OOCP - Practical Assignment 1

Name: Vivekkumar Satishbhai jadav

Class: MCA 1st

Roll no: 9

1. **Write a program to create class Student with student’s rollno, name and marks of three subjects (OOCP, AI and MF) and display the details of student with total marks of all subjects along with the percentage in proper format.(Output should be in descending order of percentage.**

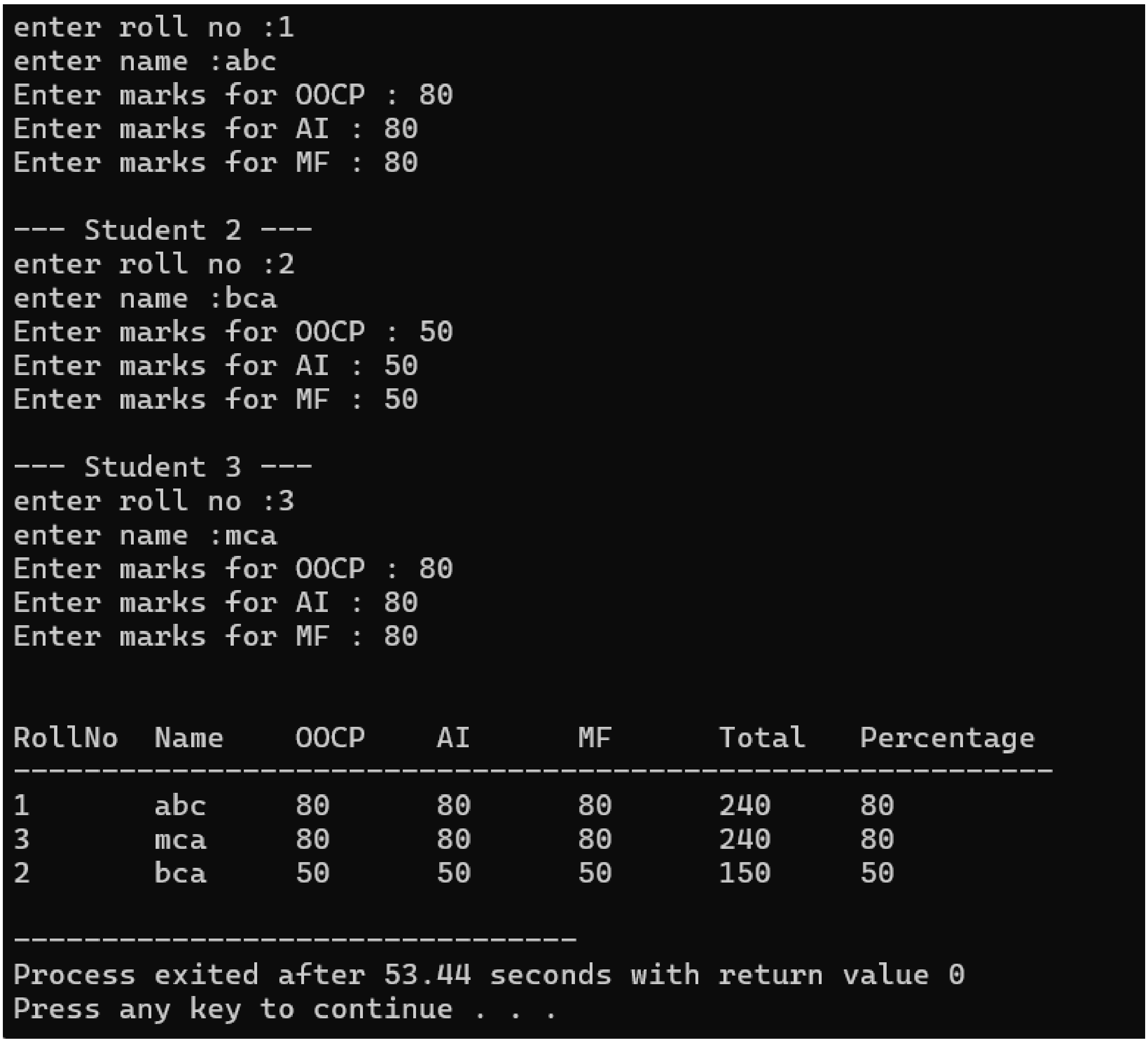
// program

```
#include<iostream>

#include<string>

using namespace std;


class Student{

        private:

                int rollno;

                string name;

                float OOCP, AI, MF, Marks, per;


        public:

                void inputData(){

                cout<< "enter roll no :";

                cin>> rollno;

                cout<< "enter name :";

                cin>> name;


                //validation for marks not greater then 100

                 OOCP = inputMarks("OOCP");

                 AI      = inputMarks("AI");

                MF      = inputMarks("MF");

                calculateMarks();

                }
```

```
// marks validation function
static float inputMarks(string subject){
float marks;
while (true) {
        cout << "Enter marks for " << subject << " : ";
        cin >> marks;
        if (marks >= 0 && marks <= 100)
        {
                break;
        }
        else
        {
                cout << "Invalid! Please enter between 0 and 100.\n";
        }
}
return marks;
}

// make differnt function for calculate
void calculateMarks() {
        Marks = OOCP + AI + MF;
        per = (Marks / 300) * 100;
}

void displayData() {
        cout << rollno << "\t" << name << "\t"
        << OOCP << "\t" << AI << "\t" << MF << "\t"
        << Marks << "\t" << per << "\n";
    }
    float getPercentage() {
    return per;
    }
};

int main() {
    int n;
     cout << "Enter number of students: ";
     cin >> n;

    Student students[100];
     for (int i = 0; i < n; i++) {
         cout << "\n--- Student " << i + 1 << " ---\n";
        students[i].inputData();
     }
 // Bubble Sort
 for (int i = 0; i < n - 1; i++) {
    for (int j = 0; j < n - i - 1; j++) {
        if (students[j].getPercentage() < students[j + 1].getPercentage()) {
            Student temp = students[j];
            students[j] = students[j + 1];
            students[j + 1] = temp;
     }
     }
}
```

```
        cout << "\n\nRollNo\tName\tOOCP\tAI\tMF\tTotal\tPercentage\n";

        cout << "-----------------------------------------------------------\n";

        for (int i = 0; i < n; i++) {

                students[i].displayData();

        }


        return 0;

    }
```

