AIM–To perform algebra of matrix:
Addition,Subtraction,Multiplication,Transpose

ALGORITHM–

1.start
2.Enter no of rows and columns
3.enter elements of rows and columns i.e

```
for(i=0;i<rows;i++)
 { for(j=0;j<columns;j++)
     {enter a[i][j] & b[i][j]
      }
  }
```

ADDITION

```
for(i=0;i<rows;i++)
 {
   for(j=0;j<columns;j++)
   {
     sum[i][j]=a[i][j]+b[i][j];
    }
 }
```

SUBTRACTION

```
for(i=0;i<rows;i++)
 {
   for(j=0;j<columns;j++)
   {
     sub[i][j]=a[i][j]-b[i][j];
    }
 }
```

MULTIPLICATION

```
if(r==c)
{ for(i=0;i<rows;i++)
  {
    for(j=0;j<columns;j++)
    {
      mul[i][j]=0;
      mul[i][j]+=a[i][j]+b[j][i];
     }
  }
}
```

TRANSPOSE

```
for(i=0;i<rows;i++)
 {
   for(j=0;j<columns;j++)
   {
     a[i][j]=b[j][i];
    } }
```

CODE-

```
#include<iostream>
using namespace std;
int main()
{
int a[5][5],b[5][5],c[5][5],sum,r1,c1,r2,c2,i,j,k,choice;
cout<<"Enter rows and columns of first matrix:";
cin>>r1>>c1;
cout<<"Enter rows and columns of second matrix:";
cin>>r2>>c2;
cout<<"\nEnter first matrix:\n";
for(i=0;i<r1;++i)
{
for(j=0;j<c1;++j)
{
cin>>a[i][j];
}
}
cout<<"\nEnter second matrix:\n";
for(i=0;i<r2;++i)
{
for(j=0;j<c2;++j)
{
cin>>b[i][j];
}
}
do
{
cout << "Matrix operations\n1: Addition\n2: Subtract\n3: Multiply\n4: Transpose\n5: Exit\
nEnter your choice :";
switch (choice)
{
case 1:
for(i=0;i<r1;++i)
{
for(j=0;j<c1;++j)
{
c[i][j]=a[i][j]+b[i][j];
}
}
cout<<"Addition of the two matrices is:\n";
for(i=0; i<r1; ++i)
{
for(j=0; j<c1; ++j)
{
cout<<c[i][j]<<" ";
}
cout<<"\n";
}
break;
case 2:
for(i=0; i<r1; i++)
{
for(j=0; j<c1; j++)
{
```

```
c[i][j]=a[i][j]-b[i][j];
}
}
cout<<"Subtraction of the two matrices is :\n";
for(i=0; i<r1; i++)
{
for(j=0; j<c1; j++)
{
cout<<c[i][j]<<" ";
}
cout<<"\n";
}
break;
case 3:
for(i=0; i<r1; i++)
{
for(j=0; j<c1; j++)
{
sum=0;
for(k=0; k<r1; k++)
{
sum = sum + a[i][k] * b[k][j];
}
c[i][j] = sum;
}
}
cout<<"\nMultiplication of two Matrices : \n";
for(i=0; i<r1; i++)
{
for(j=0; j<c1; j++)
{
cout<<c[i][j]<<" ";
}
cout<<"\n";
}
break;
case 4:
for(i=0; i<r1; i++)
{
for(j=0; j<c1; j++)
{
c[i][j]=a[j][i];
}
}
cout<<"Transpose of the Matrix is :\n";
for(i=0; i<r1; i++)
{
for(j=0; j<c1; j++)
{
cout<<c[i][j];
}
cout<<"\n";
}
break;
case 5:
break;
```

```
default:
cout << "Invalid input" << endl;
}
}while (choice != 5);
}
```

OUTPUT -

Addition–

```
Enter rows and columns of first matrix:2
2
Enter rows and columns of second matrix:2
2

Enter first matrix:
1
3
5
7

Enter second matrix:
2
4
6
8
Matrix operations
1: Addition
2: Subtract
3: Multiply
4: Transpose
5: Exit
Enter your choice :1
Addition of the two matrices is:
3 7
11 15
```

SUBTRACTION–

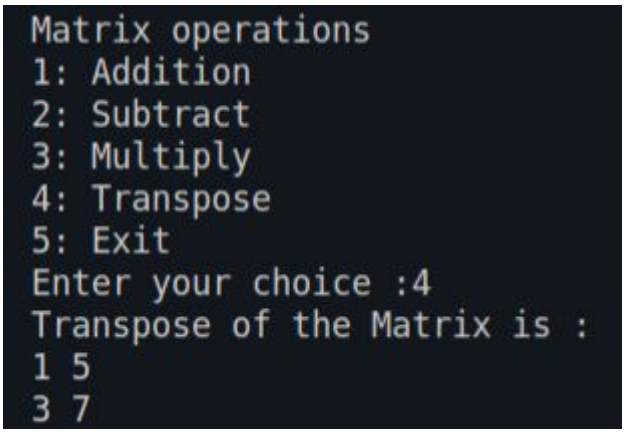
```
Matrix operations
1: Addition
2: Subtract
3: Multiply
4: Transpose
5: Exit
Enter your choice :2
Subtraction of the two matrices is :
-1 -1
-1 -1
```

```
Matrix operations
1: Addition
2: Subtract
3: Multiply
4: Transpose
5: Exit
Enter your choice :3

Multiplication of two Matrices :
20 28
52 76
```

MULTIPLICATION–

TRANSPOSE-


Matrix operations
1: Addition
2: Subtract
3: Multiply
4: Transpose
5: Exit
Enter your choice :4
Transpose of the Matrix is :
1 5
3 7