University of Sri Jayewardenepura

B.Sc. (General) Degree First Year
First Semester Terminal Course Unit Examination–November 2018
(Held in Second Semester)

ICT 107 1.0 Computer Programming - Laboratory I

(Time: 4 hours)

INSTRUCTIONS TO CANDIDATES

- Answer all questions
- Candidates are allowed to use their lecture notes, printed and hand written materials during the examination time. However, candidates are NOT allowed to exchange those materials with other colleagues.
- Candidates are NOT allowed to use Internet, Mobile Phones, Smart Watches, Computer Devices or Any Other Communication Devices during the examination time.
- Design and give a structured, user friendly program in C. It is NOT compulsory to write comments, but you do have to use good programming techniques that you have learnt.
- Enter your index number, as a comment, on the first line of your program.
- Create a C programming file using following naming conversion:
  - AS2017*ddd*_V_*x* (where *d*' s are the last three digits of your index no and *x* is a version number)
- At the end of the examination copy the folder named AS2016*ddd* on the desktop to exam –*nn* drive (where *nn* is the machine number). Make sure all the files are copied to the assign folder correctly before leave the examination hall.

"Tharuka Cab" is a Taxi service company in Maharagam. They provide three packages such as "Airport Ride", "Short Trip" and "Long Trip". They have AC and non-AC cars. For AC vehicles, they charge 20% additional amount. Calculation process of the taxi fare is different from one package to another. Company wants to develop a computer based system to calculate taxi fare for each package type.

You have been asked to develop the above system using C programming language as follows.

Write the test cases and test data that you use to test your program in each trip type.

1. Initial screen

Figure 1.1 shows the initial screen of the system. First user should enter the package number and then system directs user to the screen of the relevant package. If user enters incorrect number, system displays the error message and asks to re-enter it (Figure 1.2). The screen of the "**Airport Ride**", "**Short Trip**" and "**Long Trip**" are shown in Figure 2.1, Figure 3.1 and Figure 4.1 respectively.

```
        Select package
-------------------------------
1. Airport Ride
2. Short Trip
3. Long Trip

Enter package Number(1 or 2 or 3):
```

Figure 1.1: Initial Screen

```
---- Incorrect package number ----
        --- Re-Enter -----

        Select package
-------------------------------
1. Airport Ride
2. Short Trip
3. Long Trip

Enter package Number(1 or 2 or 3):
```

Figure 1.2: Error Screen

2. Airport Ride Package

Company operates the airport rides to Katunayake airport from three cities namely Maharagama (M), Boralesgamuwa (B) and Piliyandala (P). As shown in the Figure 2.1, system asks the pickup location and the vehicle type either AC (A) or Non-AC (N). For each ride, company charges a fixed amount, based on the pickup location as shown in the Table 1. For AC vehicle 20% additional charge will be added. Figure 2.2 shows the output format of the "Airport Ride" bill.

Pickup Location	City Code Character	Taxi Fare
Maharagama	M	Rs. 2500.00
Boralesgamuwa	B	Rs. 2750.00
Piliyandala	P	Rs. 3000.00

Table 1: City Codes and Taxi Fares

```
        Select Pickup location
  ------------------------------------
Maharagama        (M)
Boralesgamuwa     (B)
Piliyandala       (P)

Enter Location Code(M or B or P): P
Enter Vehicle type(A or N)      : A
```

Figure 2.1: Input screen of the "Airport Ride" package

```
        Taxi Fare (Airport Ride)
  ------------------------------
Package         : Airport Ride
From            : Piliyandala
To              : katunayake airport
Vehicle Type    : AC

Amount          : Rs. 3600.00
```

Figure 2.2: Output screen of the "Airport Ride" bill

Note: It is not necessary to validate user inputs in this function.

3. Short Trip Package

In "Short Trip" package, taxi fare is calculated based on three parameters such riding charge, waiting charge and AC facility charge. They defined 50.00 rupees as a cost per kilometer, 150.00 rupees as a waiting charge per hour and minimum distance as 20 kilometer. Even the actual distance is less than the minimum distance they consider the distance value as a 20 kilometer.

Calculation process is performing by using the following formulas.

Riding charge = Distance * Cost per kilometer

Waiting charge = Waiting charge per hour * Number of waiting hours

AC facility charge = Riding charge * 20%

Taxi Fare = Riding Cost + Waiting charge **(For non AC vehicle)**

Taxi Fare = Riding Cost + AC facility charge + Waiting charge **(For AC vehicle)**

Figure 3.1 and Figure 3.2 show the data input screen of the "Short Trip" package and output screen of the "Short Trip" bill.

```
          Short Trip
  ------------------------------
Enter Distance              : 5
Waiting Hours               : 1
Enter Vehicle Type (A or N) : A
```

Figure 3.1: Input screen of the "Short Trip" package

```
        Taxi Fare (Short Trip)
  ------------------------------
Package         :  Short Trip
Distance        :  5 Km
Waiting Hours:  1 Hour
Vehicle Type    :  AC

Amount          : Rs. 1350.00
```

Figure 3.2: Output screen of the "Short Trip" bill

4. Long Trip Package

In "Long Trip" package taxi fare is calculated based on three parameters such riding charge, night packing charge and AC facility charge. They defined **1500.00** rupees as a night parking per day and **50.00** rupees as an initial rate of a kilometer. The rate per kilometer is varying according to the distance, as shown in the Table 2.

Distance (Km)	Cost per one kilometer	
	Equation	Sample value
<= 300	cost per Km * 1.0	50.00 * 1.0 = 50.00
301 - 600	cost per Km * 0.9	50.00 * 0.9 = 45.00
>600	cost per Km * 0.8	50.00 * 0.8 = 40.00

Table 2 : variation of the cost per kilometer according to the distance

Calculation process is performing by using the following formulas.

Riding charge = Distance * Cost per kilometer

Night packing charge = Night packing charge per night * Number of night

AC facility charge = Riding charge * 20%

Taxi Fare = Riding Cost + Night packing charge **(For non AC vehicle)**

Taxi Fare = Riding Cost + AC facility charge + Night packing charge **(For AC vehicle)**

Figure 4.1 and Figure 4.2 show the data input screen of the "Long Trip" package and output screen of the "Long Trip" bill.

```
Long Trip
-----------------------------
Enter Distance                : 650
Number of Night               : 1
Enter Vehicle Type (A or N)   : A
```

Figure 3.1: Input screen of the "Long Trip" package

```
Taxi Fare (Long Trip)
-----------------------------
Package          :  Long Trip
Distance         :  650 Km
Number of Night  :  1 day
Vehicle Type     :  AC

Amount           : Rs. 38100.00
```

Figure 3.2: Output screen of the "Long Trip" bill

Note: It is not necessary to validate user inputs in this function.