BIT106

Assignment 1

Release Date: 12/10/2020
Due Date: 09/11/2020

Value: 15%

Assessment mode: Individual Assessment

Rationale

This assignment has been designed to:

- Measure the student's working knowledge of the conceptual and practical skills involved in writing computer programs.

- Test the student's ability to construct programs to solve elementary programming problems.

The assignment assesses the following learning outcomes:

CLO1: use the fundamental control structures and data types to write programs in the Java language
CLO2: demonstrate the use of objects and classes, both standard library classes and user defined classes
CLO3: apply the structured, and object-oriented approach to solve computing problems using Java

SUBMISSION REQUIREMENT

Your assignment has to submit to TurnItIn, with the following all contain in a single file:

1. Your Java source file, *<StudedentID>*.java, in Word document format

2. Output (showing your interactivity with your program) is to be included at the end of your Java source files, in Word document created in (1)

3. A Turnitin Report, again to be attached within the Word document created in (1)

Turnitin Report (http://www.turnitin.com)

Register yourself in 'Java Sem32020 using the following details:

      class ID : 26616679

      Enrollment password: javasem32020

Overview

There are a number of accommodation facilities, designated as quarantine centers, setup across the country for the people who are allowed to return to Malaysia, which include Malaysian Citizens and Foreigners. Among the Foreigners only those having Expat visa or Permanent resident status are allowed. Upon arrival, they are they are required to quarantine in the designated centers for a period of 14 - 42 days. HELPQuarantine, one such facility, requires a simple application that can calculate the Final Bill of the quarantined guests and also generate some other relevant information.

You are required to write a program in Java to create the application whose requirements are given as:

The core requirement of this assignment are given as:

- To read from the keyboard the following data related to each item.

  Guest name, Nationality, Number of days stayed
- To store the individual values by declaring data types of appropriate type.
- To generate a transaction ID against each guest's charges. (Auto generate, 3-digit, 001 - 999 range)
- To print amount charged for each guest.
- To print the amount paid by the guest and by Govt.
- To print the balance of the quarantine fund.

Your program will consist of one class file named *<StudentID>*.**java,** with the input and output within the main method, and additional methods defined for all of the key functions carried out by the program.

Details

The requirements for this assignment spans across three levels. You should complete and test a solution to Level 1 requirements before attempting the additional Level 2 requirements. Similarly, you should complete the Level 2 before attempting Level 3. **Higher levels will not be marked unless the lower level is completed correctly.**

Level 1 Criteria

Level 1 Requirements Specification

Your program should begin by prompting for and reading the guest details. This data should be printed before the next set of data is entered. The program should calculate the total amount charged, charges paid by guest and Govt., and should be printed. Also, the program should auto-generate a 3-digit transaction ID (001-999)
The guests are charged differently based on the category and is given **Table 1**.

Category	Charges (RM/day)
Malaysian	80.3
Resident	100.6
Expat	120.9

Table 1: Charges categorization

Some of the charges are borne by Government and the remaining are paid by the guest. The charges borne by Government is based on the category and the total charges as given in **Table 2** and **Table 3**.

Category Malaysian	
<1500 : Fixed amount 100	
>=1500 < 2000	15%
>=2000 < 2500	21.5%
>=2500	27.5%

Table 2: Charges paid by Govt. for Malaysian

Category Foreigner(Resident/Expat)	
<2000 : Fixed amount 80	
>=2000 < 3000	9.5%
>=3000	17.5%

Table 3: Charges paid by Govt. for Expat/Resident

When the user chooses to quit the program, by entering Q (or q) at the prompt, the total amount payable for all purchase made should be printed before terminating the program. When a user enters at the first prompt Q, a message should be printed to say 'No transactions'.

At Level 1 you need not verify that the numbers are valid, i.e. users will always enter valid data when prompted.

Level 1 Design and Implementation Details

```
public static void main (String args[])
{
   //All of the input and output occurs here.
   //All the calculations are performed here
   //No need to create any additional method
   // No input validation required

}
```

All of the input and output should be console-based. You should do all of the input and output in the **main** method. **None of the other methods should read or print data**.
Make use of local variables only.

