Your preparation for the examination should include attempting the following practical tasks by writing and testing a program or programs.

A car park payment system allows customers to select the number of hours to leave their car in the car park. The customer will get a discount if they enter their frequent parking number correctly. The system calculates and displays the amount the customer must pay. The price of parking, the number of hours the customer can enter, and any discount depend upon the day of the week and the arrival time. The number of hours entered is a whole number. The price per hour is calculated using the price in force at the arrival time. No parking is allowed between Midnight and 08:00.

<table>
<thead>
<tr>
<th>Day of the week</th>
<th>From 08:00 to 15:59</th>
<th>From 16:00 to Midnight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max stay in hours</td>
<td>Price per hour</td>
</tr>
<tr>
<td>Sunday</td>
<td>8</td>
<td>2.00</td>
</tr>
<tr>
<td>Monday</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Tuesday</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Wednesday</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Thursday</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Friday</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Saturday</td>
<td>4</td>
<td>3.00</td>
</tr>
</tbody>
</table>

A frequent parking number can be entered for discounted parking. This number consists of 4 digits and a check digit that is calculated using a modulo 11 check digit calculation. A discount of 50% is available for arrival times from 16:00 to Midnight; the discount is 10% at all other arrival times.

Write and test a program or programs to simulate the car park payment system.

- Your program or programs must include appropriate prompts for the entry of data; data must be validated on entry.
- Error messages and other output need to be set out clearly and understandably.
- All variables, constants and other identifiers must have meaningful names.

You will need to complete these three tasks. Each task must be fully tested.

**Task 1 – Calculating the price to park.**

A customer inputs the day, the hour of arrival excluding minutes (for example 15:45 would be 15), the number of hours to leave their car, and a frequent parking number if available. If the frequent parking number has an incorrect check digit, then no discount can be applied. The
price to park, based on the day, the hour of arrival, the number of hours of parking required and any discount available, is calculated and displayed.

**Task 2** – Keeping a total of the payments.

Extend **Task 1** to keep a daily total of payments made for parking. The daily total is zeroed at the start of the day. For the simulation, each customer inputs the amount paid, this must be greater than or equal to the amount displayed. There is no change given so the amount input may exceed the amount displayed. Each customer payment is added to the daily total, and this total is displayed at the end of the day.

**Task 3** – Making payments fairer.

Customers have complained that sometimes they are being charged too much if they arrive before 16:00 and depart after 16:00. Extend **Task 1** to calculate the price before 16:00, then add the evening charge. For example, a customer arriving at 14:45 on a Sunday and parking for five hours was previously charged 10.00 and would now be charged 6.00.
Module Module1
Sub main()
'TASK:1 //Parking Number
Dim maxparking() As Integer = {8, 2, 2, 2, 2, 2, 4}
Dim hourprice() As Integer = {2, 10, 10, 10, 10, 10, 3}
Dim parkingday As Integer
Dim arrivaltime, parkinghours, parkingprice, frequentparknum As Integer
Dim discount, totalpayable As Double
Dim choice As Boolean
Dim checkdigit, digit1, digit2, digit3, digit4, digit5 As Integer
Dim dailytotal As Integer = 0 'Daily total is zero at the start of the day

1: 'Step:1 to return to Task1 from Task2 for next customer
Console.WriteLine("Welcome to Parking System")
Do
Console.WriteLine("Welcome to Parking System")
Loop Until parkingday >= 0 And parkingday <= 6
Do
Console.WriteLine("Welcome to Parking System")
Loop Until arrivaltime >= 8 And arrivaltime <= 24
Do
Console.WriteLine("Welcome to Parking System")
Loop Until parkinghours >= 0 And parkinghours <= maxparking(parkingday)
If arrivaltime <= 15 Then
parkingprice = parkinghours * hourprice(parkingday)
ElseIf arrivaltime >= 16 Then
parkingprice = 2
End If
Console.WriteLine("Do you have frequent parking number? True for yes, False for No")
choice = Console.ReadLine()
If choice = True Then
Console.WriteLine("Enter your 5 digit frequent Parking number, one digit at a time")
digit1 = Console.ReadLine()
digit2 = Console.ReadLine()
digit3 = Console.ReadLine()
digit4 = Console.ReadLine()
digit5 = Console.ReadLine()
frequentparknum = (5 * digit1) + (4 * digit2) + (3 * digit3) + (2 * digit4)
checkdigit = 11 - (frequentparknum Mod 11)
If checkdigit = digit5 Then
If arrivaltime >= 16 Then
discount = parkingprice / 2 '50% discount applied
Else
discount = (parkingprice / 100) * 10 '10% discount
Else
Console.WriteLine("check digit did not verify")
discount = 0
End If
Else
discount = 0
End If

totalpayable = parkingprice - discount
Console.Clear()
Console.WriteLine("Parking day selected is :")
Console.WriteLine("Arrival time in Parking :")
Console.WriteLine("Total number of hours to leave car in parking :")
Console.WriteLine("Total Price of Parking is :")
Console.WriteLine("Frequent parking num = ")
Console.WriteLine("Checkdigit:")
Console.WriteLine("Discount :")
Console.WriteLine("Total amount to be paid = ")

'Task2 (SIMULATION OF PARKING SYSTEM TO CALCULATE DAILY TOTAL AT DAY-END)

Dim parkingclosed As Boolean
Dim customeramount As Integer

Do
parkingclosed = False
Console.WriteLine("Please Enter the amount you want to pay")
customeramount = Console.ReadLine()
While customeramount < totalpayable
Console.WriteLine("Amount you paid is less than parking fee, Enter again")
customeramount = Console.ReadLine()
End While
dailytotal = dailytotal + customeramount
Console.WriteLine("Total Sale till now is :")
Console.WriteLine("PARKING CLOSED ? TRUE for Yes, FALSE to Input Next Customer")
parkingclosed = Console.ReadLine()
If parkingclosed = False Then
GoTo 1
End If
Loop Until parkingclosed = True
Console.WriteLine("Total Complete Day Amount =")
Console.ReadKey()

'Task3 (MAKING PARKING SYSTEM FAIR)

Dim departuretime, departure, newprice As Integer
Dim pricebefore16, priceafter16 As Integer

departuretime = Console.ReadLine()
departure = arrivaltime + parkinghours
If departuretime <= 16 Then
pricebefore16 = parkinghours * hourprice(parkingday)
priceafter16 = 0
Else
pricebefore16 = (16 - arrivaltime) * hourprice(parkingday)
priceafter16 = 2
End If
newprice = pricebefore16 + priceafter16
Console.WriteLine("Fair Payment: ")
Console.WriteLine(newprice)