REPORT
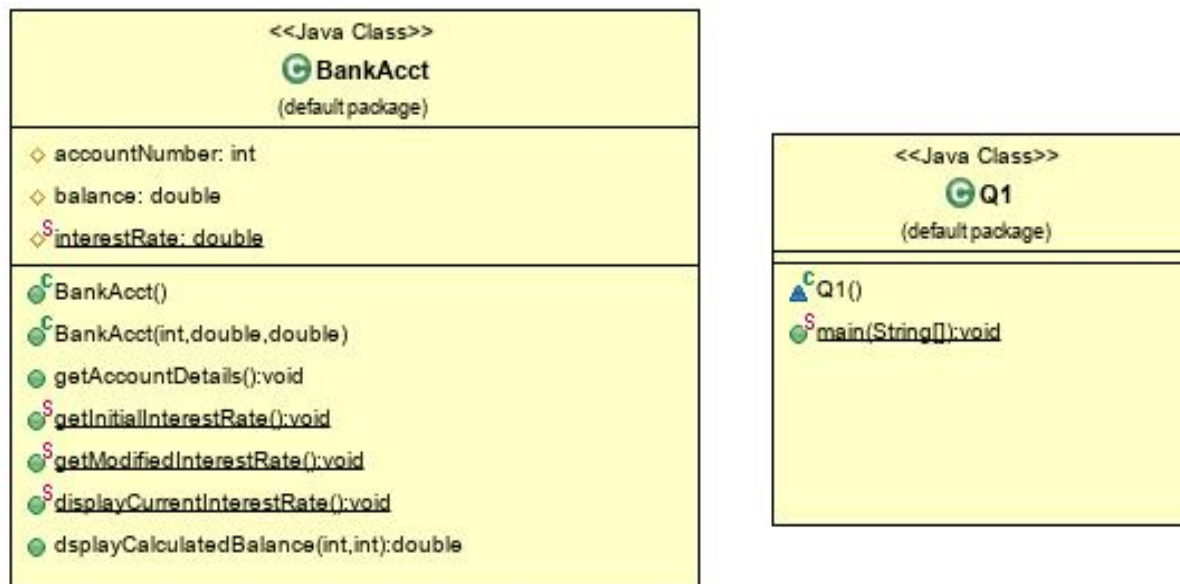
Adv OOP Lab

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JU BCSE UG-II Sem-II

Java Assignments – 2 (Part - A)

Q1 : Design a BankAcct class with account number, balance and interest rate as attribute. Interest rate is same for all account. Support must be there to initialize, change and display the interest rate. Also supports are to be there to return balance and calculate interest.

UML Diagram :

```
              <<Java Class>>
              G BankAcct
              (default package)
 ─────────────────────────────────
 ◇ accountNumber: int
 ◇ balance: double
 ◇ᔆinterestRate: double
 ─────────────────────────────────
 ●ᶜBankAcct()
 ●ᶜBankAcct(int,double,double)
 ● getAccountDetails():void
 ●ᔆgetInitialInterestRate():void
 ●ᔆgetModifiedInterestRate():void
 ●ᔆdisplayCurrentInterestRate():void
 ● dsplayCalculatedBalance(int,int):double
```

```
              <<Java Class>>
              G Q1
              (default package)
 ─────────────────────────────────
 ▲ᶜQ1()
 ●ᔆmain(String[]):void
```