// output



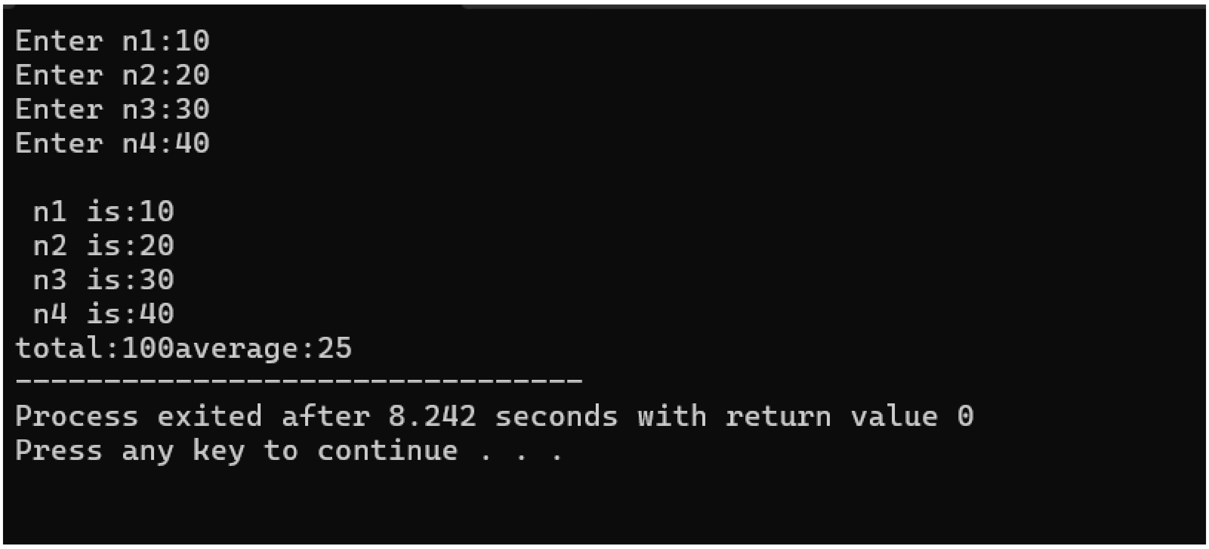
```
enter roll no :1
enter name :abc
Enter marks for OOCP : 80
Enter marks for AI : 80
Enter marks for MF : 80

--- Student 2 ---
enter roll no :2
enter name :bca
Enter marks for OOCP : 50
Enter marks for AI : 50
Enter marks for MF : 50

--- Student 3 ---
enter roll no :3
enter name :mca
Enter marks for OOCP : 80
Enter marks for AI : 80
Enter marks for MF : 80


RollNo  Name    OOCP    AI      MF      Total   Percentage
-----------------------------------------------------------
1       abc     80      80      80      240     80
3       mca     80      80      80      240     80
2       bca     50      50      50      150     50

--------------------------------
Process exited after 53.44 seconds with return value 0
Press any key to continue . . .
```

2. **Write a program to create class Num (int n1, int n2, int n3, int n4). Display total and average of n1, n2, n3 and n4.**

// program

```
#include<iostream>

using namespace std;


class Num{

        private:

                int n1,n2,n3,n4,total;

                float average;


        public:

                void input(){

                        cout<<"Enter n1:";

                        cin>>n1;

                        cout<<"Enter n2:";

                        cin>>n2;

                        cout<<"Enter n3:";

                        cin>>n3;

                        cout<<"Enter n4:";

                        cin>>n4;

                }

                void calculate(){

                        total = n1+n2+n3+n4;

                        average = total/4;

                }
        void display(){
            cout<<"\n"<<" n1 is:"<<n1<<"\n"<<" n2 is:"<<n2<<"\n"<<" n3
            is:"<<n3<<"\n"<<" n4 is:"<<n4<<endl;

            cout<< "total:"<<total;

            cout<<"average:"<<average;


        }

    };


int main(){


    Num n;

    n.input();

    n.calculate();

    n.display();

    return 0;

}
```

// output



```
Enter n1:10
Enter n2:20
Enter n3:30
Enter n4:40

 n1 is:10
 n2 is:20
 n3 is:30
 n4 is:40
total:100average:25
--------------------------------
Process exited after 8.242 seconds with return value 0
Press any key to continue . . .
```

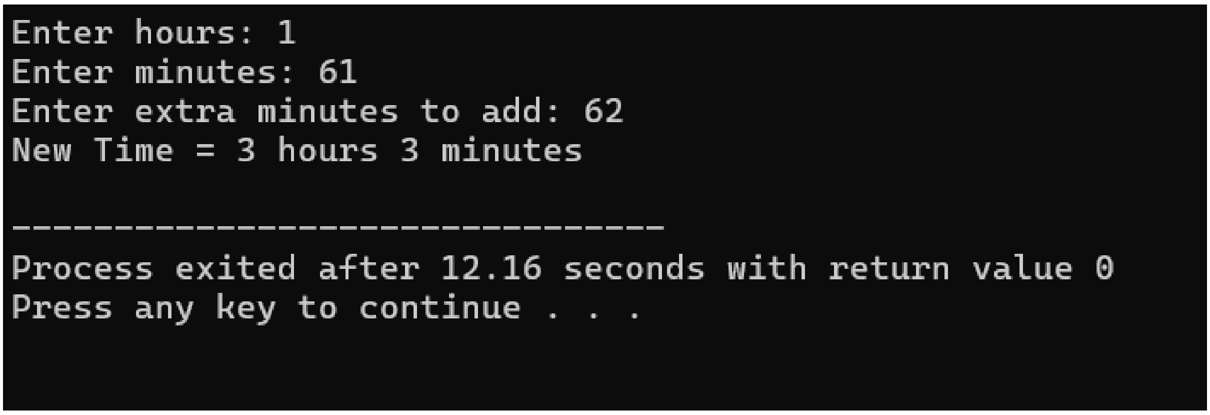
3. **Write a program to create class Time (int h, int m). Read a value as minutes from user to display new time after adding the value to minutes in Time.**

// program

```
#include<iostream>
using namespace std;

class Time{
        private:
                int h,m;
        public:
                //user input
                void getData(){
                cout << "Enter hours: ";
                cin >> h;
                cout << "Enter minutes: ";
                cin >> m;
                }
        //add minute
        void add(int extra) {
                m += extra;     // add minutes
                h += m / 60;    // change minutes to hours
                m = m % 60;     // make minute less then 60
        }
        void display() {
                cout << "New Time = " << h << " hours " << m << " minutes" << endl;
        }
};
```

```
int main() {
            Time t;
             int extra;


           t.getData();
           cout << "Enter extra minutes to add: ";
           cin >> extra;
           t.add(extra);    // add  minutes
           t.display();     // show after add minute time
   return 0;
}
```

// output



```
Enter hours: 1
Enter minutes: 61
Enter extra minutes to add: 62
New Time = 3 hours 3 minutes

--------------------------------
Process exited after 12.16 seconds with return value 0
Press any key to continue . . .
```

4. Write a program to create class Date (int day, int month, int year). Read a value as day from user to display new date after adding the value to day in Date.

