

Student Name:

Weight: 15%

Student ID:

Marks: /20

Assignment: Programming Strategies

Type: Group Assignment

Modules: 1 and 2 ONLY

- Students should **ONLY USE** programming constructs covered in modules 1 and 2.
- **Submissions using programming concepts that are not covered in modules 1 and 2 will be penalized.**
 - **Penalty with no limit could be applied**
- **Late submissions will not be accepted**

Scenario

You have recently been hired by Best Cars Inc. to develop a simple car rental system. The system should allow customers to rent cars for a specific duration, and it should calculate the total cost of the rental based on different factors.

Equipment and Materials

For this assignment, you will need:

- Python IDE

Instructions

This assignment will need to be completed outside of class time. See the course schedule and Brightspace for exact due dates. There are two parts to this assignment, and it is recommended to tackle the work in two stages, by focusing on and completing Part 1 before completing Part 2.

Group Submission

1. Working in a group, review the Scenario, Rental Cost Calculator, and Multiple Rentals and Billing Summary sections of this document, noting how the program expectations change between Part 1 and Part 2.
2. Review the grading criteria for submission.
3. Design and then write the code for a program that meets the requirements outlined for **Part 1**.
4. Test your code using the input values as shown in the **Test Plan** section, but only for one vehicle rental per run and disregarding the rental billing summary.

5. Make a copy of your Part 1 code and extend it to meet the **Part 2** requirements.
6. Test your updated code using the input values as shown in the **Test Plan** section and verifying all required functionality and output.
- Submit the following to Brightspace:
 - The final code of the program that you implemented (.py file) for **Part 2**. You should submit only your Part 2 solution unless you were unable to complete Part 2, in which case submit your completed Part 1 solution.
 - Your test outputs for **Part 2** (.txt files), covering **all** test cases in the sample run.
 - The PDF/DOC peer assessment according to your instructor's instructions.

Best Cars Inc. Rental System Details

Part 1: Rental Cost Calculator

The initial user input to the program is the type of vehicle they want to rent (e.g., Compact, Sedan, SUV, or Luxury). The base rental rate is determined according to the vehicle type as shown in table 1 below.

Table 1: Rental Rates per Day

Vehicle Type	Base Rental Rate per Day
Compact	\$25
Sedan	\$35
SUV	\$50
Luxury	\$60

The next user input is the rental duration in days. Apply the following discount based on the rental duration:

Table 2: Discounts

Rental Duration	Discount ** Applies to base rate only **
1 day	none
2 – 3 days	4%
4 – 7 days	10%
8 or more days	20%

The final inputs to part 1 of the rental cost calculator are the extra features or services that the customer chooses to add. The following table shows the daily cost for each of the available extra features. Allow the user to add multiple different features, but each feature should only be “added” once.

Table 3: Additional Features

Feature or Service	Rate per Day
GPS Navigation	\$5
Mobile Wi-Fi	\$8
Child Seat	\$2

Toll Pass	\$4.50
Roadside Assistance Plus	\$5

Note: Depending on availability at check-in time, up to two extra child seats may be included at no additional charge.

To conclude part 1, calculate and display the cost to rent the selected vehicle type for the specified number of days. Be sure to apply the applicable discount on the base rate and then add in the appropriate rates for any selected additional features/services.

Important: After successfully completing Part 1, save a copy of your work for your reference.

Part 2: Multiple Rentals and Billing Summary

Update your program from Part 1 to include the following functionality:

- Allow multiple vehicles to be rented in a single run. At the conclusion of each vehicle rental, present the user with the choice to rent another vehicle.
- When no more vehicles are to be rented, compute the total dollar amount of all rentals (before tax), the tax amount based on 5% GST, and the final total including tax. Print a rental billing summary showing these amounts.

Additional Requirements:

- Multiple additional features/services can be selected for a given rental. Allow the user to make another feature selection or choose “0” to continue on to the next step. In the menu of features displayed to the user, indicate which features have been selected with a check mark (✓).
- The program should validate the following user inputs:
 - Type of vehicle selection must be between 1 and 4
 - Duration (rental days) must be greater than 0
 - Additional feature selection must be between 0 and 5
 - Display an appropriate message if the feature selection is within the valid range **and** the feature was already selected for this vehicle rental

If a value entered by the user falls outside of the allowed values, display an appropriate error message, and have them try again. The program should not move on to the next step until a valid value has been input.

- It is NOT necessary to verify that input values match the expected data type. In other words, you can assume that the user will enter digits for an integer item such as rental duration.
- Format your program’s output to match that of the Test Plan (sample run).

