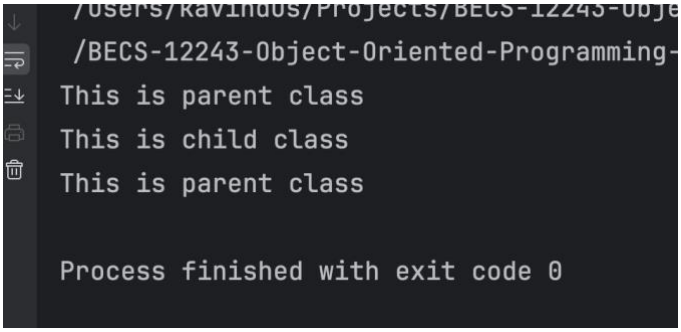
Question 01.

```
package q01;
public class Child extends Parent {
    void display() {
        System.out.println("This is child class");
    }
}
```

```
package q01;
public class Parent {
    void show() {
        System.out.println("This is parent class");
    }
}
```

```
package q01;
public class Main {
    public static void main(String[] args) {
        Parent parentObject = new Parent();
        Child childObject = new Child();
       parentObject.show();
        childObject.display();
        childObject.show();
      //  parentObject.display();

    }
}
```



We cannot called child class's method using a parent class object because a parent class doesn't know about methods specific to its child classes.

Question 02.

```
package q02;
public class Main {
    public static void main(String[] args) {
        Employee emp = new Employee("Wasanth Vittachchi", 25, "7266776666",
                                    "1/23 Sandamadulla, Kandy", 59000, "Software
Development");

        Manager mgr = new Manager("Janaka Sumith", 35, "2336632323",
                                  "45/6 Ampara, Town", 83000, "IT");

        System.out.println("Employee Salary:");
        emp.printSalary();

        System.out.println("\nManager Salary:");
        mgr.printSalary();

        System.out.println("\nEmployee Details:");
        emp.printDetails();

        System.out.println("\nManager Details:");
        mgr.printDetails();
    }
}
```

```
package q02;

public class Employee extends Member {
    private String specialization;
    public Employee(String name, int age, String phoneNumber, String address,
                    double salary, String specialization) {
        super(name, age, phoneNumber, address, salary);
        this.specialization = specialization;
    }
    public void printDetails() {
        super.printDetails();
        System.out.println("Specialization: " + specialization);
    }
}
```

```
package q02;


public class Member {
    private String name;
    private int age;
    private String phoneNumber;
    private String address;
    private double salary;



    public Member(String name, int age, String phoneNumber, String address,
double salary) {
        this.name = name;
        this.age = age;
        this.phoneNumber = phoneNumber;
        this.address = address;
        this.salary = salary;
    }


    public void printSalary() {
        System.out.println("Salary: " + salary);
    }
    public void printDetails() {
        System.out.println("Name: " + name);
        System.out.println("Age: " + age);
        System.out.println("Phone Number: " + phoneNumber);
        System.out.println("Address: " + address);
        System.out.println("Salary: " + salary);
    }
}
```

```
package q02;


public class Manager extends Member {
    private String department;
    public Manager(String name, int age, String phoneNumber, String address,
                   double salary, String department) {
        super(name, age, phoneNumber, address, salary);
        this.department = department;
    }
    public void printDetails() {
        super.printDetails();
        System.out.println("Department: " + department);
    }
}
```

```
 .app/Contents/lib/idea_rt.jar=52035:/Applications/Inte
 .encoding=UTF-8 -classpath /Users/kavindus/Projects/BE
 -Oriented-Programming-Lab-Session-11 q02.Main
Employee Salary:
Salary: 50000.0

Manager Salary:
Salary: 80000.0

Employee Details:
Name: John Doe
Age: 25
Phone Number: 1234567890
Address: 123 Street, City
Salary: 50000.0
Specialization: Software Development

Manager Details:
Name: Jane Smith
Age: 35
Phone Number: 9876543210
Address: 456 Avenue, Town
Salary: 80000.0
Department: IT

Process finished with exit code 0
```

