

PRM – Oct/Nov 2020 – P21

1 (a) The following are some examples. There are many correct responses for this question.

- engineSize
- valuePerThousand
- placeKept
- thousandDriven
- driverAge

[3]

(b) Programming concept: **Conditional Statements**

Explanation:

- Check to see whether the value of the driver's age lies between 26 and 70
- e.g. IF driverAge >= 26 AND driverAge <= 70
- If True, then check for the years without an insurance claim
- e.g. IF yearsWithoutClaim >= 2
- If True, then apply the discount.

[3]

(c) New price: **\$875**

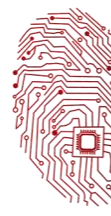
- Increases the price at the end of **Task 2** by 25%

Explanation:

- The age of the extra driver increases the price based on Table 1
- The price change for the driver's age range of 26-30 years is 25%
- $\$700 + 0.25 \times \700

[3]





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(d) The following are example programs. There are multiple correct solutions to this question.

Pseudocode:

```
DECLARE basePrice : INTEGER
DECLARE engine_size : REAL
DECLARE perc_change : Integer
DECLARE car_value : Real
DECLARE locationKept : STRING
DECLARE locationFlag : BOOLEAN
DECLARE thousandKilometerDriven : REAL
DECLARE driverAge : INTEGER
DECLARE yearsWithoutClaim : INTEGER
DECLARE discountPerc : INTEGER
DECLARE newCustDiscountPerc : INTEGER
```

```
DECLARE newPrice : REAL
```

```
basePrice = 500
perc_change = 0
engine_size = -1.0
car_value = -1000.0
locationFlag = False
thousandKilometerDriven = -1000.0
driverAge = 0
yearsWithoutClaim = -10
```

```
WHILE engine_size < 0
```

```
    OUTPUT "Enter the engine size in litres of fuel: "
```

```
    INPUT engine_size
```

```
    IF engine_size > 0.0 AND engine_size <= 0.5 THEN
```

```
        perc_change = perc_change – 5
```

```
    ELSEIF engine_size > 0.5 AND engine_size <= 1.0 THEN
```

```
        perc_change = perc_change + 0
```

```
    ELSEIF engine_size > 1.0 AND engine_size <= 2.5 THEN
```

```
        perc_change = perc_change + 5
```

```
    ELSEIF engine_size > 2.5 THEN
```

```
        perc_change = perc_change + 10
```

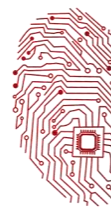
```
    ELSE
```

```
        OUTPUT "Please enter a valid engine size."
```

```
    END IF
```

```
END WHILE
```





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```
WHILE car_value < 0
    OUTPUT "Enter the value of the car (in thousands): "
    INPUT car_value

    IF car_value > 0 AND Car_value < 0.5 THEN
        perc_change = perc_change - 5
    ELSEIF car_value >= 0.5 AND Car_value <= 2 THEN
        perc_change = perc_change + 0
    ELSEIF car_value > 2 AND Car_value <= 10 THEN
        perc_change = perc_change + 5
    ELSEIF car_value > 10 AND Car_value <= 20 THEN
        perc_change = perc_change + 10
    ELSEIF car_value > 20 THEN
        perc_change = perc_change + 15
    ELSE
        OUTPUT "Please enter a valid price."
    END IF
END WHILE

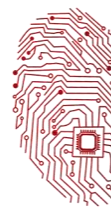
WHILE locationFlag = FALSE
    OUTPUT "Enter the location where the car is kept overnight (Garage/Drive/Street): "
    INPUT locationKept

    IF UPPER(locationKept) = "GARAGE" THEN
        locationFlag = TRUE
        perc_change = perc_change - 5
    ELSEIF UPPER(locationKept) = "DRIVE" THEN
        locationFlag = TRUE
        perc_change = perc_change + 0
    ELSEIF UPPER(locationKept) = "STREET" THEN
        locationFlag = TRUE
        perc_change = perc_change + 5
    ELSE
        OUTPUT "Please enter a valid location (Garage/Drive/Street)."
    END IF
END WHILE

