A
Skill Based Mini Project Report

On

COMPUTER PROGRAMMING (280122)

SUBMITTED BY

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First semester
Artificial Intelligence and Machine Learning

SUBMITTED TO

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DECLARATION

I hereby declare that the mini skill-based project for the course Computer Programming (280122) is being submitted in the partial fulfilment of the requirement for the award of **Bachelor of Technology** in **Artificial Intelligence and Machine Learning.**

All the information in this document has been obtained and presented in accordance with academic rule and ethical conduct.

Date :

Place: Gwalior

Dev jayswal
0901AM221031

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At the end, I want to thank my friends who displayed appreciation to my work and motivated me to continue my work

Dev jayswal

INDEX

Q 1. Write a program to add two numbers and display its sum.

CODE

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int a, b;
    cout << "enter first number" << endl;
    cin >> a;
    cout << "enter second number" << endl;
    cin >> b;
    cout << "the sum of these two number" << a + b << endl;
    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
enter first number
200
enter second number
100
the sum of these two number300
```

Q 2. Write a Program to calculate and display the volume of a cylinder for height and radius parameters to be input from the user.

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;

    int h, r;
    cout << "plese enter hight " << endl;
```

```
    cin >> h;
    cout << "plese enter radius " << endl;
    cin >> r;
    cout << "the volume of cylinder = " << 3.14 * r * r * h << endl;

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
plese enter hight
22
plese enter radius
10
the volume of cylinder = 6908
PS C:\Users\dev\Desktop\cpp>
```

Q 3. Write a program to realize the following expressions: a. V = u + at b. S = ut+1/2a c. T=2*a+√b+9c

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;

    int u, a, t, b, c;
    cout << "enter u " << endl;
    cin >> u;
    cout << "enter a " << endl;
    cin >> a;
    cout << "enter t " << endl;
    cin >> t;
    cout << "enter b " << endl;
    cin >> b;
    cout << "enter c " << endl;
    cin >> c;
    cout << "V=" << u + a * t << endl;
```

```
    cout << "S=" << u * t + 1 / 2 * a << endl;
    cout << "T=" << 2 * a + sqrt(b) + 9 * c << endl;

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if
 ($?) { .\tempCodeRunnerFile }
name:-dev jayswal
enroll no. 0901AM221031
enter u
6
enter a
7
enter t
5
enter b
9
enter c
4
V=41
S=30
T=53
```

Q 4. Write a program to take input of name, rollno and marks obtained by a student in 5 subjects of 100 marks each and display the name, rollno with percentage score secured.

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    string name;
    int rollno = 0, marks1 = 0, marks2 = 0, marks3 = 0, marks4 = 0, marks5 =
0;
    float total, percentage;
    cout << "enter name :-" << endl;
    getline(cin, name);
    cout << "enter roll no.:-" << endl;
    cin >> rollno;
    cout << "enter marks of subject 1" << endl;
```

```
    cin >> marks1;
    cout << "enter marks of subject 2" << endl;
    cin >> marks2;
    cout << "enter marks of subject 3" << endl;
    cin >> marks3;
    cout << "enter marks of subject 4" << endl;
    cin >> marks4;
    cout << "enter marks of subject 5" << endl;
    cin >> marks5;
    total = marks1 + marks2 + marks3 + marks4 + marks5;
    percentage = (total / 500) * 100;

    cout << "Name: " << name << endl;
    cout << "Roll Number: " << rollno << endl;
    cout << "Percentage: " << percentage << "%" << endl;

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if
 ($?) { .\tempCodeRunnerFile }
name:-dev jayswal
enroll no. 0901AM221031
enter name :-
Dev jayswal
enter roll no.:-
0031
enter marks of subject 1
98
enter marks of subject 2
97
enter marks of subject 3
94
enter marks of subject 4
93
enter marks of subject 5
89
Name: Dev jayswal
Roll Number: 31
Percentage: 94.2%
```

Q5. Write a program to swap values of two variables with and without using the third variable.