Level 1 Testing

You should demonstrate that your program produces the correct results by using the test data from the sample run. You should undertake another test where the first name entered is **Q** or **q.**

Sample output:

Sample Run-1:
```
Enter guest name (Q/q to quit): q
No transactions
```

Sample Run-2:
```
Enter guest name (Q/q to quit): Wira
Category: M
Days stayed: 14
Transaction ID: 040
Amount charged for 14 days @80.30 RM/day: 1124.20 RM
Paid by Self: 1024.20
Paid by Govt.: 100.00

Enter guest name (Q/q to quit): Ben
Category: R
Days stayed: 14
Transaction ID: 896
Amount charged for 14 days @100.60 RM/day: 1408.40 RM
Paid by Self: 1328.40
Paid by Govt.: 80.00

Enter guest name (Q/q to quit): Sameer
Category: E
Days stayed: 014
Transaction ID: 952
Amount charged for 14 days @120.90 RM/day: 1692.60 RM
Paid by Self: 1612.60
Paid by Govt.: 80.00

Enter guest name (Q/q to quit): Q
-------------------------------------

Total Amount from 3 guests is 4225.20 RM
```

Level 2 Criteria

Level 2 Requirements Specification

In addition to the Level 1 requirements, your program should:

1) Validate the user input
   Category: Malaysian (M/m), Resident(R/r), Expat(E/e)
   Prompt user for the category until a valid value is provided.
   Number of days: (14-42) days
   If user input any other number, a default value of 21 should be assumed and should be printed.
2) Demonstrate use of static methods (Define at least 3 methods)
3) Highest amount paid, guest name and category
4) Average amount per category (Malaysian, Foreigner)

Level 2 Design and Implementation Details

You should create methods for validating user data, calculations, etc.

Level 2 Testing

Data should be exchanged using input arguments and return values.

You should demonstrate that your program produces the correct results by using the data from the sample run for Level 1 and provide the additional output as shown in the sample run for the Level 2.

Sample output:

Sample Run-1:

```
Enter guest name (Q/q to quit): Alice
Enter guest name (Q/q to quit): Alice
Category: M
Days stayed: 10
Default value 21 set for Days stayed
Transaction ID: 444

Amount charged for 21 days @80.30 RM/day: 1686.30 RM
Paid by Self: 1433.36
Paid by Govt.: 252.95

Enter guest name (Q/q to quit): Keith
Category: R
Days stayed: 22
Transaction ID: 288

Amount charged for 22 days @100.60 RM/day: 2213.20 RM
Paid by Self: 2002.95
Paid by Govt.: 210.25

Enter guest name (Q/q to quit): Riad
Category: E
Days stayed: 33
Transaction ID: 900

Amount charged for 33 days @120.90 RM/day: 3989.70 RM
Paid by Self: 3291.50
Paid by Govt.: 698.20

Enter guest name (Q/q to quit): Shayan
Category: e
Days stayed: 24
Transaction ID: 978

Amount charged for 24 days @120.90 RM/day: 2901.60 RM
Paid by Self: 2625.95
Paid by Govt.: 275.65

Enter guest name (Q/q to quit): Meena
Category: R
Days stayed: 44
Default value 21 set for Days stayed
Transaction ID: 817

Amount charged for 21 days @100.60 RM/day: 2112.60 RM
Paid by Self: 1911.90
Paid by Govt.: 200.70

Enter guest name (Q/q to quit): Faysal
Category: t
Invalid Category
Please enter category: v
Invalid Category
Please enter category: E
Days stayed: 33
Transaction ID: 594

Amount charged for 33 days @120.90 RM/day: 3989.70 RM
Paid by Self: 3291.50
Paid by Govt.: 698.20

Enter guest name (Q/q to quit): q
-----------------------------------------

Total Amount from 6 guests is  16893.10 RM
Highest amount paid 3989.70 RM by Riad, is an Expat
Average amount from Malaysians: 1686.30
Average amount from Foreigners: 3041.36
```

Level 3 Criteria

Level 3 Requirements Specification

In addition to Level 2 requirements the quarantine center receives an initial amount of 3000 RM as quarantine fund. For each guest's total charge, a portion (Paid by Govt.) will be deducted from the fund, and the balance is displayed (rounded value)
If the balance in the quarantine fund is not sufficient, the current transaction will not complete, the admin should be provided with the following options.

1) First is to quit the program and the summary information is displayed.
2) The second option is to top up the amount in the quarantine fund, and the interaction may continue thereafter, until the user choose to quit.

Level 3 Design and Implementation Details

Again, all of the input and output should be console-based and all of the input and output should be in the main method. You should declare variables in the individual methods not at the class level.

Level 3 Testing
You should demonstrate that your program produces the correct results by using the data from the sample run for Level 3 and provide the additional output as shown in the sample run for the Level 3.