Output :

```
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q1$ java Q1
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 1
Enter Bank Account Number : 1911
Enter Current Bank Balance : 25000
Account Details are Successfully Entered
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 2
Enter Interest Rate (in %) : 5
Interest Rate is Successfully Entered
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 4
Current Interest Rate is 5.0 %
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 5
Enter Number of Years : 12
Enter Number of Months : 6
Interest Amount over total time period is 15625.0
Total Amount of Balance is 40625.0
```

```
Enter Number of Months : 6
Interest Amount over total time period is 15625.0
Total Amount of Balance is 40625.0
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 3
Enter new Interest Rate (in %) : 8
Interest Rate is Successfully Modified
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 4
Current Interest Rate is 8.0 %
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 5
Enter Number of Years : 12
Enter Number of Months : 6
Interest Amount over total time period is 25000.0
Total Amount of Balance is 50000.0
_____
1) Enter Account Details
2) Enter Interest Rate
3) Modify Previously Entered Interest Rate
4) Display Current Interest Rate
5) Calculate Balance and Total Interest
6) Exit
_____

Enter Your Choice : 6
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q1$
```
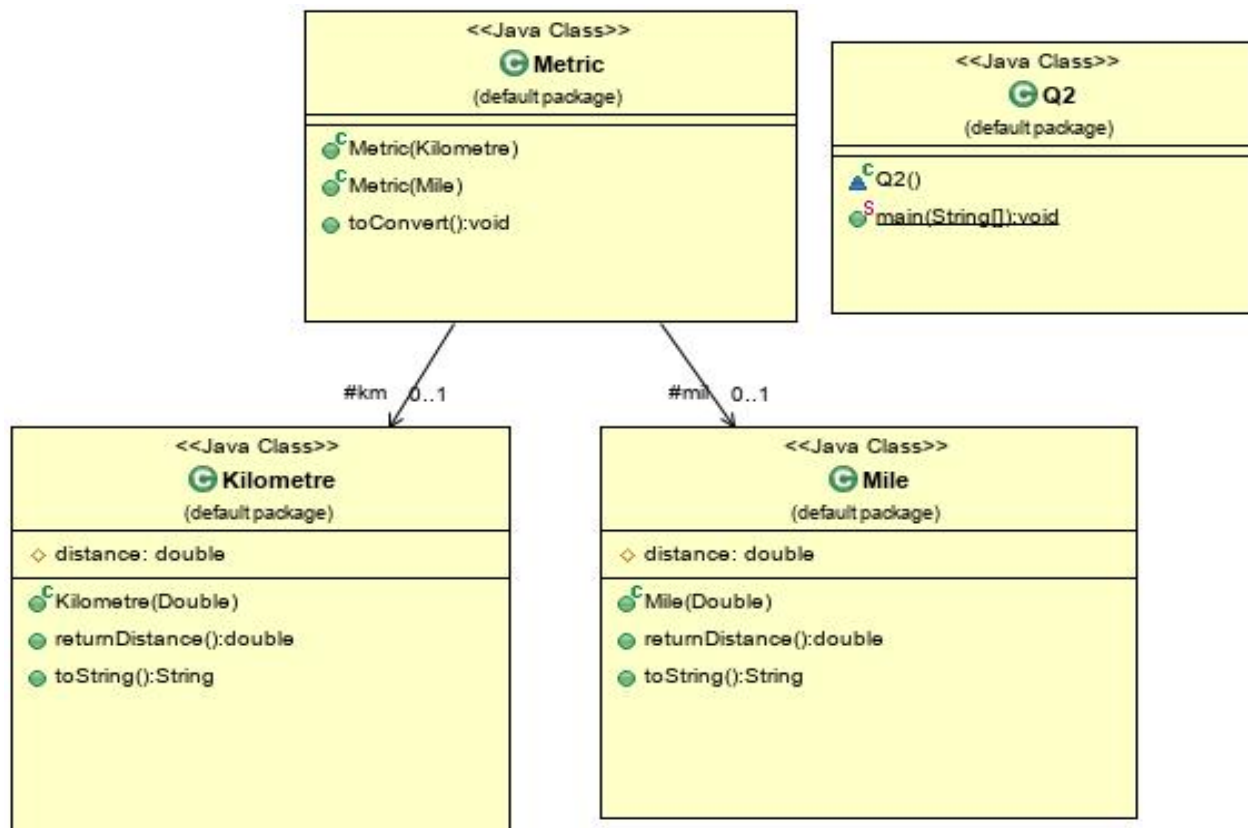
Q2 : Design a Metric class that supports Kilometre to Mile conversion with distance in Kilometre as argument and Mile to Kilometre conversion with distance in mile as argument. Assume, one Mile equals 1.5 Kilometre.

