NGEE ANN SCHOOL OF INFOCOMM TECHNOLOGY



| PRG2 | **Programming II**<br>Diploma in CSF / IT / FI<br>Year 1 (2021/22) Semester 2 | Week **6**<br>45 minutes |
|---|---|---|
| | **Practical Test (15%)** | |

## Instructions

**Prior to test**

- Create a new *Console App (.Net Core)*.
- Name the project *CarParkApp_YourStudentID*
  *(e.g. CarParkApp_S12345678 if your student ID is S12345678)*

**Submission**

- Map to **Network drive : \\ictspace.ict.np.edu.sg\PRG2PracticalTest**
- Upload the WHOLE *CarParkApp_YourStudentID* folder into the network drive (***ictspace.ict.np.edu.sg > PRG2PracticalTest > group > studentID***)

Note: It is your RESPONSIBILITY to ensure that the files are submitted correctly.

1. Analyze the class element diagram below.

| **CarPark** |
|---|
| -name: string<br>-category: string<br>-rate: double<br>-gracePeriod: int |
| +CarPark()<br>+CarPark(string, string, double, int)<br>+CalculateParking(int, int): double<br>+ToString(): string |

Note:

- Each **`CarPark`** represents a car park in a particular location. You may assume that all names are unique.
- The **`rate`** is the per minute rate in cents.
- The **`gracePeriod`** is the duration in minutes allowed where no car park charge is imposed.
- **`CalculateParking(int, int)`** method calculates the amount of parking charge to pay. The first parameter is the hour of parking duration and the second parameter is the minutes of parking duration. The amount to pay is the duration in minutes

multiplied by the rate. If the parking duration is within the **gracePeriod**, there is no parking charge.

Implement the **CarPark** class based on the *Class Element Diagram* above.

(30 marks)

2. Add the following to the Program class:

a. Create a `List` to store **CarPark** objects in the `Main()` method.

```
class Program
{
    static void Main(string[] args)
    {
        // define your list here
```

(5 marks)

b. **Write and call a method** to initialize your list of **CarPark** objects:
   i. Read the contents of "`CarPark_Rates.csv`" (downloaded from MeL) and create the **CarPark** objects. The details in each line correspond to "name", "category", "rate" and "grace period" attributes respectively.
   ii. Add all the **CarPark** objects to your list.

(25 marks)

c. **Write and call a method** to display the details of all the objects in your list as shown below:

```
Car Park Name               Category              Rate($)   Grace Period(mins)
Ang Mo Kio Hub              North                   0.023                   10
Nex Mall                    North                   0.022                   10
Downtown East               East                    0.024                   10
Singapore EXPO              East                    0.053                    0
Hilton Hotel                Hotels                  0.117                    5
Goodwood Park Hotel         Hotels                  0.083                   10
ION Orchard                 Orchard Area            0.045                    5
Tanglin Mall                Orchard Area            0.020                    5
Wheelock Place              Orchard Area            0.050                    5
Singapore Flyer             Singapore Attractions   0.033                   15
Jurong Bird Park            Singapore Attractions   0.020                   15
Singapore Botanic Gardens   Singapore Attractions   0.020                   10
Sim Lim Square              South                   0.053                    0
Singapore General Hospital  South                   0.036                   15
The Star Vista              West                    0.022                   10
West Mall                   West                    0.021                   10
```

(20 marks)

d. In the Main() method, write codes to increase the parking rate by 0.2 cent for **`CarPark`** objects with rate above 5 cents in the list. Display the number of **`CarPark`** objects rate increased and show the updated list to user.

Sample output:

```
4 car park rates are increased by 0.2 cent.

Car Park Name                Category               Rate($)   Grace Period(mins)
Ang Mo Kio Hub               North                    0.023                   10
Nex Mall                     North                    0.022                   10
Downtown East                East                     0.024                   10
Singapore EXPO               East                     0.055                    0
Hilton Hotel                 Hotels                   0.119                    5
Goodwood Park Hotel          Hotels                   0.085                   10
ION Orchard                  Orchard Area             0.045                    5
Tanglin Mall                 Orchard Area             0.020                    5
Wheelock Place               Orchard Area             0.050                    5
Singapore Flyer              Singapore Attractions    0.033                   15
Jurong Bird Park             Singapore Attractions    0.020                   15
Singapore Botanic Gardens    Singapore Attractions    0.020                   10
Sim Lim Square               South                    0.055                    0
Singapore General Hospital   South                    0.036                   15
The Star Vista               West                     0.022                   10
West Mall                    West                     0.021                   10
```

(20 marks)

**PLAGIARISM WARNING:**

**If a student is found to have submitted work not done by him/her, he/she will not be awarded any marks for this practical test. Disciplinary action may also be taken.**

**Similar action will be taken for student who allows other student(s) to copy his/her work, or posting any solutions or code related to the practical test before the end of the hour for the test.**

*** END OF PAPER ***