Question 03.

```
package q03;

public class Instructor extends User {

    private String[] teachingCourses;


    public Instructor(String name, String userID, String[] teachingCourses) {

        super(name, userID);

        this.teachingCourses = teachingCourses;

    }


    public void assignGrades(String studentName, String grade) {

        System.out.println("Instructor " + name + " assigned grade " + grade +
" to " + studentName);

    }

}
```

```
package q03;


public class Student extends User {
    private String[] enrolledCourses;


    public Student(String name, String userID, String[] enrolledCourses) {
        super(name, userID);
        this.enrolledCourses = enrolledCourses;
    }


    public void viewCourses() {
        System.out.println("Enrolled Courses: " + String.join(", ",
enrolledCourses));
    }
}
```

```
package q03;


public class User {
    protected String name;
    protected String userID;


    public User(String name, String userID) {
        this.name = name;
        this.userID = userID;
    }


    public void login() {
        System.out.println("User " + name + " with ID " + userID + " has logged
in.");
    }
}
```

```
package q03;

public class Main {

    public static void main(String[] args) {

        String[] studentCourses = {"C++", "Web Development", "Data
Structures"};

        Student student = new Student("Janitha Dasun", "S001", studentCourses);

        String[] instructorCourses = {"Python 101", "Advanced Python"};

        Instructor instructor = new Instructor("Dr. Sujeewa", "I001",
instructorCourses);


        student.login();

        instructor.login();

        student.viewCourses();

        instructor.assignGrades("Janitha Dasun", "A");

           //cmt-01 student.assignGrades("Test Student", "B");

           // System.out.println("Student cannot access instructor methods");

          //cmt-02  instructor.viewCourses();

         //System.out.println("Instructor cannot access student methods");

    }

}
```

```
415 ms
ang.String)
/Users/kavindus/Projects/BECS-12243-Object-Oriented-Programming-Lab-Session-11/src/q03/Main
.java:21:20
java: cannot find symbol
  symbol:   method assignGrades(java.lang.String,java.lang.String)
  location: variable student of type q03.Student
```

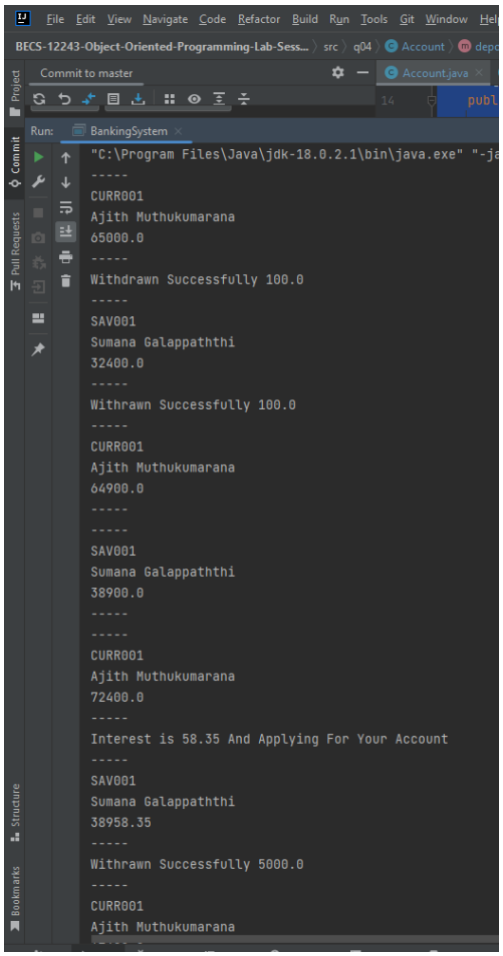
```
/Users/kavindus/Projects/BECS-12243-Object-Oriented-Programming-Lab-Session-11/src/q03/Main
.java:25:24
java: cannot find symbol
  symbol:   method viewCourses()
  location: variable instructor of type q03.Instructor
```