WHILE thousandKilometerDriven < 0
    OUTPUT "Enter the kilometers driven per year (in thousands): "
    INPUT thousandKilometerDriven

    IF thousandKilometerDriven >= 0 AND thousandKilometerDriven < 5 THEN
        perc_change = perc_change - 5
```





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```
ELSEIF thousandKilometerDriven >= 5 AND thousandKilometerDriven <= 20 THEN
    perc_change = perc_change + 0
ELSEIF thousandKilometerDriven > 20
    perc_change = perc_change + 5
ELSE
    OUTPUT "Please enter a valid value for the thousands of kilometers driven."
END IF
END WHILE

WHILE drivenAge < 18

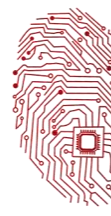
    OUTPUT "Enter the age of the driver: "
    INPUT driverAge

    IF driverAge >= 18 AND driverAge <= 20 THEN
        perc_change = perc_change + 100
    ELSEIF driverAge >= 21 AND driverAge <= 25 THEN
        perc_change = perc_change + 50
    ELSEIF driverAge >= 26 AND driverAge <= 30 THEN
        perc_change = perc_change + 25
    ELSEIF driverAge >= 31 AND driverAge <= 70 THEN
        perc_change = perc_change + 0
    ELSEIF driverAge >= 71 AND driverAge <= 80 THEN
        perc_change = perc_change + 10
    ELSEIF driverAge >= 80
        perc_change = perc_change + 20
    ELSE
        OUTPUT "Please enter a valid age."
    END IF
END WHILE

WHILE yearsWithoutClaim < 0
    OUTPUT "Enter the number of years without an insurance claim: "
    INPUT yearsWithoutClaim

    CASE OF yearsWithoutClaim
        0: discountPerc = 0
        1: discountPerc = 10
        2: discountPerc = 20
        3: discountPerc = 30
        4: discountPerc = 40
        5: discountPerc = 50
        6: discountPerc = 60
        >6: discountPerc = 70
    OTHERWISE
        OUTPUT "Please enter a valid argument."
```





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END CASE

END WHILE

OUTPUT "The price to insure your car is: \$" & newPrice

OUTPUT "The total percentage change in the base price of insurance is: " & perc_change & "%"

OUTPUT "The percentage discount due to years without claim is: " & discountPerc & "%"

Programming Language: VB

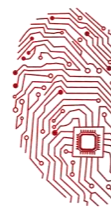
```
Dim basePrice As Integer

Dim engine_size As Decimal
Dim perc_change As Integer
Dim car_value As Decimal
Dim locationKept As String
Dim locationFlag As Boolean
Dim ThousandKilometerDriven As Decimal
Dim driverAge As Integer
Dim yearsWithoutClaim As Integer
Dim discountPerc As Integer
Dim newCustDiscountPerc As Integer
Dim addDriverChoice As String
Dim newDriverAge As Integer

Dim newPrice As Decimal

basePrice = 500
perc_change = 0
engine_size = -1.0
Car_value = -1000.0
locationFlag = False
ThousandKilometerDriven = -1000.0
driverAge = 0
yearsWithoutClaim = -10
```





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```
While engine_size < 0
    Console.WriteLine("Enter the engine size in litres of fuel: ")
    engine_size = Console.ReadLine
    If engine_size >= 0 And engine_size <= 0.5 Then : perc_change = perc_change - 5
    ElseIf engine_size > 0.5 And engine_size <= 1.0 Then : perc_change = perc_change
+ 0
    ElseIf engine_size > 1.0 And engine_size <= 2.5 Then : perc_change = perc_change
+ 5
    ElseIf engine_size > 2.5 Then : perc_change = perc_change + 10
    Else