CODE

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

void swapWithThirdVariable(int &x, int &y)
```

```
{
    int temp = x;
    x = y;
    y = temp;
}

void swapWithoutThirdVariable(int &x, int &y)
{
    x = x + y;
    y = x - y;
    x = x - y;
}

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;

    int x = 5, y = 10;
    cout << "Original values: x = " << x << ", y = " << y << std::endl;

    swapWithThirdVariable(x, y);
    cout << "Values after swapping (with third variable): x = " << x << ", y =
" << y << std::endl;

    swapWithoutThirdVariable(x, y);
    cout << "Values after swapping (without third variable): x = " << x << ",
y = " << y << std::endl;

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; i
f ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
Original values: x = 5, y = 10
Values after swapping (with third variable): x = 10, y = 5
Values after swapping (without third variable): x = 5, y = 10
PS C:\Users\dev\Desktop\cpp>
```

Q6. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int x = 5;
    cout << "Original value of x: " << x << endl;

    // Unary prefix increment
    cout << "Value of x after prefix increment: " << ++x << endl;

    // Unary postfix increment
    cout << "Value of x after postfix increment: " << x++ << endl;
    cout << "New value of x after postfix increment: " << x << endl;

    // Unary prefix decrement
    cout << "Value of x after prefix decrement: " << --x << endl;

    // Unary postfix decrement
    cout << "Value of x after postfix decrement: " << x-- << endl;
    cout << "New value of x after postfix decrement: " << x << endl;

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
Original value of x: 5
Value of x after prefix increment: 6
Value of x after postfix increment: 6
New value of x after postfix increment: 7
Value of x after prefix decrement: 6
Value of x after postfix decrement: 6
New value of x after postfix decrement: 5
```

Q7. Write a program to find the largest of three numbers using ternary operators.

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int a = 5, b = 10, c = 15;
    int largest = a > b ? (a > c ? a : c) : (b > c ? b : c);
    cout << "Largest number is: " << largest << endl;
    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
Largest number is: 15
```

Q8. Write a program to find the roots of quadratic equation.

CODE

```cpp
#include <iostream>
#include <cmath>

using namespace std;

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    double a, b, c;
    double root1, root2, imaginary;
    cout << "Enter the coefficients of the quadratic equation (ax^2 + bx + c =
0): " << endl;
    cout << "enter a =" << endl;
```

```
    cin >> a;
    cout << "enter b =" << endl;
    cin >> b;
    cout << "enter c =" << endl;
    cin >> c;

    double discriminant = b * b - 4 * a * c;

    // real and different roots
    if (discriminant > 0)
    {
        root1 = (-b + sqrt(discriminant)) / (2 * a);
        root2 = (-b - sqrt(discriminant)) / (2 * a);
        cout << "Roots are real and different." << endl;
        cout << "Root 1 = " << root1 << endl;
        cout << "Root 2 = " << root2 << endl;
    }
    // real and same roots
    else if (discriminant == 0)
    {
        root1 = root2 = -b / (2 * a);
        cout << "Roots are real and same." << endl;
        cout << "Root 1 = Root 2 = " << root1 << endl;
    }
    // complex roots
    else
    {
        imaginary = sqrt(-discriminant) / (2 * a);
        root1 = -b / (2 * a);
        root2 = -b / (2 * a);
        cout << "Roots are complex and different." << endl;
        cout << "Root 1 = " << root1 << " + " << imaginary << "i" << endl;
        cout << "Root 2 = " << root2 << " - " << imaginary << "i" << endl;
    }
    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
Enter the coefficients of the quadratic equation (ax^2 + bx + c = 0):
enter a =
3
enter b =
2
enter c =
1
Roots are complex and different.
Root 1 = -0.333333 + 0.471405i
Root 2 = -0.333333 - 0.471405i
```

Q9. Write a Program to Check Whether a Number is Prime or not.

CODE