Tips for Success:

- Use constants for predetermined values such as percentages, thresholds and rates.
- Use compound data types such as list, tuple or dictionary to streamline your solution.

Test Plan

Run your program and follow the sample run below. Input values are shown in **bold underline**.

~~~~~  
~ Welcome to Best Cars Inc. ~  
~~~~~

Step 1. Choose the type of vehicle you wish to rent.

Vehicle Type	Daily Rate
1. Compact	25
2. Sedan	35
3. SUV	50
4. Luxury	60

Your selection: **1**

You have chosen a Compact. The base rental rate is \$25.00 per day

Step 2. Specify the duration of this vehicle rental.

Enter the number of days needed: **3**

Discount to be applied is 4%

Your discounted rental rate is \$24.00 per day

Step 3. Choose your desired additional features or services.

Option	Daily Rate
1. GPS Navigation	5.00
2. Mobile Wi-Fi	8.00
3. Child Seat	2.00
4. Toll Pass	4.50
5. Roadside Assistance Plus	5.00

Enter option # or 0 to proceed: **3**

Feature: Child Seat added for \$2.00

Option	Daily Rate
1. GPS Navigation	5.00
2. Mobile Wi-Fi	8.00
3. Child Seat	2.00 ✓
4. Toll Pass	4.50
5. Roadside Assistance Plus	5.00

Enter option # or 0 to proceed: **0**

Success! Your reservation for a 3 day Compact rental is complete.

The price (not including GST) is \$26.00 per day or \$78.00 for the rental.

Do you want to rent another vehicle? (Y/N): **y**

Step 1. Choose the type of vehicle you wish to rent.

Vehicle Type	Daily Rate
--------------	------------

- | | |
|------------|----|
| 1. Compact | 25 |
| 2. Sedan | 35 |
| 3. SUV | 50 |
| 4. Luxury | 60 |

Your selection: 3

You have chosen a SUV. The base rental rate is \$50.00 per day

Step 2. Specify the duration of this vehicle rental.

Enter the number of days needed: 4

Discount to be applied is 10%

Your discounted rental rate is \$45.00 per day

Step 3. Choose your desired additional features or services.

Option	Daily Rate
--------	------------

- | | |
|-----------------------------|------|
| 1. GPS Navigation | 5.00 |
| 2. Mobile Wi-Fi | 8.00 |
| 3. Child Seat | 2.00 |
| 4. Toll Pass | 4.50 |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 1

Feature: GPS Navigation added for \$5.00

Option	Daily Rate
--------	------------

- | | |
|-----------------------------|--------|
| 1. GPS Navigation | 5.00 ✓ |
| 2. Mobile Wi-Fi | 8.00 |
| 3. Child Seat | 2.00 |
| 4. Toll Pass | 4.50 |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 2

Feature: Mobile Wi-Fi added for \$8.00

Option	Daily Rate
--------	------------

- | | |
|-----------------------------|--------|
| 1. GPS Navigation | 5.00 ✓ |
| 2. Mobile Wi-Fi | 8.00 ✓ |
| 3. Child Seat | 2.00 |
| 4. Toll Pass | 4.50 |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 34

Error: Invalid selection, please try again.

Option	Daily Rate
--------	------------

- | | |
|-------------------|--------|
| 1. GPS Navigation | 5.00 ✓ |
| 2. Mobile Wi-Fi | 8.00 ✓ |

- | | |
|-----------------------------|------|
| 3. Child Seat | 2.00 |
| 4. Toll Pass | 4.50 |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 2

Feature is already selected.

- | Option | Daily Rate |
|-----------------------------|------------|
| 1. GPS Navigation | 5.00 ✓ |
| 2. Mobile Wi-Fi | 8.00 ✓ |
| 3. Child Seat | 2.00 |
| 4. Toll Pass | 4.50 |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 3

Feature: Child Seat added for \$2.00

- | Option | Daily Rate |
|-----------------------------|------------|
| 1. GPS Navigation | 5.00 ✓ |
| 2. Mobile Wi-Fi | 8.00 ✓ |
| 3. Child Seat | 2.00 ✓ |
| 4. Toll Pass | 4.50 |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 4

Feature: Toll Pass added for \$4.50

- | Option | Daily Rate |
|-----------------------------|------------|
| 1. GPS Navigation | 5.00 ✓ |
| 2. Mobile Wi-Fi | 8.00 ✓ |
| 3. Child Seat | 2.00 ✓ |
| 4. Toll Pass | 4.50 ✓ |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 5

Feature: Roadside Assistance Plus added for \$5.00

- | Option | Daily Rate |
|-----------------------------|------------|
| 1. GPS Navigation | 5.00 ✓ |
| 2. Mobile Wi-Fi | 8.00 ✓ |
| 3. Child Seat | 2.00 ✓ |
| 4. Toll Pass | 4.50 ✓ |
| 5. Roadside Assistance Plus | 5.00 ✓ |

Enter option # or 0 to proceed: 0

Success! Your reservation for a 4 day SUV rental is complete.