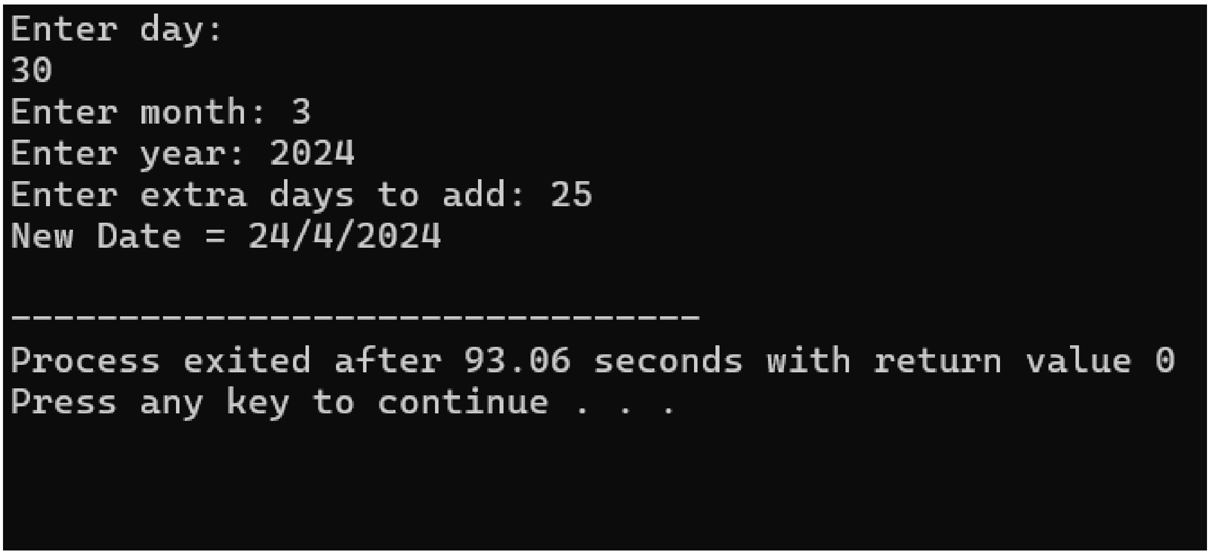
// program

```
#include<iostream>
using namespace std;

class Date{
        private:
        int day ,month ,year;
        int days(int m, int y) {
                if (m == 1 || m == 3 || m == 5 || m == 7 || m == 8 || m == 10 || m == 12)
                        return 31;
                else if (m == 4 || m == 6 || m == 9 || m == 11)
                        return 30;
                else if (m == 2) { // February
                        if ((y % 400 == 0) || (y % 4 == 0 && y % 100 != 0))
                                return 29; // leap year
                else
                        return 28;
                }
             return 30;
         }
        public:
        void input() {
                cout << "Enter day: ";
                cin >> day;
                cout << "Enter month: ";
```

```
      cin >> month;
      cout << "Enter year: ";
      cin >> year;
 }

void addDays(int extra) {
    day += extra;
    // Adjust day, month, year
    while (true) {
          int maxDays = days(month, year);
         if (day > maxDays) {
                  day -= maxDays;
                 month++;
                 if (month > 12) {
                     month = 1;
                      year++;
           }
         }
          else {
                 break;
             }
          }
      }



   void display() {
         cout << "New Date = " << day << "/" << month << "/" << year << endl;
   }
```

```
};
int main() {
        Date d;
        int extra;
        d.input();
        cout << "Enter extra days to add: ";
        cin >> extra;
       d.addDays(extra);  // add days
       d.display();   // display new date
      return 0;
}
```

// output



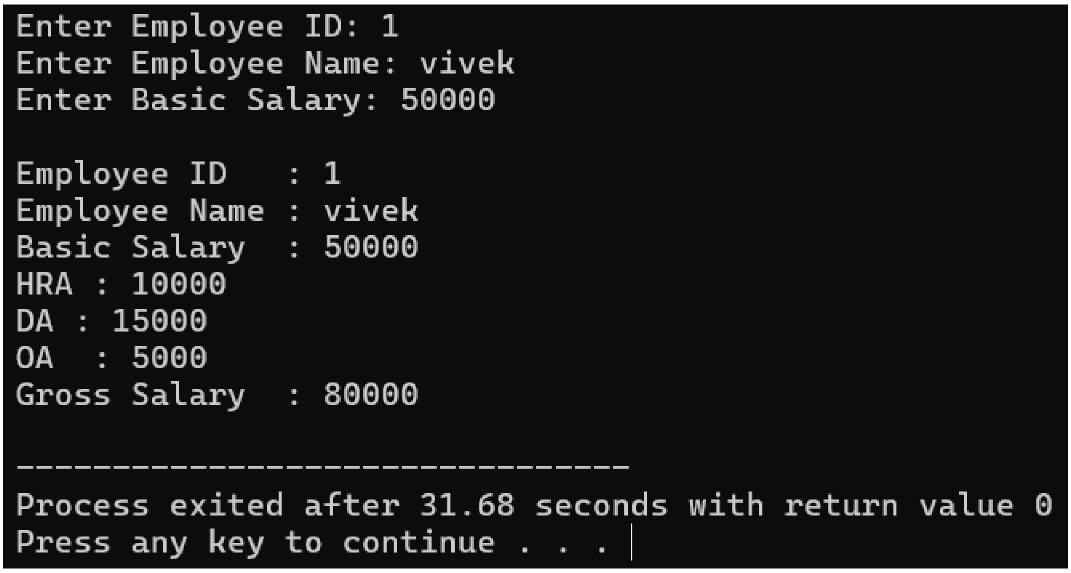
```
Enter day:
30
Enter month: 3
Enter year: 2024
Enter extra days to add: 25
New Date = 24/4/2024

--------------------------------
Process exited after 93.06 seconds with return value 0
Press any key to continue . . .
```

5. Write a program to create class employee with employee’s id, name and basic salary. Calculate gross salary for each employee(HRA 20%, DA 30%, OA 10%).

// program

```
#include<iostream>
using namespace std;

class Employee{
private:
    int id;
    string name;
    float basic ,gross,hra,da,oa;

public:
  void input() {
     cout << "Enter Employee ID: ";
     cin >> id;
     cout << "Enter Employee Name: ";
     cin >> name;
     cout << "Enter Basic Salary: ";
     cin >> basic;
   }
 void calculate(){
     hra = 0.20 * basic;
     da  = 0.30 * basic;
     oa  = 0.10 * basic;
     gross = basic + hra + da + oa;
  }
 void display() {
     cout << "\nEmployee ID   : " << id;
     cout << "\nEmployee Name : " << name;
     cout << "\nBasic Salary  : " << basic;
     cout << "\nHRA : " << hra;
     cout << "\nDA : " << da;
     cout << "\nOA  : " << oa;
     cout << "\nGross Salary  : " << gross << endl;
  }
};
int main() {
  Employee e;
  e.input();        // take employee details
  e.calculate(); // calculate gross salary
  e.display();       // show details
  return 0;
}
```

// output



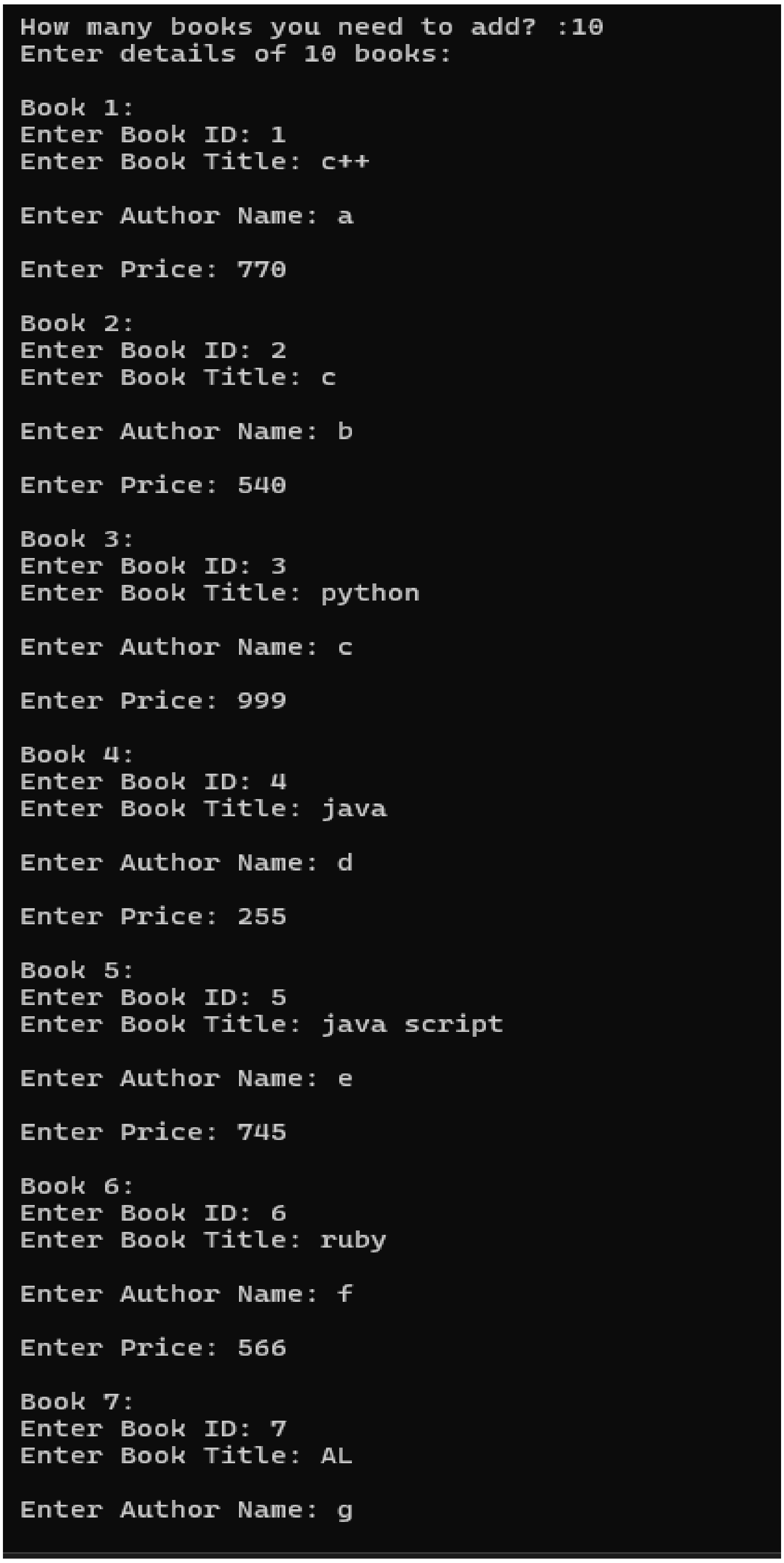
```
Enter Employee ID: 1
Enter Employee Name: vivek
Enter Basic Salary: 50000

Employee ID    : 1
Employee Name : vivek
Basic Salary   : 50000
HRA : 10000
DA : 15000
OA   : 5000
Gross Salary   : 80000

--------------------------------
Process exited after 31.68 seconds with return value 0
Press any key to continue . . .
```