```
#include <iostream>
#include <cmath>

using namespace std;

bool isPrime(int n)
{
    if (n <= 1)
    {
        return false;
    }
    for (int i = 2; i <= sqrt(n); i++)
    {
        if (n % i == 0)
        {
            return false;
        }
    }
    return true;
}

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int num;
    cout << "enter a number which you want to cheak prime or not\n enter
number :- ";
    cin >> num;

    if (isPrime(num))
    {
        cout << num << " is a prime number" << endl;
    }
    else
    {
        cout << num << " is not a prime number" << endl;
    }

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if
 ($?) { .\tempCodeRunnerFile }
name:-dev jayswal
enroll no. 0901AM221031
enter a number which you want to cheak prime or not
 enter number :- 9
9 is not a prime number
```

Q 10. Write a program to compute the grade of students using if else ladder as per MITS norms.

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    double marks;
    cout << "Enter the marks obtained by the student: ";
    cin >> marks;

    if (marks >= 90)
    {
        cout << "Grade: A+" << endl;
    }
    else if (marks >= 80)
    {
        cout << "Grade: A" << endl;
    }
    else if (marks >= 70)
    {
        cout << "Grade: B+" << endl;
    }
    else if (marks >= 60)
    {
        cout << "Grade: B" << endl;
    }
    else if (marks >= 50)
    {
        cout << "Grade: C+" << endl;
```

```
    }
    else if (marks >= 40)
    {
        cout << "Grade: C" << endl;
    }
    else
    {
        cout << "Grade: F" << endl;
    }
    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if
 ($?) { .\tempCodeRunnerFile }
name:-dev jayswal
enroll no. 0901AM221031
Enter the marks obtained by the student: 67
Grade: B
```

Q 11. Write a program to check whether the entered year is leap year or not

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int year;
    cout << "enter year which you want to cheak \n enter year:-";
    cin >> year;
    if (year % 4 == 0)
    {
        if (year % 100 == 0)
        {
            if (year % 400 == 0)
            {
                cout << year << " is a leap year." << endl;
            }
```

```
            else
            {
                cout << year << " is not a leap year." << endl;
            }
        }
        else
        {
            cout << year << " is a leap year." << endl;
        }
    }
    else
    {
        cout << year << " is not a leap year." << endl;
    }

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
enter year which you want to cheak
 enter year:-2023
2023 is not a leap year.
```

Q 12. Write a program to print the sum of digits of a number using for loop.

CODE

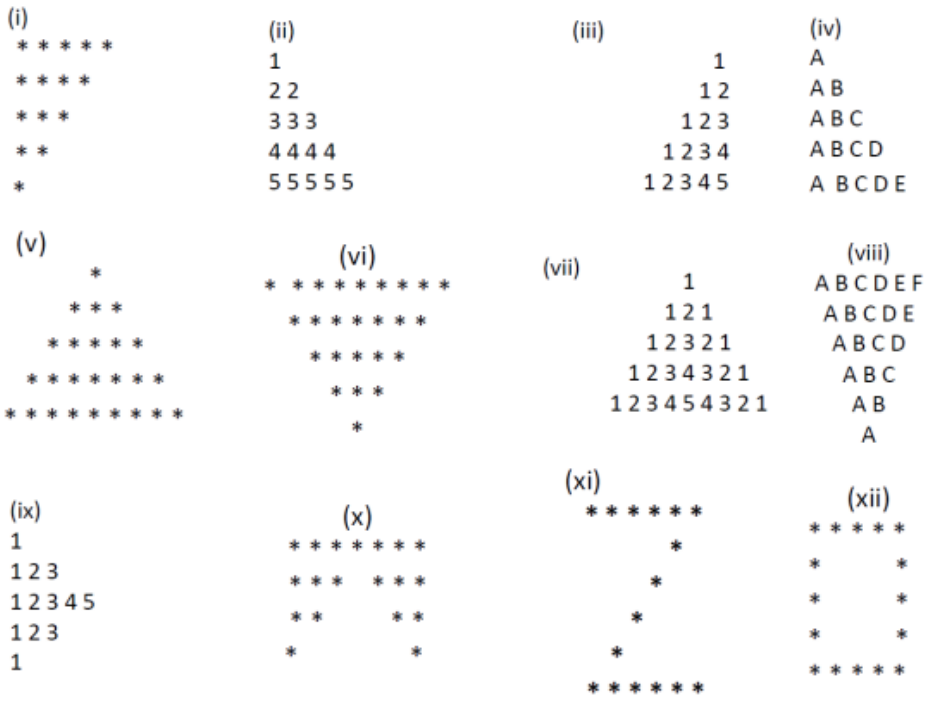
```
#include <iostream>
using namespace std;