Sample Run;

```
Quarantine Fund amount: 3000 RM

Enter guest name (Q/q to quit): Jim
Category: e
Days stayed: 20;
Transaction ID: 581

Amount charged for 20 days @120.90 RM/day: 2418.00 RM
Paid by Self: 2188.29 RM
Paid by Govt.: 229.71 RM
Quarantine fund balance: 2770 RM


Enter guest name (Q/q to quit): Chris
Category: R
Days stayed: 42
Transaction ID: 680

Amount charged for 42 days @100.60 RM/day: 4225.20 RM
Paid by Self: 3485.79 RM
Paid by Govt.: 739.41 RM
Quarantine fund balance: 2031 RM


Enter guest name (Q/q to quit): Lina
Category: M
Days stayed: 33
Transaction ID: 5198 RM

Amount charged for 33 days @80.30 RM/day: 2649.90 RM
Paid by Self: 1921.18 RM
Paid by Govt.: 728.72 RM
Quarantine fund balance: 1302 RM


Enter guest name (Q/q to quit): Tan
Category: M
Days stayed: 25
Transaction ID: 823

Amount charged for 25 days @80.30 RM/day: 2007.50 RM
Paid by Self: 1575.89 RM
```

```
Paid by Govt.: 431.61 RM
Quarantine fund balance: 871 RM


Enter guest name (Q/q to quit): Shaan
Category: E
Days stayed: 40
Transaction ID: 789

Amount charged for 40 days @120.90 RM/day: 4836.00 RM
Paid by Self: 3989.70 RM
Paid by Govt.: 846.30 RM
Quarantine fund balance: 24 RM


Enter guest name (Q/q to quit): Rex
Category: m
Days stayed: 1
Default value 21 set for Days stayed

Insufficient balance in quarantine fund
Would you like to:
T. Top Up , Any other key to quit
Your choice: t
Top Up Amount: 1000
Quarantine fund balance: 1024 RM



Enter guest name (Q/q to quit): q
---------------------------------------

Total Amount from 5 guests is 16136.60 RM
Highest amount paid 4836.00 RM by Shaan, is an Expat
Average amount from Malaysians: 2328.70 RM
Average amount from Foreigners: 3826.40 RM
Quarantine fund balance: 1024 RM
```

NOTE: You need to test and include all possible scenarios.

Documentation (All Levels)
- You should include comments in your code stating what each method does and explaining any complex sections of code.
- You should also include your name and student ID as comments within the code.
- You should use appropriate variable names. Same applies to methods.
- The program should be properly indented.

What To Submit
You should submit the following:

- A cover-sheet stating your name and student number, along with **the level at which you have completed the assignment** (i.e. Level 1, Level 2, or Level 3).

   NOTE: **You only need to submit one file.** If you have successfully finished up to Level 2, then you NEED not submit the Level 1 file. If you have successfully finished up to Level 3, then you NEED not submit the Level 2 file.

- Marking scheme

- Output showing your interactivity with your program covering various scenarios.

- The source code file.

- Turnitin report.

Marking Scheme

Level 1 requirements completed and correct results for given test data demonstrated	55 marks
Levels 2 and 1 requirements completed and correct results for given test data demonstrated	75 marks
Levels 3, 2, and 1 requirements completed and correct results for given test data demonstrated	85 marks
Quality of code, clarity and documentation	15 marks

NOTE: Refer to the Excel file, *msA1BIT106.xlsx*, for detailed breakdown of the marks allocated for each level, as well as the requirement for each level.

Note about marking

In order to obtain the marks for a given level, you must demonstrate that your program produces the correct results for the given test data.

If your program does not meet Level 1 requirements by the due date you should obtain help from the lecturer and notify the lecturer that you will submit the assignment late (marks will be deducted).

Note about testing and plagiarism

It is very important that you **complete** this assignment **alone**. You may of course obtain general assistance from the lecturing staff in the subject and your peers, but the coding must be carried out yourself. It is normally quite easy to detect when two or more students work together on their coding.

It is also very important that the demonstration of the results of your program using the given test data is produced using the identical version of the program to the printout of your source code. **Students who hand in substantially similar assignments or whose programs do not match their demonstration of testing will fail the assignment.**

Any student suspected of copying, or of not producing the work himself or herself, can be called for **oral examination**, where the student will be expected **to demonstrate sufficient knowledge of the application** to show that it is his or her own original work.