** BufferedWriter(fileWriter);

//String str="";

resultList.forEach((StudentResult result)->{

String str="";

**if**(roll.equals(result.getRollNumber()))

{

System.***out***.println("The Student Name:"+result.getStudentName());

System.***out***.println("Enter English Marks(out of 100):");

**double** eng=Double.*parseDouble*(scanner.nextLine());

System.***out***.println("Enter Language Marks(out of 100):");

**double** lang=Double.*parseDouble*(scanner.nextLine());

System.***out***.println("Enter Mathematics Marks(out of 100):");

**double** math=Double.*parseDouble*(scanner.nextLine());

System.***out***.println("Enter Science Marks(out of 100):");

**double** sci=Double.*parseDouble*(scanner.nextLine());

System.***out***.println("Enter Social Study Marks(out of 100):");

**double** ss =Double.*parseDouble*(scanner.nextLine());

**double** annualTotal=eng+lang+math+sci+ss;

result.setAnnualTotal(annualTotal);

String grade=ResultService.*gradeCalculation*(result);

result.setGrade(grade);

System.***out***.println(String.*format*("%-5s %-20s %-20s %-20s %5s","Roll","Name","Half Yearly Total","Annual Total","Grade"));

System.***out***.println(result);

}

**if**(result.getAnnualTotal()==**null**)

str=result.getRollNumber()+"-"+result.getStudentName()+"-"+result.getHalfYearlyTotal();

**else**

str=result.getRollNumber()+"-"+result.getStudentName()+"-"+result.getHalfYearlyTotal()+"-"+result.getAnnualTotal()+"-"+result.getGrade();

**try**

{

bufferedWriter.write(str);

bufferedWriter.flush();

bufferedWriter.newLine();

}**catch**(Exception e) {}

System.***out***.println("File Updated");

}); // end of loop

}

}

Junit Testing

**import** java.io.File;

**import** java.io.FileWriter;

**import** java.io.IOException;

**public** **class** TestUtils {

**public** **static** File *businessTestFile*;

**public** **static** File *boundaryTestFile*;

**public** **static** File *exceptionTestFile*;

**static** {

*businessTestFile* = **new** File("./output\_revised.txt");

*businessTestFile*.delete();

*boundaryTestFile* = **new** File("./output\_boundary\_revised.txt");

*boundaryTestFile*.delete();

*exceptionTestFile* = **new** File("./output\_exception\_revised.txt");

*exceptionTestFile*.delete();

}

**public** **static** **void** yakshaAssert(String testName, Object result, File file) **throws** IOException {

System.***out***.println("\n" + testName + "=" + result);

FileWriter writer = **new** FileWriter(file,**true**);

writer.append("\n" + testName + "=" + result);

writer.flush();

writer.close();

}

**public** **static** String currentTest() {

**return** Thread.*currentThread*().getStackTrace()[2].getMethodName();

}

}

**import** **static** org.junit.Assert.\*;

**import** org.junit.Test;

**import** **static** java9.diff.app1.TestUtils.\*;

**public** **class** ResultServiceTest {

@Test

**public** **void** testGradeCalculation() **throws** Exception {

StudentResult studentResult=**new** StudentResult("14","Bobita Ghosh",375.0);

studentResult.setAnnualTotal(440.0);

String value =ResultService.*gradeCalculation*(studentResult);

*yakshaAssert*(*currentTest*(),(value.equals("V")?"true":"false"),*businessTestFile*);

}

}

Test Data1

Enter student roll number

25

Student not found

Test Data2

Enter student roll number

14

The Student Name:Bobita Ghosh

Enter English Marks(out of 100):

90

Enter Language Marks(out of 100):

85

Enter Mathematics Marks(out of 100):

95

Enter Science Marks(out of 100):

90

Enter Social Study Marks(out of 100):

80

Roll Name Half Yearly Total Annual Total Grade

14 Bobita Ghosh 375.0 440.0 V

File Updated

Learning outcome: Participant could able to use file handling in java, forEach() function, Lambda expression and collection.