        Console.WriteLine("Please enter a valid engine size.")
    End If
End While
```

```
While Car_value < 0

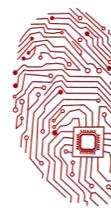
    Console.WriteLine("Enter the value of the car (in thousands): ")
    Car_value = Console.ReadLine
    If Car_value > 0 And Car_value < 0.5 Then : perc_change = perc_change - 5
    ElseIf Car_value >= 0.5 And Car_value <= 2 Then : perc_change = perc_change + 0
    ElseIf Car_value > 2 And Car_value <= 10 Then : perc_change = perc_change + 5
    ElseIf Car_value > 10 And Car_value <= 20 Then : perc_change = perc_change + 10
    ElseIf Car_value > 20 Then : perc_change = perc_change + 15
    Else

        Console.WriteLine("Please enter a valid price.")
    End If
End While
```

```
While locationFlag = False
```

```
    Console.WriteLine("Enter the location where the car is kept overnight
(Garage/Drive/Street): ")
    locationKept = Console.ReadLine
```





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```
If UCase(locationKept) = "GARAGE" Then
    locationFlag = True
    perc_change = perc_change - 5
ElseIf UCase(locationKept) = "DRIVE" Then
    locationFlag = True
    perc_change = perc_change + 0
ElseIf UCase(locationKept) = "STREET" Then
    locationFlag = True
    perc_change = perc_change + 5
Else

    Console.WriteLine("Please enter a valid location (Garage/Drive/Street).")
End If
End While

While ThousandKilometerDriven < 0

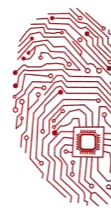
    Console.Write("Enter the kilometers driven per year (in thousands): ")
    ThousandKilometerDriven = Console.ReadLine
    If ThousandKilometerDriven >= 0 And ThousandKilometerDriven < 5 Then :
perc_change = perc_change - 5
    ElseIf ThousandKilometerDriven >= 5 And ThousandKilometerDriven <= 20 Then :
perc_change = perc_change + 0
    ElseIf ThousandKilometerDriven > 20 Then : perc_change = perc_change + 5
    Else

        Console.WriteLine("Please enter a valid value for the thousands of kilometers
driven.")
    End If
End While

While driverAge < 18

    Console.Write("Enter the age of the driver: ")
    driverAge = Console.ReadLine
```





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```
If driverAge >= 18 And driverAge <= 20 Then : perc_change = perc_change + 100
ElseIf driverAge >= 21 And driverAge <= 25 Then : perc_change = perc_change + 50
ElseIf driverAge >= 26 And driverAge <= 30 Then : perc_change = perc_change + 25
ElseIf driverAge >= 31 And driverAge <= 70 Then : perc_change = perc_change + 0
ElseIf driverAge >= 71 And driverAge <= 80 Then : perc_change = perc_change + 10
ElseIf driverAge > 80 Then : perc_change = perc_change + 20
Else

    Console.WriteLine("Please enter a valid age.")
End If
End While

newPrice = basePrice + (perc_change / 100) * basePrice

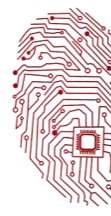
While yearsWithoutClaim < 0

    Console.Write("Enter the number of years without an insurance claim: ")
    yearsWithoutClaim = Console.ReadLine
    Select Case yearsWithoutClaim
        Case 0 : discountPerc = 0
        Case 1 : discountPerc = 10
        Case 2 : discountPerc = 20
        Case 3 : discountPerc = 30
        Case 4 : discountPerc = 40
        Case 5 : discountPerc = 50
        Case 6 : discountPerc = 60
        Case Is > 6 : discountPerc = 70
        Case Else

            Console.WriteLine("Please enter a valid argument.")
        End Select
    End While