The price (not including GST) is \$69.50 per day or \$278.00 for the rental.

Do you want to rent another vehicle? (Y/N): Y

Step 1. Choose the type of vehicle you wish to rent.

Vehicle Type	Daily Rate
--------------	------------

- | | |
|------------|----|
| 1. Compact | 25 |
| 2. Sedan | 35 |
| 3. SUV | 50 |
| 4. Luxury | 60 |

Your selection: 2

You have chosen a Sedan. The base rental rate is \$35.00 per day

Step 2. Specify the duration of this vehicle rental.

Enter the number of days needed: 11

Discount to be applied is 20%

Your discounted rental rate is \$28.00 per day

Step 3. Choose your desired additional features or services.

Option	Daily Rate
--------	------------

- | | |
|-----------------------------|------|
| 1. GPS Navigation | 5.00 |
| 2. Mobile Wi-Fi | 8.00 |
| 3. Child Seat | 2.00 |
| 4. Toll Pass | 4.50 |
| 5. Roadside Assistance Plus | 5.00 |

Enter option # or 0 to proceed: 0

Success! Your reservation for a 11 day Sedan rental is complete.

The price (not including GST) is \$28.00 per day or \$308.00 for the rental.

Do you want to rent another vehicle? (Y/N): y

Step 1. Choose the type of vehicle you wish to rent.

Vehicle Type	Daily Rate
--------------	------------

- | | |
|------------|----|
| 1. Compact | 25 |
| 2. Sedan | 35 |
| 3. SUV | 50 |
| 4. Luxury | 60 |

Your selection: 5

Invalid selection. Please enter one of the option numbers displayed.

Your selection: 4

You have chosen a Luxury. The base rental rate is \$60.00 per day

Step 2. Specify the duration of this vehicle rental.

Enter the number of days needed: -1

Error: Value cannot be less than 1.

Enter the number of days needed: 0

Error: Value cannot be less than 1.

Enter the number of days needed: 1
Discount to be applied is 0%
Your discounted rental rate is \$60.00 per day

Step 3. Choose your desired additional features or services.

Option	Daily Rate
1. GPS Navigation	5.00
2. Mobile Wi-Fi	8.00
3. Child Seat	2.00
4. Toll Pass	4.50
5. Roadside Assistance Plus	5.00

Enter option # or 0 to proceed: 1

Feature: GPS Navigation added for \$5.00

Option	Daily Rate
1. GPS Navigation	5.00 ✓
2. Mobile Wi-Fi	8.00
3. Child Seat	2.00
4. Toll Pass	4.50
5. Roadside Assistance Plus	5.00

Enter option # or 0 to proceed: 5

Feature: Roadside Assistance Plus added for \$5.00

Option	Daily Rate
1. GPS Navigation	5.00 ✓
2. Mobile Wi-Fi	8.00
3. Child Seat	2.00
4. Toll Pass	4.50
5. Roadside Assistance Plus	5.00 ✓

Enter option # or 0 to proceed: 0

Success! Your reservation for a 1 day Luxury rental is complete.
The price (not including GST) is \$70.00 per day or \$70.00 for the rental.
Do you want to rent another vehicle? (Y/N): n

```
~~~~~  
~~~      RENTAL BILLING SUMMARY      ~~~  
Number of vehicles rented:           4  
Amount due before tax:                734.00  
GST:                                 36.70  
Total amount due:                    770.70  
~~~~~
```

Thank you for choosing Best Cars!

Peer Assessment

Each member should assign a mark out of 10 to the other group members.

Please use the following table to complete the peer assessment. Marks/tasks are just samples.

	Member 1 Name	Member 2 Name	Member 3 Name	Completed Tasks
Member 1 Name	N/A	9	10	<ul style="list-style-type: none">• Task 1 description• Task 2 description
Member 2 Name	8	N/A	9	<ul style="list-style-type: none">• Task 3 description• Task 4 description
Member 3 Name	9	10	N/A	<ul style="list-style-type: none">• Task 5 description• Task 6 description
Average	8.5	9.5	9.5	<ul style="list-style-type: none">•

Marking Criteria

Rubric available in Brightspace.