6. Write a program to define a class called book. Write a program to read information about 10 books and display books details in ascending order of price in proper format.

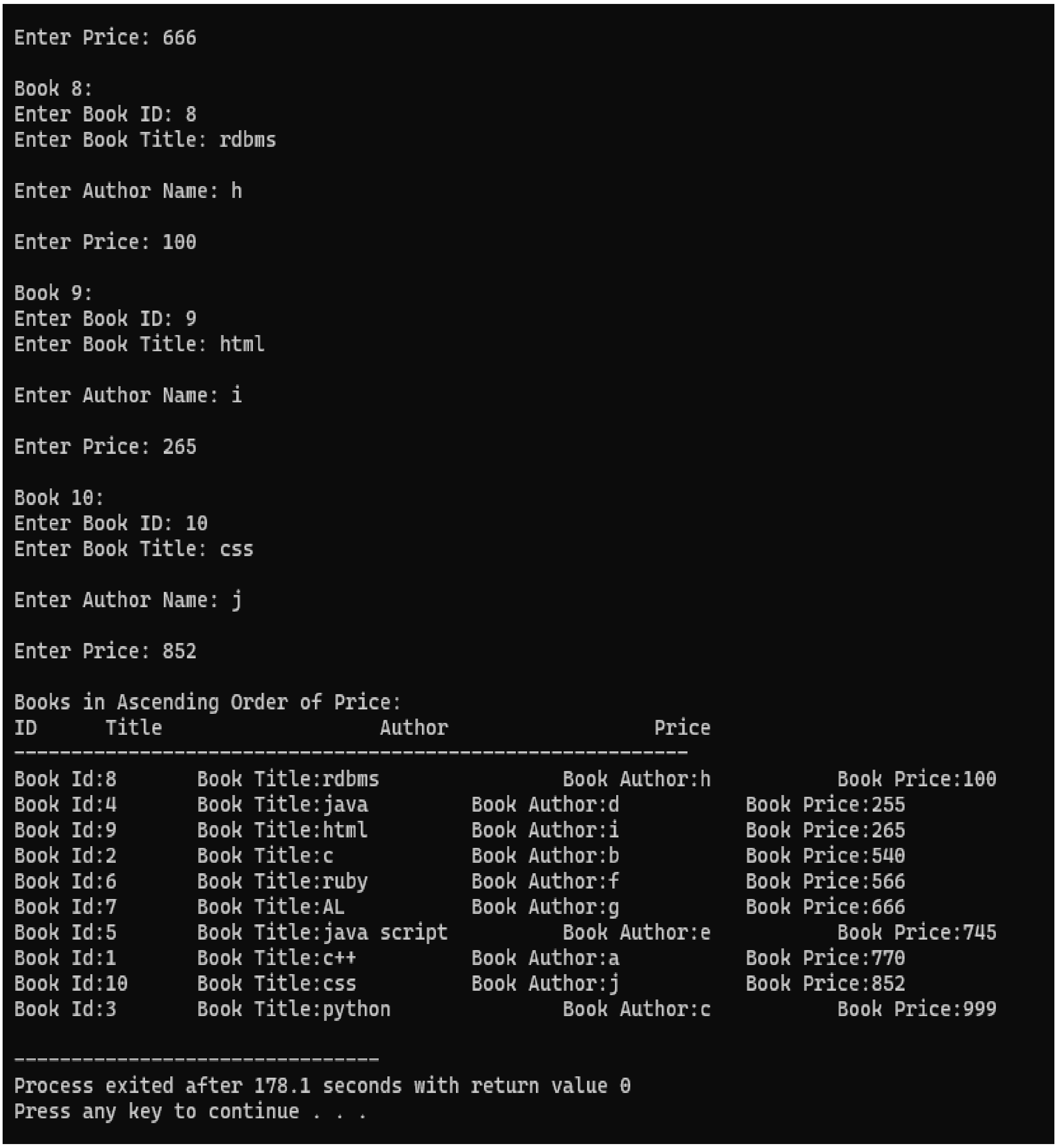
// program

```
#include <iostream>

#include<string>

using namespace std;


class Book {

private:

  int id;

  string title;

         string author;

  float price;


public:

  void input() {

    cout << "Enter Book ID: ";

    cin >> id;

    cin.ignore();

    cout << "Enter Book Title: ";

    getline(cin, title);

    cout << "\nEnter Author Name: ";

    getline(cin, author);

    cout << "\nEnter Price: ";

    cin >> price;

  }
  // take price
  float getPrice() {
    return price;
  }

  void display() {
    cout << "Book Id:"<<id << "\t"<<"Book Title:" << title << "\t\t"<<"Book Author:" <<
author << "\t\t"<<"Book Price:" << price << endl;
  }
};

int main() {
  int SIZE;
  cout << "How many books you need to add? :";
  cin >> SIZE;
  Book books[SIZE];

  // input
  cout << "Enter details of " << SIZE << " books:\n";
  for (int i = 0; i < SIZE; i++) {
    cout << "\nBook " << (i + 1) << ":\n";
    books[i].input();
  }

 //sort
  for (int i = 0; i < SIZE - 1; i++) {
    for (int j = i + 1; j < SIZE; j++) {
          if (books[i].getPrice() > books[j].getPrice()) {
              swap(books[i], books[j]);
          }
    }
  }

 //dispaly
  cout << "\nBooks in Ascending Order of Price:\n";
  cout << "ID\tTitle\t\t\tAuthor\t\t\tPrice\n";
  cout << "--------------------------------------------------\n";

  for (int i = 0; i < SIZE; i++) {
    books[i].display();
  }

  return 0;
}
```