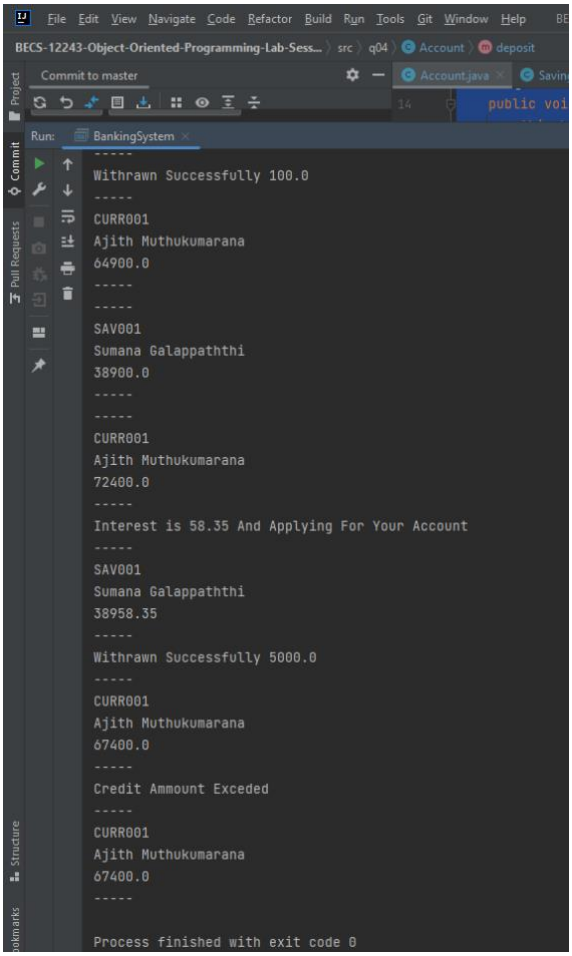
If I uncomment above cmt-01 and cmt-02, The above error has occur and Doesn't compile. We cannot access different object's method through another instance of another class.

Question 04.

```
package q04;

public class BankingSystem {

    public static void main(String[] args) {

        SavingsAccount savingsAccount01 = new SavingsAccount("SAV001","Sumana
Galappaththi",32500);

        CurrentAccount currentAccount01 = new CurrentAccount("CURR001","Ajith
Muthukumarana",65000);

        currentAccount01.setCreditLimit(9500);

        currentAccount01.displayAccountDetails();


        savingsAccount01.withdraw(100);

        savingsAccount01.displayAccountDetails();


        currentAccount01.withdraw(100);

        currentAccount01.displayAccountDetails();


        savingsAccount01.deposit(6500);

        savingsAccount01.displayAccountDetails();


        currentAccount01.deposit(7500);

        currentAccount01.displayAccountDetails();


        savingsAccount01.applyInterest();

        savingsAccount01.displayAccountDetails();

        currentAccount01.withdraw(5000);

        currentAccount01.displayAccountDetails();


        currentAccount01.withdraw(35000);

        currentAccount01.displayAccountDetails();

    }

}
```

```
package q04;

public class CurrentAccount extends Account{

   double  creditLimit ;

    public CurrentAccount(String accountNumber, String accountHolderName,
double balance) {

        super(accountNumber, accountHolderName, balance);

    }

    public void setCreditLimit(double creditLimit) {

        this.creditLimit = creditLimit;

    }

    public void withdraw(double amount){

        if (amount<=creditLimit){

            System.out.println("Withrawn Successfully "+amount);

            super.balance-=amount;

        } else {

            System.out.println("Credit Ammount Exceded");

        }

    }
}
```





```
package q04;

public class SavingsAccount extends Account {

    double interestRate = 0.15;

    public SavingsAccount(String accountNumber, String accountHolderName,
double balance) {

        super(accountNumber, accountHolderName, balance);

    }

    public void withdraw(double amount){

        if (super.balance >=0){

            System.out.println("Withdrawn Successfully "+amount);

            super.balance -= amount;

        } else {

            System.out.println("Insufficient Balance");

        }

    }

    public void applyInterest(){

        double Interest = balance * interestRate / 100;

        System.out.println("Interest is "+Interest+ " And Applying For Your
Account");

        super.balance += Interest;

    }

}
```