'ADDITIONAL CODE FOR TASK 3 BEGINS HERE'
```





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```
Console.WriteLine("Would you like to add another driver? (Y/N) ")
addDriverChoice = Console.ReadLine
If UCase(addDriverChoice) = "Y" Then
    newDriverAge = 0
    While newDriverAge < 18

        Console.WriteLine("Enter the age of the second driver: ")
        newDriverAge = Console.ReadLine
        If newDriverAge >= 18 And newDriverAge <= 20 Then : perc_change = perc_change
+ 100
        ElseIf newDriverAge >= 21 And newDriverAge <= 25 Then : perc_change =
perc_change + 50
        ElseIf newDriverAge >= 26 And newDriverAge <= 30 Then : perc_change =
perc_change + 25
        ElseIf newDriverAge >= 31 And newDriverAge <= 70 Then : perc_change =
perc_change + 0
        ElseIf newDriverAge >= 71 And newDriverAge <= 80 Then : perc_change =
perc_change + 10
        ElseIf newDriverAge > 80 Then : perc_change = perc_change + 20
        Else

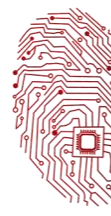
            Console.WriteLine("Please enter a valid age.")
        End If
    End While
End If

Console.WriteLine("The total percentage change in the base price of insurance is: " &
perc_change & "%")

Console.WriteLine("The percentage discount due to years without claim is: " & discountPerc
& "%")

Console.WriteLine("The price to insure your car is: $" & newPrice)
```





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Programming Language: Python

```
basePrice = 500
```

```
perc_change = 0
```

```
engine_size = -1.0
```

```
car_value = -1000.0
```

```
locationFlag = False
```

```
thousandKilometerDriven = -1000.0
```

```
driverAge = 0
```

```
yearsWithoutClaim = -10
```

```
while engine_size < 0:
```

```
    engine_size = float(input("Enter the engine size in litres of fuel: "))
```

```
    if 0 <= engine_size <= 0.5: perc_change = perc_change - 5
```

```
    elif 0.5 < engine_size <= 1.0: perc_change = perc_change + 0
```

```
    elif 1.0 < engine_size <= 2.5: perc_change = perc_change + 5
```

```
    elif engine_size > 2.5: perc_change = perc_change + 10
```

```
    else: print("Please enter a valid engine size.")
```

```
while car_value < 0:
```

```
    car_value = float(input("Enter the value of the car (in thousands): "))
```

```
    if 0 < car_value < 0.5: perc_change = perc_change - 5
```

```
    elif 0.5 <= car_value <= 2: perc_change = perc_change + 0
```

```
    elif 2 < car_value <= 10: perc_change = perc_change + 5
```

```
    elif 10 < car_value <= 20: perc_change = perc_change + 10
```

```
    elif car_value > 20: perc_change = perc_change + 15
```

```
    else: print("Please enter a valid price.")
```

```
while not locationFlag:
```

```
    locationKept = input("Enter the location where the car is kept overnight  
(Garage/Drive/Street): ")
```

```
    if locationKept.upper() == "GARAGE":
```

```
        locationFlag = True
```

```
        perc_change = perc_change - 5
```

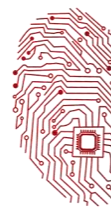
```
    elif locationKept.upper() == "DRIVE":
```

```
        locationFlag = True
```

```
        perc_change = perc_change + 0
```

```
    elif locationKept.upper() == "STREET":
```





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```
locationFlag = True
perc_change = perc_change + 5
else: print("Please enter a valid location (Garage/Drive/Street).")

while thousandKilometerDriven < 0:
    thousandKilometerDriven = float(input("Enter the kilometers driven per year (in thousands):
"))
    if 0 <= thousandKilometerDriven < 5: perc_change = perc_change - 5
    elif 5 <= thousandKilometerDriven <= 20: perc_change = perc_change + 0
    elif thousandKilometerDriven > 20: perc_change = perc_change + 5
    else: print("Please enter a valid value for the thousands of kilometers driven.")

