```java
package lab8;

import java.util.Scanner;

public class Calculator {

    public int x;
    public int y;

    public Calculator() {

    }
    public void setxy(int x,int y) {
        this.x = x;
        this.y = y;
    }
    public void Clear() {
        this.x = 0;
        this.y = 0;
    }
    public int add() {
        int ga =0;
        ga = this.x+this.y;
        return ga;
    }
    public int subtract() {
        int ga =0;
        ga = this.x-this.y;
        return ga;

    }
    public int multiply() {
        int ga =0;
        ga = this.x*this.y;
        return ga;

    }
    public int divide() {
        int ga =0;
```

```java
package lab8;

import java.util.Scanner;

public class ScientificCalculatorDemo {

    public static void main(String[] args) {
        Scanner sr = new Scanner (System.in);
        System.out.println("Welcome to calculator program");
        char ch,operation;
        do {
            int x=0,y=0,a;
            double ga=0.0;
            Calculator cal = new Calculator();
            System.out.print("enter x : ");
            x = sr.nextInt();
            System.out.print("enter x : ");
            y = sr.nextInt();
            cal.setxy(x, y);

            System.out.print("select operation [+,-,*,/,c,p,m]: ");
            operation = sr.next().charAt(0);
            if(operation == '+'||operation == '-'||operation == '*'||operation == '/'||operation == 'p'||operation == 'm'){
                    if(operation == '+') {
                        ga=cal.add();
                    }
                    else if(operation == '-') {
                        ga=cal.subtract();
                    }
                    else if(operation == '*') {
                        ga=cal.multiply();
                    }
                    else if(operation == '/') {
                        ga=cal.divide();
                    }
                    else if(operation == '%') {
                        ga=cal.divide();
                    }
                    else if(operation == 'p') {
```

```
                else if(operation ==  p ) {
                    ga=cal.divide();
                    System.out.println("Answer of" +x+""+operation+""+y+"="+ga);
                }
                else if(operation == 'm') {
                    ga=cal.divide();
                    System.out.println("Answer of" +x+""+operation+""+y+"="+ga);
                }
                System.out.println("Answer of" +x+""+operation+""+y+"="+(int)ga);
                System.out.print("Do you want to continue [y/n]: ");
                ch = sr.next().charAt(0);
            }
            else {
                cal.Clear();
            }
            System.out.println("Bye Bye----");
        }
    }
}
```

```java
package Lab8;
public class GraduationCheck{
    public static void DisplayGraduation(Course[] c) {
        for(int i=0;i<c.length;i++){
            System.out.print(" "+c[i].toString());
            System.out.println("");
        }
    }
    public static void calGPA(Course[] arrGen,Course[] arrMajor) {
        double a=0,unit1=0,unit2=0,gradeGen=0,gradeMajor=0
                ,sumunit1=0,sumunit2=0,gradeGentotal=0,gradeMajortotal=0;
        for (int i=0;i<arrGen.length;i++) {
            if (arrGen[i].getgrade().equals("A")) {
                a=4;
            }
            else if(arrGen[i].getgrade().equals("B+")) {
                a=3.5;
            }
            else if(arrGen[i].getgrade().equals("B")) {
                a=3;
            }
            else if(arrGen[i].getgrade().equals("C+")) {
                a=2.5;
            }
            else if(arrGen[i].getgrade().equals("C")){
                a=2;
            }
            else if(arrGen[i].getgrade().equals("D+")){
                a=1.5;
            }
            else if(arrGen[i].getgrade().equals("D")){
                a=1;
            }
            else if(arrGen[i].getgrade().equals("F")){
                a=0;
            }
            else{
```

```
79⊖    public static void main(String[] args) {
80         String[] GenID = {"GEN61-127","GEN61-152","GEN61-153"};
81         int[] GenUnit = {3,4,2};
82         String[] GenGrade = {"C","D","C+"};
83         String[] GenSchool = {"School of Liberal Arts","School of Science"
84
85         String[] MajorID = {"SWE62-123","SWE62-205","SWE62-214","SWE62-215
86         int[] MajorUnit = {2,3,3,2};
87         String[] MajorGrade = {"W","F","C+","F"};
88         int[] MajorYear = {1,2,2,2};
89
90         int passEnM=0,passEnG=0;
91
92         Course[] arrGen = new GenEdCourse[3];
93         for (int i=0;i<arrGen.length;i++) {
94             arrGen[i]=new GenEdCourse(GenID[i],GenUnit[i],GenGrade[i],GenS
95             if(GenGrade[i]!="F"&&GenGrade[i]!="W") {
96                 passEnG+=1;
97             }
98         }
99         System.out.println("General Education Course :");
100        DisplayGraduation(arrGen);
101        System.out.println("You enroll "+arrGen.length+" Pass : "+passEnG)
102        System.out.println("================================");
103
104        Course[] arrMajor = new MajorCourse[4];
105        for (int i=0;i<arrMajor.length;i++) {
106            arrMajor[i]=new MajorCourse(MajorID[i],MajorUnit[i],MajorGrade
107            if(MajorGrade[i]!="F"&&MajorGrade[i]!="W") {
108                passEnM+=1;
109            }
110        }
111        System.out.println("Major Course : ");
112        DisplayGraduation(arrMajor);
113        System.out.println("You enroll "+arrMajor.length+" Pass : "+passEn
114        System.out.println("================================");
115        System.out.println("total enroll "+(arrMajor.length+arrGen.length)
116        calGPA(arrGen,arrMajor);
```

```
3  public class GenEdCourse extends Course{
4      protected String school;