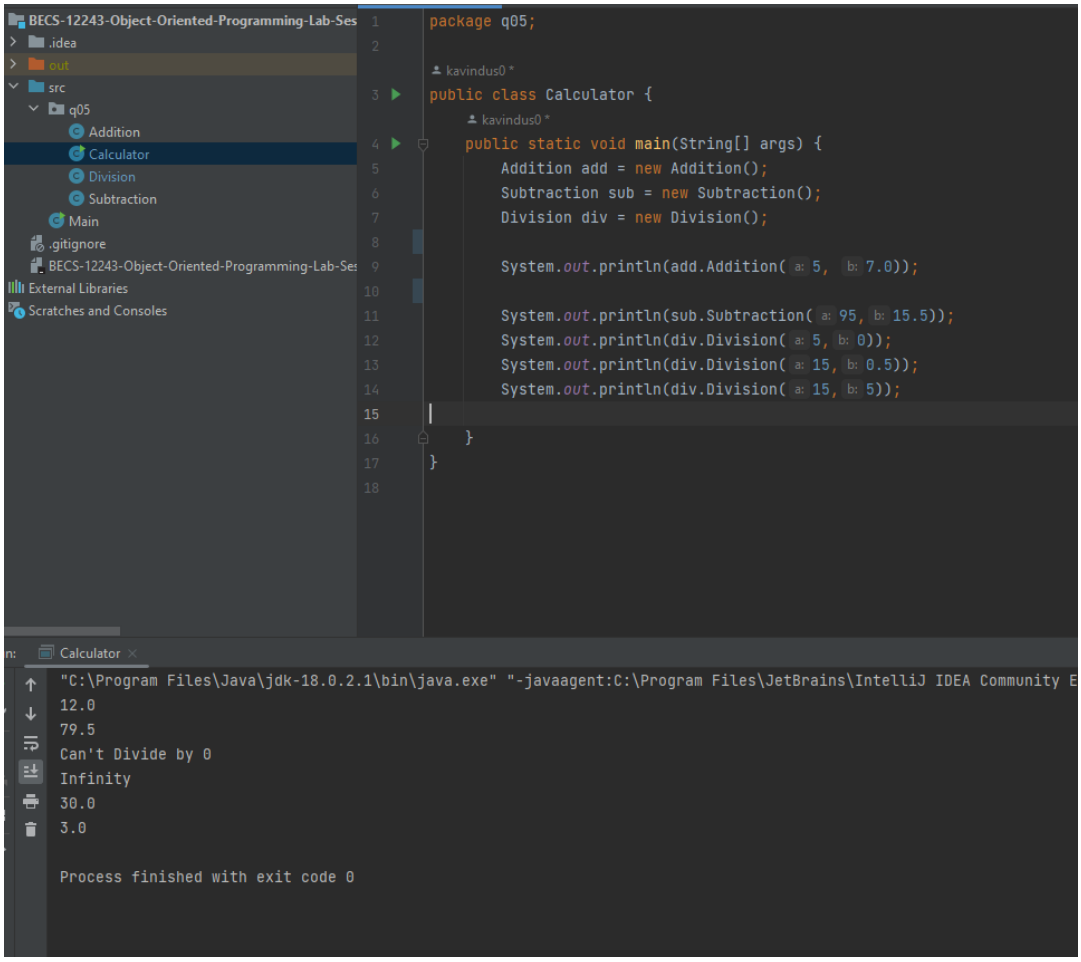
```
package q04;

public class Account {

    protected String accountNumber;

    protected String accountHolderName;

    protected double balance;

    public Account(String accountNumber, String accountHolderName, double
balance) {

        this.accountNumber = accountNumber;

        this.accountHolderName = accountHolderName;

        this.balance = balance;

    }

    public void deposit(double amount) {

        this.balance +=amount;

    }

    public void displayAccountDetails() {

        System.out.println("-----");

        System.out.println(accountNumber);

        System.out.println(accountHolderName);

        System.out.println(balance);

        System.out.println("-----");


    }


}
```

Question 05.