// output



```
How many books you need to add? :10
Enter details of 10 books:

Book 1:
Enter Book ID: 1
Enter Book Title: c++

Enter Author Name: a

Enter Price: 770

Book 2:
Enter Book ID: 2
Enter Book Title: c

Enter Author Name: b

Enter Price: 540

Book 3:
Enter Book ID: 3
Enter Book Title: python

Enter Author Name: c

Enter Price: 999

Book 4:
Enter Book ID: 4
Enter Book Title: java

Enter Author Name: d

Enter Price: 255

Book 5:
Enter Book ID: 5
Enter Book Title: java script

Enter Author Name: e

Enter Price: 745

Book 6:
Enter Book ID: 6
Enter Book Title: ruby

Enter Author Name: f

Enter Price: 566

Book 7:
Enter Book ID: 7
Enter Book Title: AL

Enter Author Name: g
```



```
Enter Price: 666

Book 8:
Enter Book ID: 8
Enter Book Title: rdbms

Enter Author Name: h

Enter Price: 100

Book 9:
Enter Book ID: 9
Enter Book Title: html

Enter Author Name: i

Enter Price: 265

Book 10:
Enter Book ID: 10
Enter Book Title: css

Enter Author Name: j

Enter Price: 852

Books in Ascending Order of Price:
ID      Title                   Author                  Price
-----------------------------------------------------------
Book Id:8       Book Title:rdbms                Book Author:h           Book Price:100
Book Id:4       Book Title:java         Book Author:d           Book Price:255
Book Id:9       Book Title:html         Book Author:i           Book Price:265
Book Id:2       Book Title:c            Book Author:b           Book Price:540
Book Id:6       Book Title:ruby         Book Author:f           Book Price:566
Book Id:7       Book Title:AL           Book Author:g           Book Price:666
Book Id:5       Book Title:java script          Book Author:e           Book Price:745
Book Id:1       Book Title:c++          Book Author:a           Book Price:770
Book Id:10      Book Title:css          Book Author:j           Book Price:852
Book Id:3       Book Title:python               Book Author:c           Book Price:999

--------------------------------
Process exited after 178.1 seconds with return value 0
Press any key to continue . . .
```

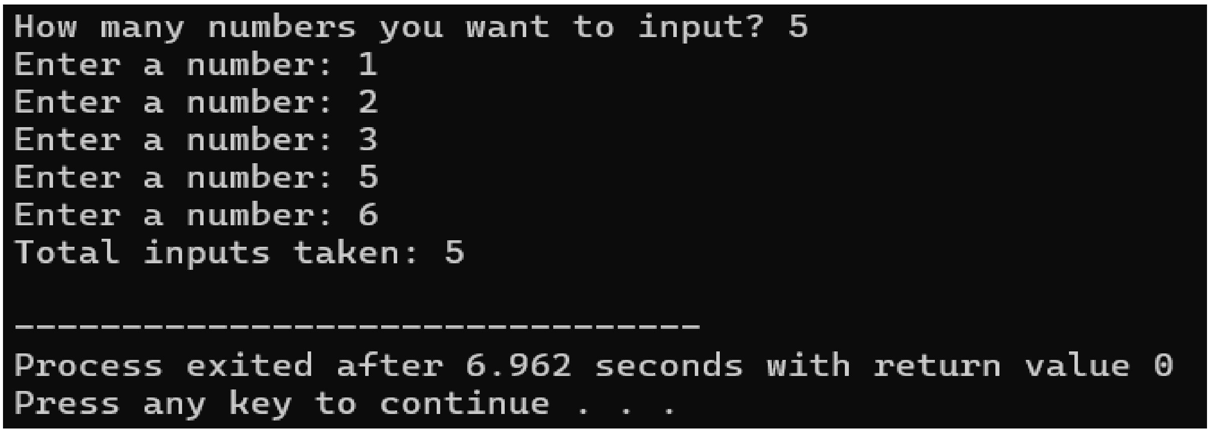
7. Demonstrate the use of static variables in a class by using it to count the number of times the value is being inputted in the program.

// program

```
#include<iostream>

using namespace std;


class Counter{

       private:

              int value;

              static int count;


      public:

               void read(){

               cout << "Enter a number: ";

               cin >> value;

               count++;// increase static value

          }


         void display() {

                   cout << "You entered: " << value << endl;

          }


          static void Count() {

                  // static function can access static members only

                   cout << "Total inputs taken: " << count << endl;

          }

};
```

```
int Counter::count = 0;


int main() {

  int n;

  cout << "How many numbers you want to input? ";

  cin >> n;


  Counter obj[100];  // create array of objects


  for (int i = 0; i < n; i++) {

    obj[i].read();


  }


  // show how many inputs taken

  Counter::Count();


  return 0;

}
```

// output



```
How many numbers you want to input? 5
Enter a number: 1
Enter a number: 2
Enter a number: 3
Enter a number: 5
Enter a number: 6
Total inputs taken: 5

--------------------------------
Process exited after 6.962 seconds with return value 0
Press any key to continue . . .
```

8. Create class STUDENT having rollno, name and age as data members, also take subject with three subjects and initialize their value with minimum passing marks. Using member function, modify marks of student with specific rollno which is given by user.

