

DSA Lab 2 - OOP Revision

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Problem 1:

Design a class named CustomerData.

The CustomerData class should have the following member variables:

- customerNumber
- Customer Name
- Address
- mailingList

The customerNumber variable will be used to hold a unique integer for each customer. The mailingList variable should be a bool. It will be set to true if the customer wishes to be on a mailing list, or false if the customer does not wish to be on a mailing list. Write appropriate getter setter functions for these member variables.

Problem Solving

None needed as everything is given in question description

Code

```
#include <iostream>
#include <string>

using namespace std;

class CustomerData {
```

```
private:
    int *customerNumber = new int[3];
    string *customerName = new string[3];
    string *customerAddress = new string[3];
    bool *mailingList = new bool[3];
    string *mailingAddress = new string[3];
```

```
public:
    CustomerData() {

        for (int i = 0; i < 3; i++) {
            customerNumber[i] = 0;
            customerName[i] = "";
            customerAddress[i] = "";
            mailingList[i] = false;
            mailingAddress[i] = "";
        }
    }
```

```
    void setCustomerData(int num, string name, string address) {
        customerNumber[num] = num;
        customerName[num] = name;
        customerAddress[num] = address;
    }
```

```
    int getCustomerNumber(int index) {
        return customerNumber[index];
    }
```

```
    string getCustomerName(int index) {
        return customerName[index];
    }
```

```
    string getCustomerAddress(int index) {
        return customerAddress[index];
    }
```

```

    }

    bool getMailingList(int index) {
        return mailingList[index];
    }

    string getMailingAddress(int index) {
        return mailingAddress[index];
    }

    void setMailingList(int index, bool status) {
        mailingList[index] = status;
    }

    void setMailingAddress(int index, string address) {
        mailingAddress[index] = address;
    }
};

int main() {

    CustomerData customerData;

    customerData.setCustomerData(0, "Muhammad Abdullah", "D.I.KI
customerData.setCustomerData(1, "Waheed Akhtar", "Gujrat");
customerData.setCustomerData(2, "Faizan Umer", "Lahore");

    cout << "\t\t\t\tCustomer 1" << endl;
    cout << "Number: " << customerData.getCustomerNumber(0) << endl;
    cout << "Name: " << customerData.getCustomerName(0) << endl;
    cout << "Address: " << customerData.getCustomerAddress(0) << endl;
    cout << "Mailing List: " << (customerData.getMailingList(0) ? "Yes" : "No") << endl;
    cout << "Mailing Address: " << customerData.getMailingAddress(0) << endl;
}

```

```

customerData.setMailingList(1, true);
customerData.setMailingAddress(1, "maabdullah.rhs@gmail");

cout << "\n\t\t\t\t\tCustomer 2:" << endl;
cout << "Number: " << customerData.getCustomerNumber(1) << endl;
cout << "Name: " << customerData.getCustomerName(1) << endl;
cout << "Address: " << customerData.getCustomerAddress(1) << endl;
cout << "Mailing List: " << (customerData.getMailingList(1) ? "Yes" : "No") << endl;
cout << "Mailing Address: " << customerData.getMailingAddress(1) << endl;

return 0;
}

```

Output

```

PS D:\Resources> & 'c:\Users\hp\.vscode\extensions\ms-vscode.cpptools-1.22.9-win32-x64\debugAdap...
rs\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-rqhngths.541' '--stdout=Microsoft-M
IEngine-Out-hibdu2gd.hin' '--stderr=Microsoft-MIEngine-Error-122ch34k.ukn' '--pid=Microsoft-MIEngin
e-Pid-vd4woaly.qex' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'
Customer 1
Number: 0
Name: Muhammad Abdullah
Address: D.I.Khan
Mailing List: No
Mailing Address:

Customer 2:
Number: 1
Name: Waheed Akhtar
Address: Gujrat
Mailing List: Yes
Mailing Address: maabdullah.rhs@gmail
PS D:\Resources>

```

Problem 2:

A retail store has a preferred customer plan where customers may earn discounts on all their purchases. The amount of a customer's discount is determined by the

amount of the customer's cumulative purchases in the store.

- When a preferred customer spends \$500, he or she gets a 5% discount on all future purchases.
- When a preferred customer spends \$1,000, he or she gets a 6% discount on all future purchases.
- When a preferred customer spends \$1,500, he or she gets a 7% discount on all future purchases.
- When a preferred customer spends \$2,000 or more, he or she gets a 10% discount on all future purchases.

Design a class named PreferredCustomer, which is derived from the CustomerData class you created. The PreferredCustomer class should have the following member variables:

- purchasesAmount (a double)
- discountLevel (a double)

provide default and parameterized constructor (with super keyword set values of parent's attributes), and toString method.

The purchasesAmount variable holds the total of a customer's purchases to date.

The discountLevel variable should be set to the correct discount percentage, according to the store's preferred customer plan.

Also calculate discount Amount based on discount.

Provide getters as well.

Write appropriate member functions for this class,

Now in Main class create and ArrayList and add customers into it and display the customers details, purchase of each customer along with discount he/she gets.