5      public GenEdCourse(String id,int u,String g ,String s) {
6          super(id,u,g);
7          this.school=s;
8      }
9      public String toString() {
10         return ""+super.toString()+"\t"+this.school;
11     }
12 }
13
```

```java
public class MajorCourse extends Course{
    protected int year;
    public MajorCourse(String id,int u,String g,int y) {
        super(id,u,g);
        this.year=y;
    }
    public String toString() {
        return ""+super.toString()+"\t"+this.year;
    }
}
```

```java
public class Course {
    private String courseID,grade;
    private int unit;
    public Course(){
    }
    public Course(String id,int u,String g) {
        this.courseID = id;
        this.unit = u;
        this.grade = g;
    }
    public int getUnit() {
        return this.unit;
    }
    public String getgrade() {
        return this.grade;
    }
    public String toString() {
        String ts = "";
        ts += ""+this.courseID+"\t"+this.unit+"\t"
        +this.grade;
        return ts;
    }
}
```

```
General Education Course :
 GEN61-127       3          C        School of Liberal Arts
 GEN61-152       4          D        School of Science
 GEN61-153       2          C+       School of Science
You enroll 3 Pass : 3
================================
Major Course :
 SWE62-123       2          W        1
 SWE62-205       3          F        2
 SWE62-214       3          C+       2
 SWE62-215       2          F        2
You enroll 4 Pass : 1
================================
```

```java
public class PersonDemo {
    public static void displayAllPerson(Person[] o) {
        for(int i=0;i<o.length;i++){
            System.out.printf("%s\n",o[i].toString());
        }
    }
    public static int calAverageAge(Person[] o) {
        int sumAge=0,avgAge=0;
        for(int i=0;i<o.length;i++){
            sumAge+=o[i].getAge();
        }
        avgAge=sumAge/o.length;
        return avgAge;
    }
    public static void main(String[] args) {
        String[] studentName = {"Aaa bbb","Ccc ddd","Eee fff"};
        int[] studentBirth = {1996,1997,1998};
        String[] studentID = {"60100010","60100011","60100013"};
        String[] studentMajor = {"SWE","COE","SWE"};

        String[] EmployeeName = {"zzz zzz","ddd fff","eee kkk","jjj lll"};
        int[] EmployeeBirth = {1980,1970,1960,1950};
        boolean[] EmployeeStatus = {false,true,true};
        int[] EmployeeSalary = {28000,40000,60000};

        Person[] arrStudent = new Student[3];
        for (int i=0;i<arrStudent.length;i++) {
            arrStudent[i] = new Student(studentName[i],studentBirth[i],
                    studentID[i],studentMajor[i]);
        }

        System.out.println("No. of  Student :"+arrStudent.length);
        displayAllPerson(arrStudent);
        int avgAgeSt=calAverageAge(arrStudent);
        System.out.println("Average Age of Student: "+avgAgeSt);
        System.out.println("==========================");
```

```
int EmpSalary=0;
Person[] arrEmployee = new Employee[3];
for (int i=0;i<arrEmployee.length;i++) {
    arrEmployee[i] = new Employee(EmployeeName[i],
            EmployeeBirth[i],EmployeeStatus[i],EmployeeSalary[i]);
    EmpSalary+=EmployeeSalary[i];
}
System.out.println("No. of  Employee :"+arrEmployee.length);
displayAllPerson(arrEmployee);
int avgAgeEmp=calAverageAge(arrEmployee);
System.out.printf("Average Age of Employee: %d",avgAgeEmp);
System.out.printf(", Average Salary : %d\n",(EmpSalary/EmployeeSalary.length)
System.out.println("================================");
System.out.printf("Average Age of 6 person = %d",(avgAgeEmp+avgAgeSt)/2);
```

```java
package Lab06;

public class Employee extends Person{
    protected boolean isMarried;
    protected int salary;
    public Employee(String n,int b,boolean i,int s) {
        super(n,b);
        this.isMarried=i;
        this.salary=s;
    }
    public String toString() {
        String ts = "";
        String status;
        if (isMarried) status="Married";
        else status="Single";
        ts += super.toString()+", Status: "+status+", Salary: "+this.salary;
        return ts;
    }
```

```
3  public class Student extends Person{
4      protected String studentID;
5      protected String major;
6      public Student(String n,int b,String id,String m) {
7          super(n,b);
8          this.studentID=id;
9          this.major=m;
0      }
1      public String toString() {
2          String ts = "";
3          ts += super.toString()+",  Student Id:"+this.studentID+", Major: "+this.major;
4          return ts;
5      }
6
7  }
8
```

```java
import java.util.Calendar;
public class Person {
    protected String name;
    protected int birthYear;
    public Person(String name,int year) {
        this.name = name;
        this.birthYear = year;
    }
    public int getAge() {
        int year = Calendar.getInstance().get(Calendar.YEAR);
        year=year-this.birthYear;
        return year;
    }

    public String toString() {
        String ts = "";
        ts += "Name: "+this.name+", Birth Year: "+this.birthYear+", Age: "+getAge();
        return ts;
    }
}

```

```
No. of  Student :3
Name: Aaa bbb, Birth Year: 1996, Age: 25,  Student Id:60100010, Major: SWE
Name: Ccc ddd, Birth Year: 1997, Age: 24,  Student Id:60100011, Major: COE
Name: Eee fff, Birth Year: 1998, Age: 23,  Student Id:60100013, Major: SWE
Average Age of Student: 24
==================================
No. of  Employee :3
Name: zzz zzz, Birth Year: 1980, Age: 41, Status: Single, Salary: 20300
Name: ddd fff, Birth Year: 1970, Age: 51, Status: Married, Salary: 43000
Name: eee kkk, Birth Year: 1960, Age: 61, Status: Married, Salary: 63000
Average Age of Employee: 51, Average Salary : 42666
==================================
Average Age of 6 person = 37
```