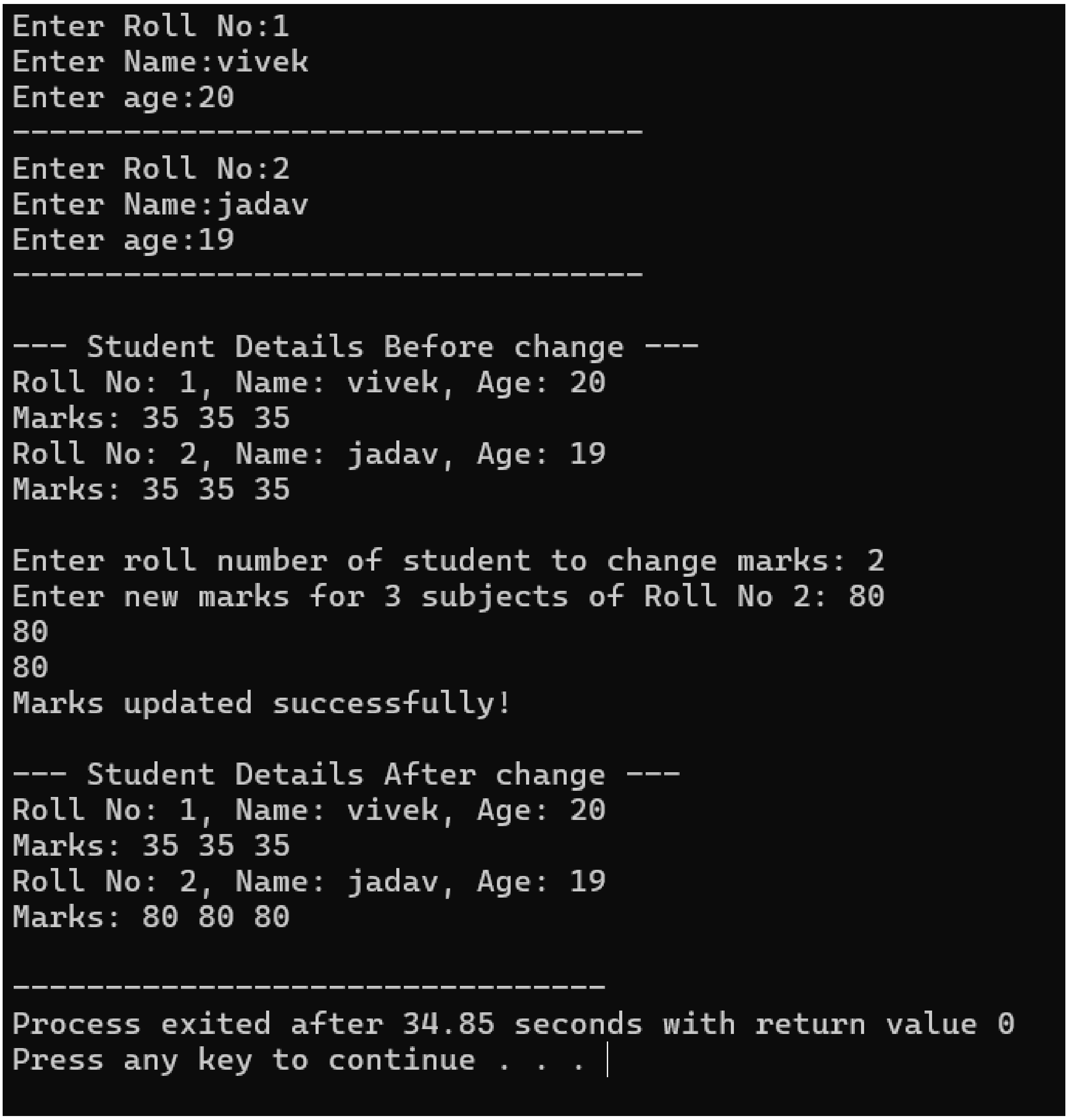
// program

```
#include<iostream>

#include<string>


using namespace std;


class Student{

           private:

           int rollno;

           string name;

           int age;

           int marks[3];


   public:

           //constructor

          Student(int r=0, string n="" , int a=0){

          rollno = r;

          name = n;

          age = a;

         for (int i = 0; i < 3; i++) {

                  marks[i] = 35; // minimum pass mark is 35

      }

 }


   void display(){
            cout << "Roll No: " << rollno << ", Name: " << name << ", Age: " << age << endl;
            cout << "Marks: ";
            for (int i = 0; i < 3; i++) {
                    cout << marks[i] << " ";
                   }
           cout << endl;
          }

      void change(int r) {
          if (rollno == r) {
         cout << "Enter new marks for 3 subjects of Roll No " << rollno << ": ";
         for (int i = 0; i < 3; i++) {
           cin >> marks[i];
         }
         cout << "Marks updated successfully!" << endl;
      }
    }

 int getRollNo() {
      return rollno;
   }

};

int main() {
   int n;
   cout << "Enter number of students: ";
   cin >> n;
```

```
Student s[100];
int roll; string name; int age;

// input student details
for (int i = 0; i < n; i++) {
  cout << "Enter Roll No:";
  cin >> roll;
  cout << "Enter Name:";
  cin>>name;
  cout << "Enter age:";
  cin >> age;




  s[i] = Student(roll, name, age);
}

// display students before change
cout << "\n--- Student Details Before change ---\n";
for (int i = 0; i < n; i++) {
  s[i].display();
}

// ask roll number to change marks
int searchRno;
cout << "\nEnter roll number of student to change marks: ";
cin >> searchRno;
```

```
 for (int i = 0; i < n; i++) {
   s[i].change(searchRno);
 }

 // display students after change
 cout << "\n--- Student Details After change ---\n";
 for (int i = 0; i < n; i++) {
   s[i].display();
 }

 return 0;
}
```

// output



```
Enter Roll No:1
Enter Name:vivek
Enter age:20
----------------------------------
Enter Roll No:2
Enter Name:jadav
Enter age:19
----------------------------------

--- Student Details Before change ---
Roll No: 1, Name: vivek, Age: 20
Marks: 35 35 35
Roll No: 2, Name: jadav, Age: 19
Marks: 35 35 35

Enter roll number of student to change marks: 2
Enter new marks for 3 subjects of Roll No 2: 80
80
80
Marks updated successfully!

--- Student Details After change ---
Roll No: 1, Name: vivek, Age: 20
Marks: 35 35 35
Roll No: 2, Name: jadav, Age: 19
Marks: 80 80 80

--------------------------------
Process exited after 34.85 seconds with return value 0
Press any key to continue . . .
```

9. Define a class to represent a bank account. Include the following members :

DATA MEMBERS	**MEMBER FUNCTIONS**
Name of depositor	**(1) To assign initial values**
Account Number	**(2) To Deposit the amount**
Type of Account	**(3) To withdraw an amount after checking the**
Balance amount in account	**(4) To display name and balance**

Write C++ program to handle 10 customers.

// program

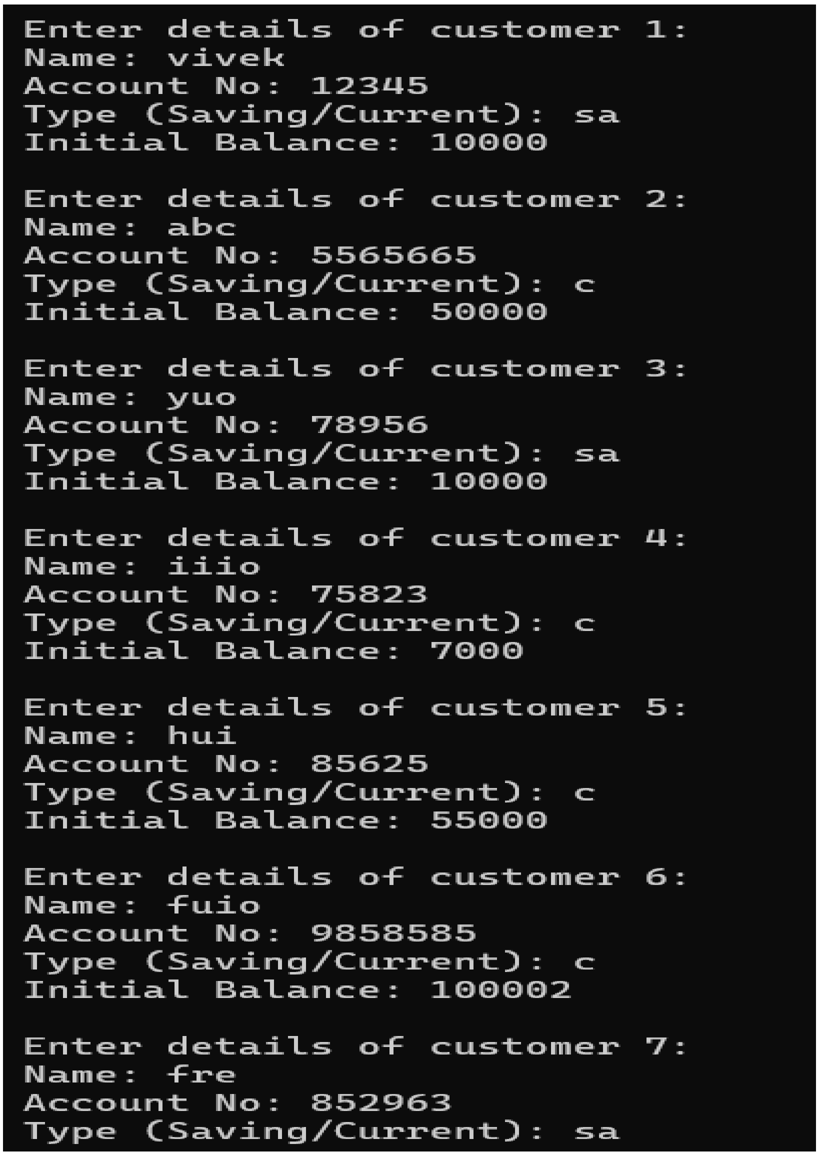
```
#include <iostream>

#include <string>

using namespace std;


class Bank {

private:

   string name;   // depositor name

   int accno;     // account number

   string type;   // account type

   float bal;     // balance


public:

   // set initial values

   void setdata(string n, int a, string t, float b) {

      name = n;
   accno = a;

   type = t;

   bal = b;

}


// deposit money

void deposit(float amt) {

   bal = bal + amt;

   cout << "Deposited: " << amt << endl;

   cout << "Balance: " << bal << endl;

}


// withdraw money

void withdraw(float amt) {

   if (amt > bal) {

      cout << "Not enough balance!" << endl;

   } else {

      bal = bal - amt;

      cout << "Withdrawn: " << amt << endl;

      cout << "Balance: " << bal << endl;

   }

}


// show account details

void display() {

   cout << "\nName: " << name;

   cout << "\nAcc No: " << accno;

   cout << "\nType: " << type;
```

```
        cout << "\nBalance: " << bal << endl;
    }

    // to search by account number
    int getAccNo() {
        return accno;
    }
};

int main() {
    Bank cust[10];  // 10 customers

    // input for 10 customers
    for (int i = 0; i < 10; i++) {
        string n, t;
        int a;
        float b;
        cout << "\nEnter details of customer " << i + 1 << ":\n";
        cout << "Name: ";
        cin.ignore();  // clear buffer
        getline(cin, n);
        cout << "Account No: ";
        cin >> a;
        cout << "Type (Saving/Current): ";
        cin >> t;
        cout << "Initial Balance: ";
        cin >> b;
        cust[i].setdata(n, a, t, b);
```