Problem Solving

Date: .../.../20...

```
class PreferredCustomer: public CustomerData
{
private protected:
    double purchaseAmount;
    double discountLevel;
}
```

Step 1:

Default ~~Param~~ Constructor
initialize purchaseAmount and
discountLevel to 0

* We have to call base/Parent class
constructor as well, for that we
use:

```
PreferredCustomer(): CustomerData() {
    //code
}
```

Step 2:

getter and setter for purchase
amount ~~and dis~~

Step 3:

Set DiscountLevel () function

if pAmount >= 2000 \Rightarrow dLevel = 0.10 (10%)

elseif // >= 1500 and < 2000 \Rightarrow dLevel = 0.07 (7%)

// // >= 1000 and < 1500 \Rightarrow // = 0.06 (6%)

// // >= 500 and < 1000 \Rightarrow // = 0.05 (5%)

else dLevel = 0 (0%)

Date:/...../20.....

Step 4: getDAmount
 $\text{Discount Amount} = \text{PAmount} * \text{Dlevel}$

Step 5:
Parameterized constructors
is bas ~~discount amount~~
Purchase Amount ~~get~~ bhi pass
karni hai.

Step 6:
usi constructor mein setDiscount
aur discount amount functions
ko call karen
 $\text{setDiscountLevel}();$
 $\text{dAmount} = \text{getDAmount}();$

Step 7:
In parameterized constructor:

Display Customer Details ()

```
cout << number  
    << Name  
    << Address  
    (bool) if mailing list = True  
        => cout << "MailingList: Yes"  
cout << Mail address  
cout << PurchaseAmount  
cout << DiscountLevel  
cout << DiscountAmount  
cout << Total Bill = PurchaseAmount - Discount  
                        Amount
```


Code

```
#include <iostream>
#include <string>
#include <vector>

using namespace std;

class CustomerData {
private:
    int customerNumber;
    string customerName;
    string customerAddress;
    bool mailingList;
    string mailingAddress;

public:

    CustomerData() {
        customerNumber = 0;
        customerName = "";
        customerAddress = "";
        mailingList = false;
        mailingAddress = "";
    }

    CustomerData(int num, string name, string address, bool mailingListStatus, string mailingAddress) {
        customerNumber = num;
        customerName = name;
        customerAddress = address;
        mailingList = mailingListStatus;
        mailingAddress = mailingAddress;
    }
}
```

```

    int getCustomerNumber() {
        return customerNumber;
    }

    string getCustomerName() {
        return customerName;
    }

    string getCustomerAddress() {
        return customerAddress;
    }

    bool getMailingList() {
        return mailingList;
    }

    string getMailingAddress() {
        return mailingAddress;
    }

    void setMailingList(bool status) {
        mailingList = status;
    }

    void setMailingAddress(string address) {
        mailingAddress = address;
    }
};

class PreferredCustomer : public CustomerData {
private:
    double purchasesAmount;
    double discountLevel;

```

```

void setDiscountLevel() {
    if (purchasesAmount >= 2000) {
        discountLevel = 0.10;
    } else if (purchasesAmount >= 1500) {
        discountLevel = 0.07;
    } else if (purchasesAmount >= 1000) {
        discountLevel = 0.06;
    } else if (purchasesAmount >= 500) {
        discountLevel = 0.05;
    } else {
        discountLevel = 0.0;
    }
}

```

public:

```

PreferredCustomer() : CustomerData() {
    purchasesAmount = 0;
    discountLevel = 0;
}

```

```

PreferredCustomer(int num, string name, string address, bool mailingListStatus) : CustomerData(num, name, address, mailingListStatus) {
    setDiscountLevel();
}

```

```

double getPurchasesAmount() {
    return purchasesAmount;
}

```

```

double getDiscountLevel() {
    return discountLevel;
}

```


Output

The screenshot shows the Visual Studio Code interface with the following details:

- Explorer Panel:** Displays a file tree with folders 'University', '3rd Sem', 'DSA Labs', and 'Lab 2-08.Oct.2024'. The file 'Problem_2.exe' is selected.
- Terminal Panel:** Shows the output of the program, displaying details for three customers:

```
Customer 1 Details:
Number: 1
Name: Muhammad Abdullah
Address: D.I.Khan
Mailing List: Yes
Mailing Address: abdullah@gmail.com
Total Purchases: $2100
Discount Level: 10%
Discount Amount: $210

Customer 2 Details:
Number: 2
Name: Waheed Akhtar
Address: Gujrat
Mailing List: Yes
Mailing Address: waheed@gmail.com
Total Purchases: $1500
Discount Level: 7%
Discount Amount: $105

Customer 3 Details:
Number: 3
Name: Faizan Umer
Address: Lahore
Mailing List: No
Mailing Address: faizan@gmail.com
Total Purchases: $1200
Discount Level: 6%
Discount Amount: $72
PS D:\Resources>
```
- Bottom Panel:** Includes the status bar with file information (main*, 0:111, 0:0, 0:0), a search bar, and a taskbar at the bottom showing system icons and the time 10:35 pm on 18/10/2024.