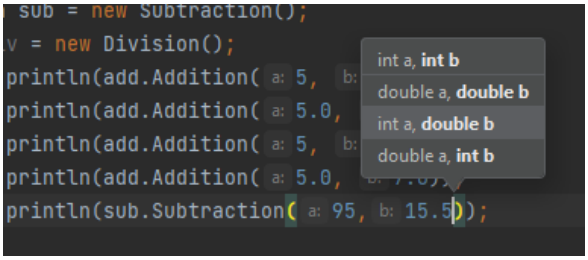
```
package q05;

public class Calculator {

    public static void main(String[] args) {

        Addition add = new Addition();

        Subtraction sub = new Subtraction();

        Division div = new Division();

        System.out.println(add.Addition(5, 7));

        System.out.println(add.Addition(5.0, 7));

        System.out.println(add.Addition(5, 7.0));

        System.out.println(add.Addition(5.0, 7.0));

        System.out.println(sub.Subtraction(95,15.5));

        System.out.println(div.Division(5,0));

        System.out.println(div.Division(15,0.5));

    }

}
```

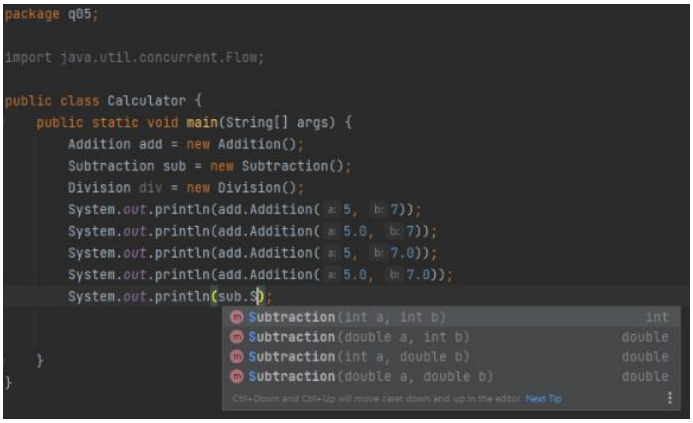
```
package q05;

public class Subtraction {
    public int Subtraction(int a, int b) {
        return a - b;
    }
    public double Subtraction(double a, double b) {
        return a - b;
    }
    public double Subtraction(int a, double b) {
        return a - b;
    }
    public double Subtraction(double a, int b) {
        return a - b;  }
}
```

```
package q05;
public class Addition {
    public int Addition(int a, int b) {
        return a + b;
    }
    public double Addition(double a, double b) {
        return a + b;
    }
    public double Addition(int a, double b) {
        return a + b;
    }
    public double Addition(double a, int b) {
        return a + b;
    }
}
```



```
package q05;

public class Division {
    public double Division(int a, int b) {
        if (b==0){
            System.out.println("Can't Divide by 0");
                    } else
        return (double)a / b;
    }
    public double Division(double a, double b) {
        if (b==0){
            System.out.println("Can't Divide by 0");
            } else
        return a / b;
    }
    public double Division(int a, double b) {
        if (b==0){
            System.out.println("Can't Divide by 0");
        }else
        return a / b;
    }
    public double Division(double a, int b) {
        if (b==0){
            System.out.println("Can't Divide by 0");
        }else
        return a / b;
    }
}
```





Question 06.

```
package q06;
public class StringManipulator {
    public static void main(String[] args) {
        StringManipulator str = new StringManipulator();
        System.out.println(str.reverse("HelloWorld"));
        System.out.println(str.reverse("HelloWorld",3));
        System.out.println(str.reverse("HelloWorld",2,9));
    }
    public String reverse(String s){
        StringBuffer sbf = new StringBuffer(s);
        sbf.reverse();
        return s;
    }
    public String reverse(String s, int n){
        StringBuffer sbf3 = new StringBuffer(s);
        String subs = sbf3.substring(0,n);
        StringBuffer sbst = new StringBuffer(subs);
        sbst.reverse();
        return subs;
    }
    public String reverse(String s, int start, int end){
        StringBuffer sbf3 = new StringBuffer(s);
        String subs = sbf3.substring(start,end);
        StringBuffer sbst = new StringBuffer(subs);
        sbst.reverse();
        return subs;
    }
}
```