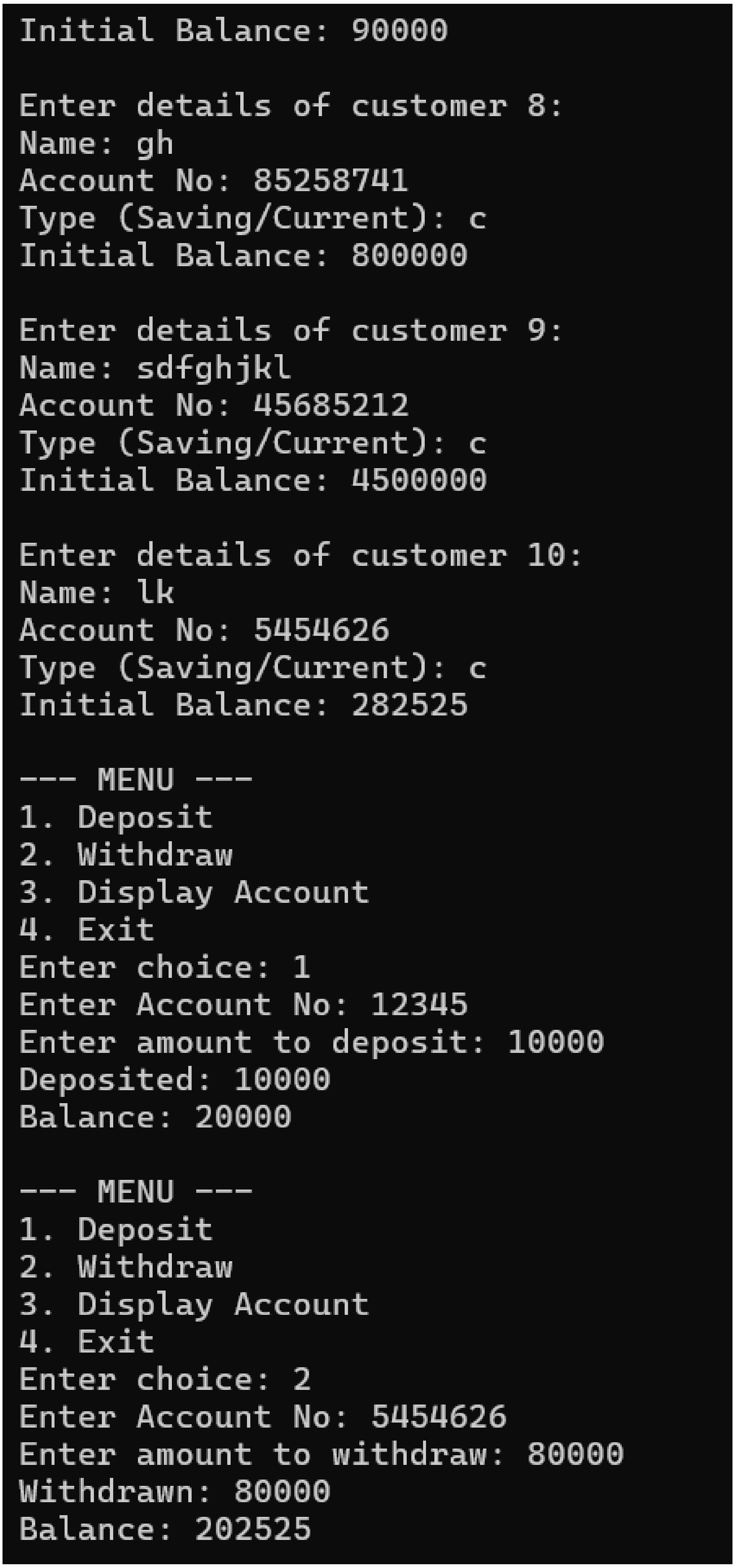
```
}

int ch, a;
do {
    cout << "\n--- MENU ---\n";
    cout << "1. Deposit\n";
    cout << "2. Withdraw\n";
    cout << "3. Display Account\n";
    cout << "4. Exit\n";
    cout << "Enter choice: ";
    cin >> ch;

    if (ch == 4) break;

    cout << "Enter Account No: ";
    cin >> a;

    // find account
    int pos = -1;
    for (int i = 0; i < 10; i++) {
        if (cust[i].getAccNo() == a) {
            pos = i;
            break;
        }
    }

    if (pos == -1) {
        cout << "Account not found!" << endl;
```

```
      continue;
    }

    switch (ch) {
    case 1: {
      float amt;
      cout << "Enter amount to deposit: ";
      cin >> amt;
      cust[pos].deposit(amt);
      break;
    }
    case 2: {
      float amt;
      cout << "Enter amount to withdraw: ";
      cin >> amt;
      cust[pos].withdraw(amt);
      break;
    }
    case 3:
      cust[pos].display();
      break;
    default:
      cout << "Invalid choice!" << endl;
    }
  } while (ch != 4);
  cout << "\nThanks for using banking system!\n";
  return 0;
}
```