UML Diagram :

```
            <<Java Class>>
              Ⓖ Metric
           (default package)

        Ⓒ Metric(Kilometre)
        Ⓒ Metric(Mile)
        ● toConvert():void
```

```
          <<Java Class>>
             Ⓖ Q2
         (default package)

      ▲ᶜ Q2()
      ●ˢ main(String[]):void
```

```
#km  0..1                           #mil  0..1
```

```
          <<Java Class>>
            Ⓖ Kilometre
         (default package)

     ◇ distance: double

     Ⓒ Kilometre(Double)
     ● returnDistance():double
     ● toString():String
```

```
          <<Java Class>>
              Ⓖ Mile
         (default package)

     ◇ distance: double

     Ⓒ Mile(Double)
     ● returnDistance():double
     ● toString():String
```

Output :

```
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q2$ java Q2
-----------------------------------
1) Convert Kilometres to Miles
2) Convert Miles to Kilometres
3) Exit
-----------------------------------
Enter Your Choice : 1
Enter the distance (in KM) you want to convert to Miles : 1500
Distance in Mile is : 1000.0
-----------------------------------
1) Convert Kilometres to Miles
2) Convert Miles to Kilometres
3) Exit
-----------------------------------
Enter Your Choice : 2
Enter the distance (in Miles) you want to convert to KM : 2000
Distance in Kilometre is : 3000.0
-----------------------------------
1) Convert Kilometres to Miles
2) Convert Miles to Kilometres
3) Exit
-----------------------------------
Enter Your Choice : 4
Enter either 1, 2 or 3
-----------------------------------
1) Convert Kilometres to Miles
2) Convert Miles to Kilometres
3) Exit
-----------------------------------
Enter Your Choice : 3
```

Q3 : **Take a String input that contains multiple words. Do the following: i) number of times 'a' appears ii) number of times "and" appears iii) whether it starts with "The" or not iv) put the String into an array of characters v) display the tokens in the String (tokens are the substrings separated by space or @ or .)**

UML Diagram :

```
                    <<Java Class>>
                      G Q3
                   (default package)

   C Q3()
   S numberOfA(String):void
   S numberOfAnd(String):void
   S checkStartingWord(String):void
   S convertToCharArray(String):void
   S displayTokens(String):void
   S main(String[]):void
```

Output :

```
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q3$ java Q3
-------------------------------------------------
1) Enter a New String
2) Count Total Number of 'a'-s in the String
3) Count Total Number of 'and'-s in the String
4) Check Whether String Starts With 'The' or Not
5) Put the String Into an Array of Characters
6) Display the Tokens in the String
7) Exit the Menu
-------------------------------------------------

Enter Your Choice : 1
Enter the String : The Sun rises in the east and sets in the west. This is what @everyone says.
-------------------------------------------------
1) Enter a New String
2) Count Total Number of 'a'-s in the String
3) Count Total Number of 'and'-s in the String
4) Check Whether String Starts With 'The' or Not
5) Put the String Into an Array of Characters
6) Display the Tokens in the String
7) Exit the Menu
-------------------------------------------------

Enter Your Choice : 2
Total number of 'a'-s present in the String : 4
-------------------------------------------------
1) Enter a New String
2) Count Total Number of 'a'-s in the String
3) Count Total Number of 'and'-s in the String
4) Check Whether String Starts With 'The' or Not
5) Put the String Into an Array of Characters
6) Display the Tokens in the String
7) Exit the Menu
-------------------------------------------------

Enter Your Choice : 3
Total number of 'and'-s present in the String : 1
-------------------------------------------------
1) Enter a New String
2) Count Total Number of 'a'-s in the String
3) Count Total Number of 'and'-s in the String
4) Check Whether String Starts With 'The' or Not
5) Put the String Into an Array of Characters
6) Display the Tokens in the String
7) Exit the Menu
-------------------------------------------------

Enter Your Choice : 4
The String Starts With 'The'.
-------------------------------------------------
1) Enter a New String
```

----
1) Enter a New String
2) Count Total Number of 'a'-s in the String
3) Count Total Number of 'and'-s in the String
4) Check Whether String Starts With 'The' or Not
5) Put the String Into an Array of Characters
6) Display the Tokens in the String
7) Exit the Menu