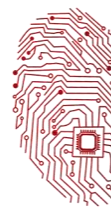
while driverAge < 18:
    driverAge = int(input("Enter the age of the driver: "))
    if 18 <= driverAge <= 20: perc_change = perc_change + 100
    elif 21 <= driverAge <= 25: perc_change = perc_change + 50
    elif 26 <= driverAge <= 30: perc_change = perc_change + 25
    elif 31 <= driverAge <= 70: perc_change = perc_change + 0
    elif 71 <= driverAge <= 80: perc_change = perc_change + 10
    elif driverAge > 80: perc_change = perc_change + 20
    else: print("Please enter a valid age.")

while yearsWithoutClaim < 0:
    yearsWithoutClaim = int(input("Enter the number of years without an insurance claim: "))
    if yearsWithoutClaim == 0: discountPerc = 0
    elif yearsWithoutClaim == 1: discountPerc = 10
    elif yearsWithoutClaim == 2: discountPerc = 20
    elif yearsWithoutClaim == 3: discountPerc = 30
    elif yearsWithoutClaim == 4: discountPerc = 40
    elif yearsWithoutClaim == 5: discountPerc = 50
    elif yearsWithoutClaim == 6: discountPerc = 60
    elif yearsWithoutClaim > 6: discountPerc = 70
    else: print("Please enter a valid argument.")

print("The total percentage change in the base price of insurance is:{}".format(perc_change))
print("The price to insure your car is: {}".format(newPrice))
print("The percentage discount due to years without claim is: {}".format(discountPerc))
```

[6]





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(e) The following are example programs. There are multiple correct solutions to this question.

Pseudocode:

```
IF driverAge >= 26 AND driverAge <= 70 THEN
    IF yearsWithoutClaim >= 2 THEN
        newCustDiscountPerc = 10
    END IF
END IF
```

```
OUTPUT "The amount of money saved by applying the 'new customer discount' is: $" & (newPrice *
(newCustDiscountPerc / 100))
```

Programming Language: VB

```
If driverAge >= 26 And driverAge <= 70 Then
    If yearsWithoutClaim >= 2 Then
        newCustDiscountPerc = 10
    End If
End If
```

```
Console.WriteLine("The amount of money saved by applying the 'new customer discount' is: $" &
(newPrice * (newCustDiscountPerc / 100)))
```

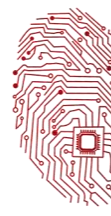
Programming Language: Python

```
newCustDiscountPerc = 0
if 26 <= driverAge <= 70:
    if yearsWithoutClaim >= 2: newCustDiscountPerc = 10

print("The amount of money saved by applying the 'new customer discount' is: {}".format(newPrice
* (newCustDiscountPerc / 100)))
```

[4]





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(f) The following is an example solution. There are multiple correct solutions to this question.

- User is prompted to choose whether or not to add another driver
- If the user chooses to add another driver, a new variable for the driver's age is initialized
- The user is prompted to enter the age of the driver
- Conditional statements for age range apply the correct change in price.
- If the age is out of the allowed range, an error message is generated.

Pseudocode:

OUTPUT "Would you like to add another driver? (Y/N) "

INPUT addDriverChoice

IF UPPER(addDriverChoice) = "Y" THEN

 newDriverAge = 0

 WHILE newDriverAge < 18

 OUTPUT "Enter the age of the second driver: "

 INPUT newDriverAge

 IF newdriverAge >= 18 AND newdriverAge <= 20 THEN

 priceChangePerc = priceChangePerc + 100

 ELSEIF newdriverAge >= 21 AND newdriverAge <= 25 THEN

 priceChangePerc = priceChangePerc + 50

 ELSEIF newdriverAge >= 26 AND newdriverAge <= 30 THEN

 priceChangePerc = priceChangePerc + 25

 ELSEIF newdriverAge >= 31 AND newdriverAge <= 70 THEN

 priceChangePerc = priceChangePerc + 0

 ELSEIF newdriverAge >= 71 AND newdriverAge <= 80 THEN

 priceChangePerc = priceChangePerc + 10

 ELSEIF newdriverAge >= 80

 priceChangePerc = priceChangePerc + 20

 ELSE

 OUTPUT "Please enter a valid age."

 END IF

 END WHILE

END IF