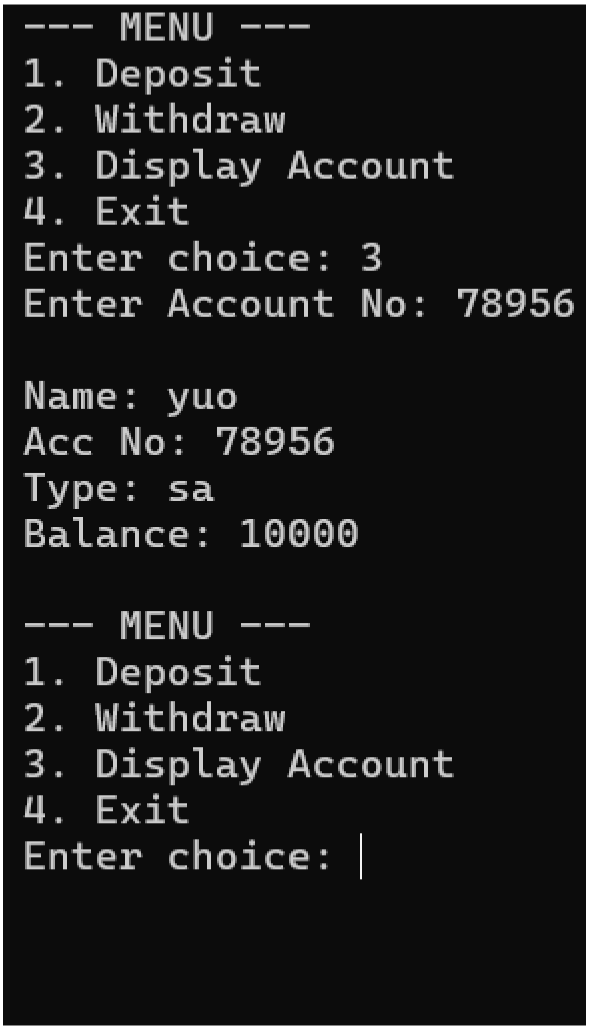
// output



```
Enter details of customer 1:
Name: vivek
Account No: 12345
Type (Saving/Current): sa
Initial Balance: 10000

Enter details of customer 2:
Name: abc
Account No: 5565665
Type (Saving/Current): c
Initial Balance: 50000

Enter details of customer 3:
Name: yuo
Account No: 78956
Type (Saving/Current): sa
Initial Balance: 10000

Enter details of customer 4:
Name: iiio
Account No: 75823
Type (Saving/Current): c
Initial Balance: 7000

Enter details of customer 5:
Name: hui
Account No: 85625
Type (Saving/Current): c
Initial Balance: 55000

Enter details of customer 6:
Name: fuio
Account No: 9858585
Type (Saving/Current): c
Initial Balance: 100002

Enter details of customer 7:
Name: fre
Account No: 852963
Type (Saving/Current): sa
```



```
Initial Balance: 90000

Enter details of customer 8:
Name: gh
Account No: 85258741
Type (Saving/Current): c
Initial Balance: 800000

Enter details of customer 9:
Name: sdfghjkl
Account No: 45685212
Type (Saving/Current): c
Initial Balance: 4500000

Enter details of customer 10:
Name: lk
Account No: 5454626
Type (Saving/Current): c
Initial Balance: 282525

--- MENU ---
1. Deposit
2. Withdraw
3. Display Account
4. Exit
Enter choice: 1
Enter Account No: 12345
Enter amount to deposit: 10000
Deposited: 10000
Balance: 20000

--- MENU ---
1. Deposit
2. Withdraw
3. Display Account
4. Exit
Enter choice: 2
Enter Account No: 5454626
Enter amount to withdraw: 80000
Withdrawn: 80000
Balance: 202525
```



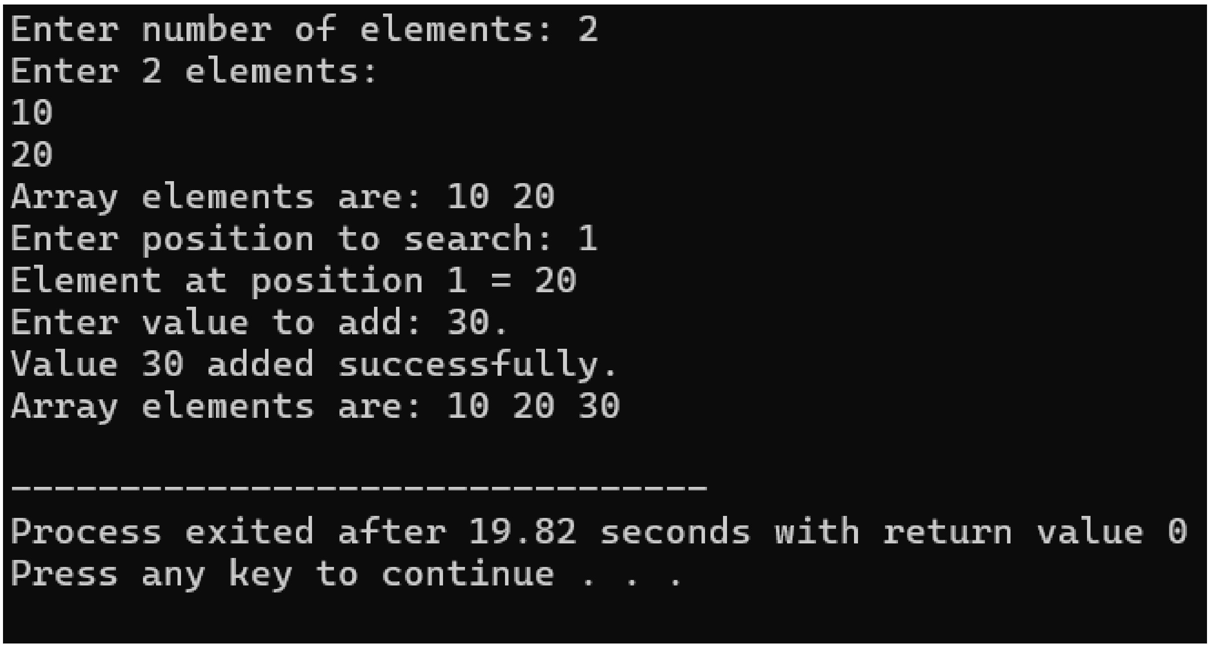
```
--- MENU ---
1. Deposit
2. Withdraw
3. Display Account
4. Exit
Enter choice: 3
Enter Account No: 78956

Name: yuo
Acc No: 78956
Type: sa
Balance: 10000

--- MENU ---
1. Deposit
2. Withdraw
3. Display Account
4. Exit
Enter choice: 
```

10. Write a program to create class 'Search' having data members (int a[ ], x) and define member functions as void input(), void output(), void search(int position), void add(int value) to display result.

// program

```
#include <iostream>
using namespace std;

class Search {
private:
  int a[50];  // array
  int n;      // size of array

public:
  // take input
  void input() {
    cout << "Enter number of elements: ";
    cin >> n;
    cout << "Enter " << n << " elements:\n";
    for (int i = 0; i < n; i++) {
      cin >> a[i];
    }
  }

  // display array
  void output() {
    cout << "Array elements are: ";
    for (int i = 0; i < n; i++) {
            cout << a[i] << " ";
        }
        cout << endl;
    }

    // search by position
    void search(int pos) {
        if (pos < 0 || pos >= n) {
            cout << "Invalid position!" << endl;
        } else {
            cout << "Element at position " << pos << " = " << a[pos] << endl;
        }
    }

    // add value at end
    void add(int value) {
        if (n < 50) {
            a[n] = value;
            n++;
            cout << "Value " << value << " added successfully." << endl;
        } else {
            cout << "Array is full! Cannot add more elements." << endl;
        }
    }
};

int main() {
    Search s;
    s.input();
    s.output();


    int pos;
    cout << "Enter position to search: ";
    cin >> pos;
    s.search(pos);


    int val;
    cout << "Enter value to add: ";
    cin >> val;
    s.add(val);


    s.output();  // show updated array


    return 0;
}
```

// output



```
Enter number of elements: 2
Enter 2 elements:
10
20
Array elements are: 10 20
Enter position to search: 1
Element at position 1 = 20
Enter value to add: 30.
Value 30 added successfully.
Array elements are: 10 20 30

--------------------------------
Process exited after 19.82 seconds with return value 0
Press any key to continue . . .
```