Enter Your Choice : 6
Tokens Present in the String are :
The Sun rises in the east and sets in the west
 This is what
everyone says
----
1) Enter a New String
2) Count Total Number of 'a'-s in the String
3) Count Total Number of 'and'-s in the String
4) Check Whether String Starts With 'The' or Not
5) Put the String Into an Array of Characters
6) Display the Tokens in the String
7) Exit the Menu

Enter Your Choice : 4
The String Starts With 'The'.
----
1) Enter a New String
2) Count Total Number of 'a'-s in the String
3) Count Total Number of 'and'-s in the String
4) Check Whether String Starts With 'The' or Not
5) Put the String Into an Array of Characters
6) Display the Tokens in the String
7) Exit the Menu

Enter Your Choice : 5
Character at position 0 is : T
Character at position 1 is : h
Character at position 2 is : e
Character at position 3 is :
Character at position 4 is : S
Character at position 5 is : u
Character at position 6 is : n
Character at position 7 is :
Character at position 8 is : r
Character at position 9 is : i
Character at position 10 is : s
Character at position 11 is : e
Character at position 12 is : s
Character at position 13 is :
Character at position 14 is : i
Character at position 15 is : n
Character at position 16 is :
Character at position 17 is : t
Character at position 18 is : h
Character at position 19 is : e
Character at position 20 is :
Character at position 21 is : e
Character at position 22 is : a
Character at position 23 is : s
Character at position 24 is : t
Character at position 25 is :
Character at position 26 is : a
Character at position 27 is : n
Character at position 28 is : d
Character at position 29 is :
Character at position 30 is : s
Character at position 31 is : e
Character at position 32 is : t
Character at position 33 is : s
Character at position 34 is :
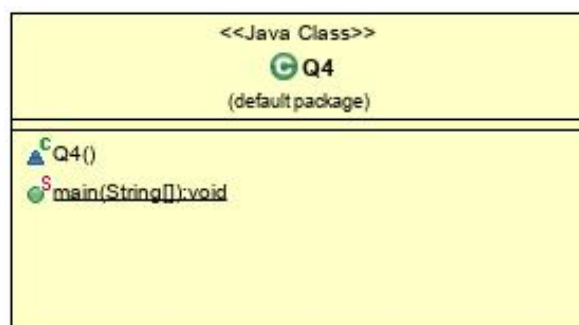Character at position 35 is : i
Character at position 36 is : n

Q4 : **Consider a wrapper class for a numeric basic type. Check the support for the following: conversion from i) basic type to object ii) object to basic type iii) basic type to String iv) String (holding numeric data) to numeric object v) object to String.**