int getSum(int n)
{
    int sum = 0;
    while (n != 0)
    {
        sum = sum + n % 10;
        n = n / 10;
    }
```

```
    return sum;
}

int main()
{

    int n;
    cout << "enter a number:- " << endl;
    cin >> n;

    cout << getSum(n);
    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if
 ($?) { .\tempCodeRunnerFile }
enter a number:-
657
18
PS C:\Users\dev\Desktop\cpp>
```

Q 13 Write a program to display the following pattern using for loops.



(I) CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    for (int i = 5; i >= 1; i--)
    {
        for (int j = 1; j <= i; j++)
        {
            cout << "*";
        }
        cout << endl;
    }

    return 0;
}
```

OUTPUT

```
PS C:\Users\dev\Desktop\cpp> cd "c:\Users\dev\Desktop\cpp\" ; if ($?) { g++ qns17.cpp -o qns17 } ; if ($?) { .\qns17 }
name:-dev jayswal
enroll no. 0901AM221031
*****
****
***
**
*
```

(II) CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    for (int i = 1; i <= 5; i++)
    {
        for (int j = 1; j <= i; j++)
        {
            cout << i;
        }
```

```
        cout << endl;
    }

    return 0;
}
```

(III)CODE

```
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    for (int i = 1; i <= 5; i++)
    {
        for (int j = 1; j <= i; j++)
        {
            cout << j;
        }
        cout << endl;
    }

    return 0;
}
```

(IV)CODE

```
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    for (int i = 1; i <= 5; i++)
    {
        for (int j = 'A'; j < 'A' + i; j++)
        {
            cout << (char)j;
        }
        cout << endl;
    }
```

```
    return 0;
}
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int n = 5; // number of rows in the triangle
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j <= n - i; j++)
        {
            cout << " ";
        }
        for (int j = 1; j <= 2 * i - 1; j++)
        {
            cout << "*";
        }
        cout << endl;
    }
    return 0;
}
```

(VI)CODE

```
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int n = 5; // number of rows in the triangle
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j <= i; j++)
        {
            cout << " ";
        }
        for (int j = 1; j <= 2 * (n - i) - 1; j++)
        {
            cout << "*";
        }
        cout << endl;
    }
    return 0;
}
```

(VII)CODE

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int n = 5; // number of rows in the triangle
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j <= n - i; j++)
        {
            cout << " ";
        }
        for (int j = 1; j <= i; j++)
        {
            cout << j;
        }
        for (int j = i - 1; j >= 1; j--)
        {
            cout << j;
        }
        cout << endl;
    }
    return 0;
}
```

(VIII)CODE

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int n = 6; // number of rows in the triangle
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j <= i; j++)
        {
            cout << " ";
        }
        for (int j = 'A'; j < 'A' + n - i; j++)
        {
            cout << (char)j;
        }
```

```
        cout << endl;
    }
    return 0;
}
```

(IX)CODE

```
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int n = 4; // number of rows in the pattern
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j <= i; j++)
        {
            cout << j;
        }
        for (int j = i - 1; j >= 1; j--)
        {
            cout << j;
        }
        cout << endl;
    }
    return 0;
}
```

(X)CODE

