

Date: Nov 7<sup>th</sup> 2017**IMPORTANT:** All code should be in **one** solution file and uploaded to Moodle.**Question 1: Calculations/Methods/Loops (33%)**

- a) Write a program which calculates the total cost of fitting a carpet based on the carpet size, distance to travel to the fitting and fitting cost per square meter. The rates are as follows.
- Travel costs: €0.45 per kilometre
  - Fitting cost per square meter: €3.25
  - Both of these are constant values and your code should reflect this

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C:\Windows\system32\cmd.exe
The Carpet Fitting Cost Calculator
Enter a distance in Kilometers: 200
Enter a carpet size: 120
Cost of Fitting: EUR 432

Enter a 0 to end or 1 to input another fitting details: 1
Enter a distance in Kilometers: 15
Enter a carpet size: 8.9
Cost of Fitting: EUR 35.68

Enter a 0 to end or 1 to input another fitting details: 1
Enter a distance in Kilometers: 23
Enter a carpet size: 16.5
Cost of Fitting: EUR 63.98

Enter a 0 to end or 1 to input another fitting details: 0
Total Costs: EUR 531.65:
Average Costs: EUR 177.22
Press any key to continue . . .
  
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- b) Include 2 variables to hold the total cost of all fitting charges and the number of fittings.
- c) In the Main() have the inputting of data repeat until a sentinel value is entered so that a number of delivery charges can be calculated.
- d) Introduce a method to the program so that the fitting charge is calculated in a method and the cost is returned. If the fitting cost is over €250 then this method will apply a 10% discount. This method also updates the 2 variables in part (b).
- e) After the sentinel is entered the total of all fitting charges is outputted as well as the average cost of each fitting. All of this should be done in a specific method with the required details passed to the method.

**Marking Scheme**

Comments/Readability/Output	3	
Appropriate types	3	
Part A	4	
Part B	3	
Part C	7	
Part D	7	
Part E	6	
Total		33

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**Question 2: Classes (50 marks/67%)**

- a) Create a class called MemberTest and also a class called Member. In the Member class add auto implemented properties for the First Name, Last Name, Age, MemberID and MembershipStatus (that is either current or expired). Add a Constructor to take 4 parameters, MembershipStatus is not a parameter but is set to "expired" within the constructor. Override ToString() to display all the Member Information. In the Main() in Member Test create 5 Member objects using the Constructor and add the Member objects to an array of Members.
- b) In MemberTest create a method that takes an array of Member objects as a parameter. This method will, using a loop, output all the details for all of the members. The Main() will then request this method to display the details for all the members.
- c) In Member add a method called ChangeStatus which inverts the status when called. Have the main program change the status of the 1<sup>st</sup> and 3<sup>rd</sup> member objects. Output all members details again using the method in part (b).
- d) Add a method to set a price field for a member, this price field has a read only property Price. The call to set the Price is made by the Constructor. Member price is different depending on age. If a member is younger than 18 the price is €50. If older than 18 the price is €150. Update the ToString() method in Member to take account of this new property.
- e) Add a static variable which stores a count of Members, this variable is updated in the Constructor. Output this value from Main().
- f) Implement IComparable and code the CompareTo method so that Members objects can be sorted by Last Name. The Main() method should request that the Array of Members is sorted in reverse order. Display the members' details after sorting.

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C:\Windows\system32\cmd.exe

==== Club Membership Details ====
=== Members Details ===
FirstName: Pat Surname: Kelly Age: 23 ID: 1022 Status: Expired Price: EUR150
FirstName: Jim Surname: Jones Age: 17 ID: 2167 Status: Expired Price: EUR50
FirstName: Pa Surname: Keirnan Age: 33 ID: 1234 Status: Expired Price: EUR150
FirstName: Lucy Surname: Lipton Age: 44 ID: 2032 Status: Expired Price: EUR150
FirstName: Mary Surname: Kennedy Age: 13 ID: 2022 Status: Expired Price: EUR50

=== Members Details With Status Changed on 1 & 3 ===
FirstName: Pat Surname: Kelly Age: 23 ID: 1022 Status: Current Price: EUR150
FirstName: Jim Surname: Jones Age: 17 ID: 2167 Status: Expired Price: EUR50
FirstName: Pa Surname: Keirnan Age: 33 ID: 1234 Status: Current Price: EUR150
FirstName: Lucy Surname: Lipton Age: 44 ID: 2032 Status: Expired Price: EUR150
FirstName: Mary Surname: Kennedy Age: 13 ID: 2022 Status: Expired Price: EUR50

Number of Club Members:5

=== Members Details After Sorting by Surname ===
FirstName: Jim Surname: Jones Age: 17 ID: 2167 Status: Expired Price: EUR50
FirstName: Pa Surname: Keirnan Age: 33 ID: 1234 Status: Current Price: EUR150
FirstName: Pat Surname: Kelly Age: 23 ID: 1022 Status: Current Price: EUR150
FirstName: Mary Surname: Kennedy Age: 13 ID: 2022 Status: Expired Price: EUR50
FirstName: Lucy Surname: Lipton Age: 44 ID: 2032 Status: Expired Price: EUR150
Press any key to continue . . .

```

### Marking Scheme

Comments/Readability/Output	3	
Appropriate types	2	
Part A	14	
Part B	8	
Part C	10	
Part D	12	
Part E	5	
Part F	13	
Total		67