UML Diagram:

```
              <<Java Class>>
                 G Q4
              (default package)
  ─────────────────────────────────
  C Q4()

  S main(String[]):void
```
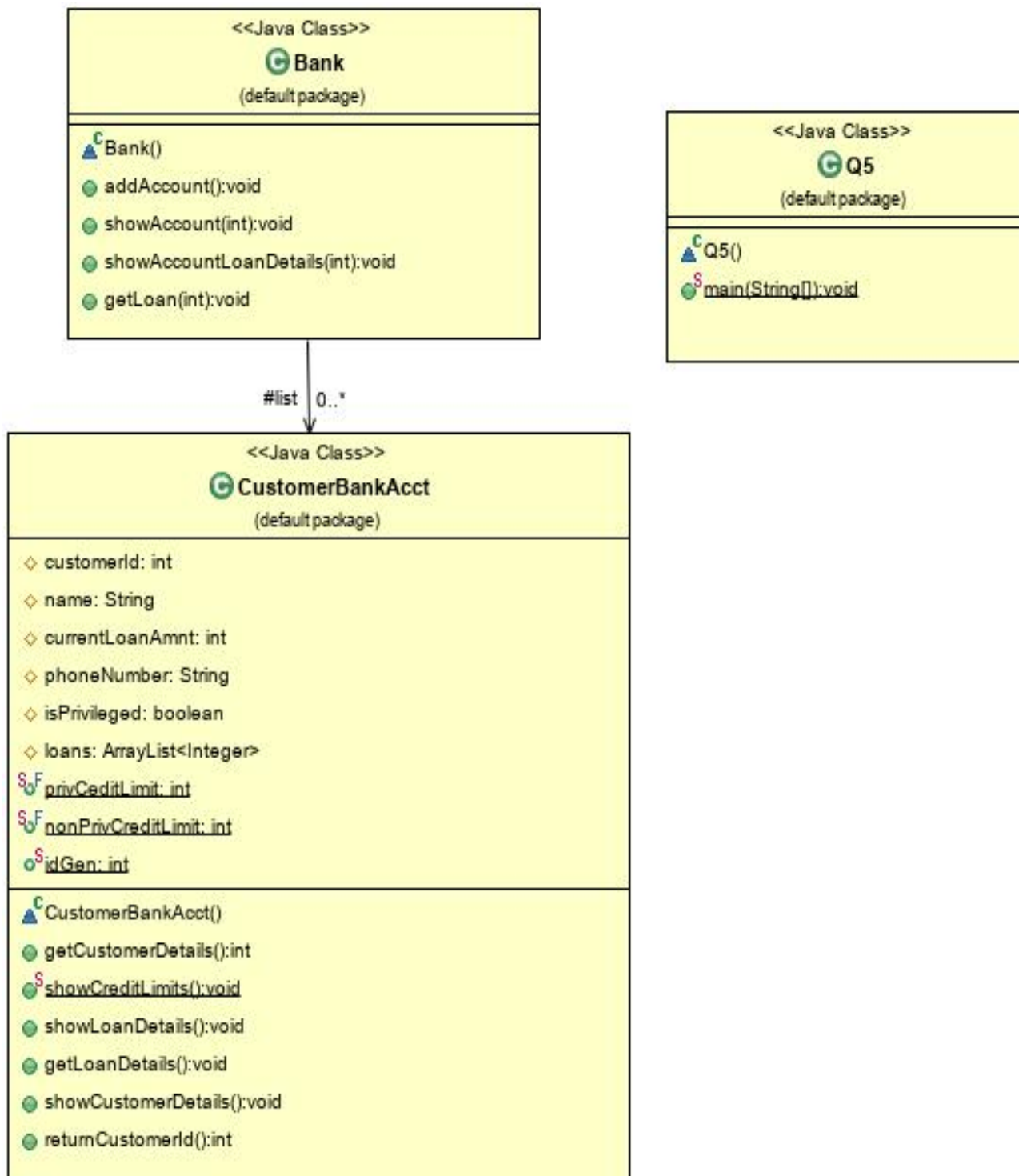
Output:

```
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2$ cd q4
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q4$ javac Q4.java
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q4$ java Q4
Basic Data Type to Integer Object : 100
Integer Object to Basic Data Type : 100
Basic Data Type to Splitted String : 100
Basic Data Type to Splitted String : ju
String to Basic Data Type Via Wrapper Class Function : 125
Object to String Conversion : 125abc
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q4$ |
```

Q5 : Each customer of a bank has customer id, name, and current loan amount and phone number. One can change the attributes like name, phone number. A customer may ask for loan of certain amount. It is granted provided the sum of current loan amount and asked amount does not exceed credit limit (fixed amount for all customer). A customer may be a privileged amount. For such customers credit limit is higher. Once a loan is sanctioned necessary updates should be made. Any type of customer should be able to find his credit limit, current loan amount and amount of loan he can seek. Design and implement the classes.

UML Diagram:


```
                <<Java Class>>
                  © Bank
                (default package)

   ©Bank()
   ● addAccount():void
   ● showAccount(int):void
   ● showAccountLoanDetails(int):void
   ● getLoan(int):void
```

```
                <<Java Class>>
                   © Q5
                (default package)

   ©Q5()
   ●ˢmain(String[]):void
```

```
                    #list │ 0..*
```

```
                <<Java Class>>
            © CustomerBankAcct
                (default package)

   ◇ customerId: int
   ◇ name: String
   ◇ currentLoanAmnt: int
   ◇ phoneNumber: String
   ◇ isPrivileged: boolean
   ◇ loans: ArrayList<Integer>
   ●ˢᶠ privCeditLimit: int
   ●ˢᶠ nonPrivCreditLimit: int
   ●ˢ idGen: int

   ©CustomerBankAcct()
   ● getCustomerDetails():int
   ●ˢ showCreditLimits():void
   ● showLoanDetails():void
   ● getLoanDetails():void
   ● showCustomerDetails():void
   ● returnCustomerId():int
```