```
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int n = 7; // number of rows in the pattern
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j <= n - i; j++)
        {
            cout << " ";
        }
        for (int j = 1; j <= i; j++)
        {
            cout << "*";
```

```
        }
        for (int j = 1; j <= n - i; j++)
        {
            cout << " ";
        }
        cout << endl;
    }
    return 0;
}
```

(XI)CODE

```
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int n = 7; // number of rows in the pattern
    for (int i = 1; i <= n; i++)
    {
        if (i == 1 || i == n)
        {
            for (int j = 1; j <= n; j++)
            {
                cout << "*";
            }
        }
        else
        {
            for (int j = 1; j <= n; j++)
            {
                if (j == n - i + 1)
                {
                    cout << "*";
                }
                else
                {
                    cout << " ";
                }
            }
        }
        cout << endl;
    }
    return 0;
}
```

(XII)CODE

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int width = 5, length = 5;
    for (int i = 1; i <= length; i++)
    {
        for (int j = 1; j <= width; j++)
        {
            if (i == 1 || i == length || j == 1 || j == width)
            {
                cout << "*";
            }
            else
            {
                cout << " ";
            }
        }
        cout << endl;
    }
    return 0;
}
```

14. Write a program to calculate factorial of a number using recursion.

CODE

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

int fact(int n)
{
    if (n <= 1)
        return 1;
    else
        return n * fact(n - 1);
}

int main()
{
    cout << "name:-dev jayswal" << endl
```

```
         << "enroll no. 0901AM221031" << endl;
    int num;
    cout << "enter a number  ";
    cin >> num;
    cout << "factorial=" << fact(num);
    return 0;
}
```

OUTPUT

15. Write a program to add two matrices of the same order.

CODE

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

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    int rows, columns;
    cout << "Enter the number of rows and columns of the matrices:-" << endl;
    cin >> rows >> columns;

    int matrix1[rows][columns], matrix2[rows][columns];

    cout << "Enter the elements of matrix 1:" << endl;
    for (int i = 0; i < rows; i++)
    {
        for (int j = 0; j < columns; j++)
        {
            cin >> matrix1[i][j];
        }
    }

    cout << "Enter the elements of matrix 2:" << endl;
    for (int i = 0; i < rows; i++)
    {
        for (int j = 0; j < columns; j++)
        {
            cin >> matrix2[i][j];
        }
    }

    cout << "The sum of the matrices is:" << endl;
    for (int i = 0; i < rows; i++)
```

```
    {
        for (int j = 0; j < columns; j++)
        {
            cout << matrix1[i][j] + matrix2[i][j] << " ";
        }
        cout << endl;
    }

    return 0;
}
```

OUTPUT

16. Write a program to add two complex numbers, use structure data-type to represent complex numbers.

CODE

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

struct Complex
{
    double real;
    double imag;
};

Complex add(Complex a, Complex b)
{
    Complex result;
    result.real = a.real + b.real;
    result.imag = a.imag + b.imag;
    return result;
}

int main()
{
    cout << "name:-dev jayswal" << endl
         << "enroll no. 0901AM221031" << endl;
    Complex c1, c2, c3;
    cout << "enter real part of first  complex number ";
    cin >> c1.real;
    cout << "enter imaginary part of first  complex number ";
    cin >> c1.imag;
    cout << "enter real part of second  complex number ";
```

```
    cin >> c2.real;
    cout << "enter imaginary part of second  complex number ";
    cin >> c2.imag;
    c3 = add(c1, c2);
    cout << "the sum of these two complex number is " << endl;
    cout << c3.real << " + " << c3.imag << "i" << endl;
    return 0;
}
```

OUTPUT

17. Write a program to create 10 objects of a student class containing the student's name, ID, Semester and CGPA as data members, and getDetails(), setDetails() as member functions. The class should also contain static variables which keep track of the student with maximum CGPA in each semester. The class should also contain a constructor to initialize the data members.

CODE

OUTPUT