Output:

```
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q5$ java Q5
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
-------------------------------------
Enter Your Choice : 1
Enter Name of Customer : Atanu Ghosh
Enter Phone Number of Customer : 9988776655
Type of Membership You Want is -
1) Normal/Non-Privileged Membership
2) Privileged Membership
Enter Your Choice : 1
Account Creation Successfull !
Account Number : 1911
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
-------------------------------------
Enter Your Choice : 1
Enter Name of Customer : Sourish Pal
Enter Phone Number of Customer : 9876543210
Type of Membership You Want is -
1) Normal/Non-Privileged Membership
2) Privileged Membership
Enter Your Choice : 2
Account Creation Successfull !
Account Number : 1912
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
-------------------------------------
Enter Your Choice : 2
Enter Customer Id : 1911
Name of the Customer : Atanu Ghosh
Id of the Customer : 1911
Membership Type : NON-PRIVILEGED
Phone Number of the Customer : 9988776655
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
```

```
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
-------------------------------------
Enter Your Choice : 1912
Enter a value out of 1, 2, 3, 4, 5
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
-------------------------------------
Enter Your Choice : 2
Enter Customer Id : 1912
Name of the Customer : Sourish Pal
Id of the Customer : 1912
Membership Type : PRIVILEGED
Phone Number of the Customer : 9876543210
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
-------------------------------------
Enter Your Choice : 3
Enter Customer Id : 1911
Loans Taken so Far--------
Maximum Credit Limit Allowance 2000000
No Loan Issued So Far !
Total Amount of Loan Taken : 0
Loan Amount Available for Issue : 2000000
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
-------------------------------------
Enter Your Choice : 1912
Enter a value out of 1, 2, 3, 4, 5
-------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
```

```
------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
Enter Your Choice : 4
Enter Customer Id : 1911
Loan Amount Available for Issue : 2000000
Enter the amount of loan : 55000
Your Loan Was Issued Successfully !
------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
Enter Your Choice : 3
Enter Customer Id : 1911
Loans Taken so Far--------
55000
Maximum Credit Limit Allowance 2000000
Last Amount of Issued Loan : 55000
Total Amount of Loan Taken : 55000
Loan Amount Available for Issue : 1945000
Do You Want to See the Loan History (y/N) ? : y
Loan #1 : 55000
------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
Enter Your Choice : 4
Enter Customer Id : 1912
Loan Amount Available for Issue : 5000000
Enter the amount of loan : 95000
Your Loan Was Issued Successfully !
------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
Enter Your Choice : 3
Enter Customer Id : 1912
Loans Taken so Far--------
```

```
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
Enter Your Choice : 3
Enter Customer Id : 1911
Loans Taken so Far--------
55000
Maximum Credit Limit Allowance 2000000
Last Amount of Issued Loan : 55000
Total Amount of Loan Taken : 55000
Loan Amount Available for Issue : 1945000
Do You Want to See the Loan History (y/N) ? : y
Loan #1 : 55000
------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
Enter Your Choice : 4
Enter Customer Id : 1912
Loan Amount Available for Issue : 5000000
Enter the amount of loan : 95000
Your Loan Was Issued Successfully !
------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
Enter Your Choice : 3
Enter Customer Id : 1912
Loans Taken so Far--------
95000
Maximum Credit Limit Allowance 5000000
Last Amount of Issued Loan : 95000
Total Amount of Loan Taken : 95000
Loan Amount Available for Issue : 4905000
Do You Want to See the Loan History (y/N) ? : y
Loan #1 : 95000
------------------------------------
1) Add Customer Account
2) View Account by Id
3) Show Account Loan Details
4) Issue Loan
5) Exit
------------------------------------
```

Q6 : For every person in an institute details like name, address (consists of premises number, street, city, pin and state), phone number, e-mail id are maintained. A person is either a student or a faculty. For student roll number and course of study are also be maintained. For faculty employee id, department and specialisation are to be stored. One should be able to view the object details and set the attributes. For address, one may change it partially depending on the choice. Design and implement the classes.

UML Diagram:
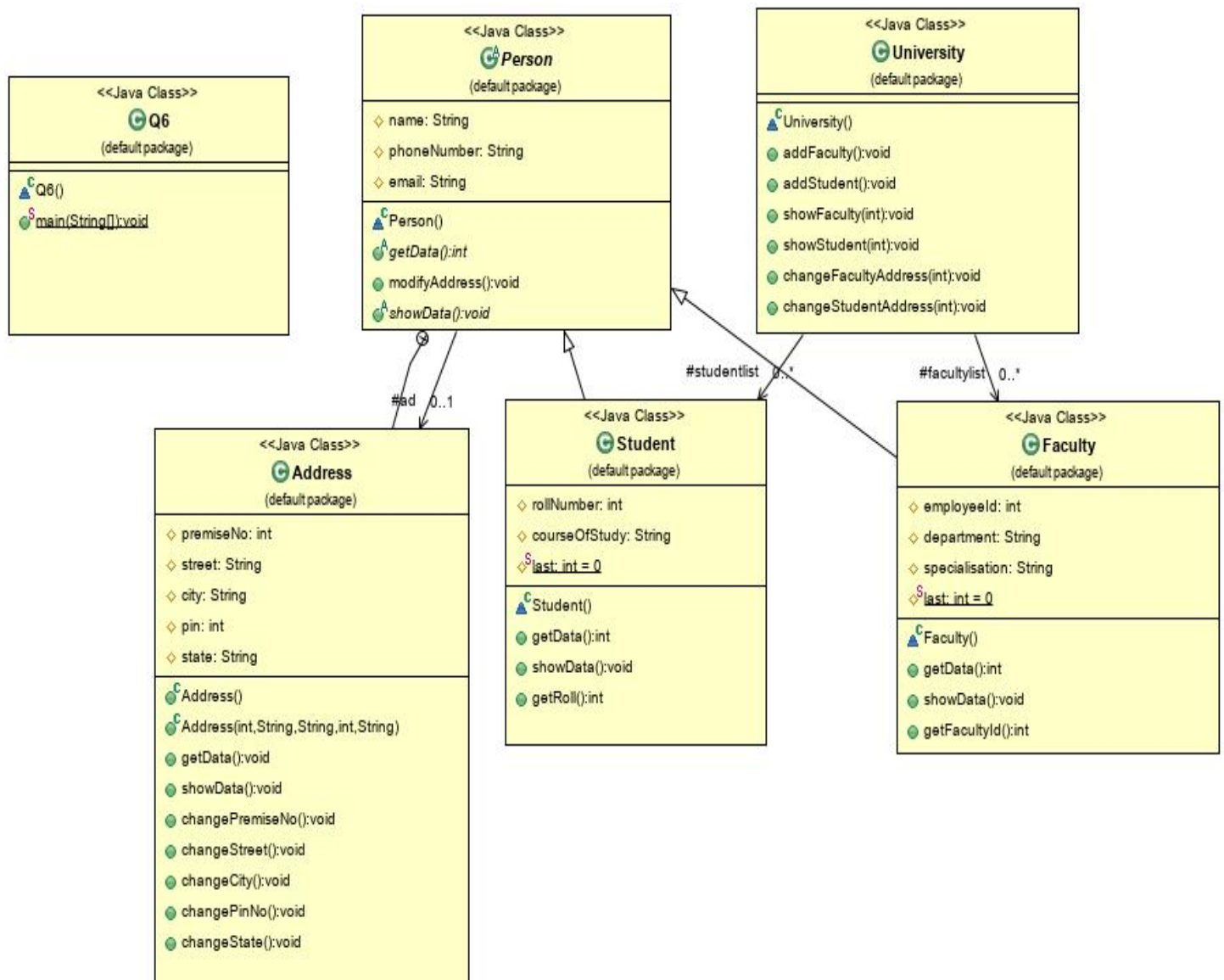
Output:

```
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q6$ javac Q6.java
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q6$ java Q6
------------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
------------------------------------------------
Enter Your Choice : 1
Enter Name :- Atanu Ghosh
Enter Phone Number :- 9988776655
Enter the email id :- atanu@gmail.com
Enter the Basic Address Details :-
Enter the premise Number :- 123
Enter the street Name :- MG Rd
Enter the city Name :- Kolkata
Enter the pin :- 700001
Enter State Name :- WB
Enter Course of study :- BCSE
Data entry successful ! Roll Number generated :- 1
Student Added successfully !
------------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
------------------------------------------------
Enter Your Choice : 2
Enter Name :- Dr. Sanjoy Kumar Saha
Enter Phone Number :- 9876543210
Enter the email id :- saha@yahoo.com
Enter the Basic Address Details :-
Enter the premise Number :- 897
Enter the street Name :- RN Tagore Rd
Enter the city Name :- Kolkata
Enter the pin :- 701003
Enter State Name :- WB
Enter Department :- ETCE
Enter field of specialisation :-
Signal Analysis
Data entry successful ! emmployee Id generated :- 1
Faculty Added successfully !
------------------------------------------------
1. Add Student
2. Add Faculty
```

```
------------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
------------------------------------------------
Enter Your Choice : 3
Enter Student Roll Number :- 1
Student Name :- Atanu Ghosh
Student Roll Number :- 1
Course Of Study :- BCSE
Student's Phone Number :- 9988776655
Student email id :- atanu@gmail.com
Residential Address Details -----------

Premise Number :- 123
Street Name :- MG Rd
City Name :- Kolkata
Pin Number :- 700001
State Name :- WB
------------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
------------------------------------------------
Enter Your Choice : 4
Enter Faculty Id :- 1
Faculty Name :- Dr. Sanjoy Kumar Saha
Faculty employee Id :- 1
Department :- ETCE
Field Of Specialisation :- Signal Analysis
Faculty Phone Number :- 9876543210
Faculty email id :- saha@yahoo.com
Residential Address Details -----------

Premise Number :- 897
Street Name :- RN Tagore Rd
City Name :- Kolkata
Pin Number :- 701003
State Name :- WB
------------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
```

```
-----------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
-----------------------------------------------
Enter Your Choice : 5
Enter Student Roll Number :- 1
1. modify premise number
2. modify street name
3. modify city name
4. modify pin number
5. modify state name
Enter Choice :- 3
City :- Kolkata
Enter the new city name :- Chennai
City Name changed sucessfully !
-----------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
-----------------------------------------------
Enter Your Choice : 3
Enter Student Roll Number :- 1
Student Name :- Atanu Ghosh
Student Roll Number :- 1
Course Of Study :- BCSE
Student's Phone Number :- 9988776655
Student email id :- atanu@gmail.com
Residential Address Details -----------

Premise Number :- 123
Street Name :- MG Rd
City Name :- Chennai
Pin Number :- 700001
State Name :- WB
-----------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
```

```
-----------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
-----------------------------------------------
Enter Your Choice : 6
Enter Faculty Id :- 1
1. modify premise number
2. modify street name
3. modify city name
4. modify pin number
5. modify state name
Enter Choice :- 5
State :- WB
Enter the new State Name :- J&K
State Name changed sucessfully !
-----------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
-----------------------------------------------
Enter Your Choice : 6
Enter Faculty Id :- 1
1. modify premise number
2. modify street name
3. modify city name
4. modify pin number
5. modify state name
Enter Choice :- 5
State :- J&K
Enter the new State Name :- J&K
State Name changed sucessfully !
-----------------------------------------------
1. Add Student
2. Add Faculty
3. Show Student
4. Show Faculty
5. Change Student Address
6. Change Faculty Address
7. Exit
-----------------------------------------------
Enter Your Choice : 7
atanu@dell:~/Documents/OOP Adv Lab/java_assignments2/q6$
```