|  |  |
| --- | --- |
| **Name** | **Hatim Yusuf Sawai** |
| **UID no.** | **2021300108** |
| **Experiment No.** | 6 |

|  |  |
| --- | --- |
| **AIM:** |  |
| **Program 1** | |
| **PROBLEM STATEMENT:** | Write a program to perform Matrix Addition, Subtraction, Multiplication, Transpose of Matrix and Norm of Matrix. Dimensions of matrices will be decided by user. |
| **ALGORITHM:** |  |
| **FLOWCHART:** |  |
| **PROGRAM:** | #include <stdio.h>  #include <math.h>  void add\_mat(int m, int n, int mat1[m][n], int a, int b, int mat2[a][b])  {      for(int i=0;i<m;i++)      {          for(int j=0;j<n;j++)              printf("%d ",mat1[i][j]+mat2[i][j]);          printf("\n");      }  }  void sub\_mat(int m, int n, int mat1[m][n], int a, int b, int mat2[a][b])  {      for (int i = 0; i < m; i++)      {          for (int j = 0; j < n; j++)              printf("%d ", mat1[i][j] - mat2[i][j]);          printf("\n");      }  }  void print\_mat(int m,int n,int mat[m][n])  {      for(int i=0;i<m;i++)      {          for(int j=0;j<n;j++)              printf("%d ",mat[i][j]);          printf("\n");      }  }  void zero\_mat(int m, int n,int mat[m][n])  {      for (int i = 0; i < m; i++)      {          for (int j = 0; j < n; j++)              mat[i][j] = 0;      }  }  void mul\_mat(int m, int n, int mat1[m][n], int a, int b, int mat2[a][b])  {      int mat3[m][b];      zero\_mat(m,b,mat3);      for(int i=0;i<m;i++)      {          for(int j=0;j<b;j++)          {              for(int k=0;k<n;k++)                  mat3[i][j]+=mat1[i][k]\*mat2[k][j];          }      }      print\_mat(m,b,mat3);  }  void trans\_mat(int m,int n, int mat[m][n])  {      int mat3[n][m];      for (int i=0;i<n;i++)      {          for (int j=0;j<m;j++)              mat3[i][j] = mat[j][i];      }      print\_mat(n,m,mat3);  }  int frob\_norm(int m,int n,int mat[m][n])  {      float fr=0;      for(int i=0;i<m;i++)      {          for(int j=0;j<n;j++)              fr+= mat[i][j] \* mat[i][j];      }      return fr;  }  int main()  {      int m, n, a, b, i, j;      printf("Enter dimensions of Matrix 1:\n");      scanf("%d %d", &m, &n);      int mat1[m][n];      printf("Enter elements of Matrix 1:\n");      for (i = 0; i < m; i++)      {          for (j = 0; j < n; j++)              scanf("%d", &mat1[i][j]);      }      printf("Enter dimensions of Matrix 2:\n");      scanf("%d %d", &a, &b);      int mat2[a][b];      printf("Enter elements of Matrix 2:\n");      for (i = 0; i < m; i++)      {          for (j = 0; j < n; j++)              scanf("%d", &mat2[i][j]);      }      if(m==a && n==b)      {          printf("Additon of Matrices:\n");          add\_mat(m, n, mat1, a, b, mat2);          printf("Subtraction of Matrices:\n");          sub\_mat(m, n, mat1, a, b, mat2);      }      else          printf("Dimensions should be the same for addition & subtraction\n");      if(n==a)      {          printf("Multiplication of Matrices:\n");          mul\_mat(m, n, mat1, a, b, mat2);      }      else          printf("Multiplication is not possible");      printf("Transpose of Matrix 1:\n");      trans\_mat(m, n, mat1);      printf("Transpose of Matrix 2:\n");      trans\_mat(a, b, mat2);      printf("Frobenius Norm of Matrix 1 = %f\n",sqrt(frob\_norm(m,n,mat1)));      printf("Frobenius Norm of Matrix 2 = %f\n",sqrt(frob\_norm(a,b,mat2)));      return 0;  } |
| **RESULT:** | |
| **Program 2** | |
| **PROBLEM STATEMENT:** | Write a program which reads the current year followed by N followed by a list of N employee numbers and their current ages. Produce a list showing the years in which the employees retire (become 65 years old). If more than one employee retires in a given year then include them all under the same heading. |
| **ALGORITHM:** |  |
| **FLOWCHART:** |  |
| **PROGRAM:** | #include<stdio.h>  void print\_emp(int n, int emp[n][2])  {      printf("Ret Year    Emp No.\n");      for (int i=0;i<n;i++)      {          if (i!= 0 && emp[i][0]==emp[i-1][0])              printf("            %d\n", emp[i][1]);          else              printf("%d        %d\n", emp[i][0], emp[i][1]);      }  }  void selectionsort(int n, int emp[n][2])  {      int min,temp1,temp2;      for (int i = 0; i < n - 1; i++)      {          min = i;          for (int j = i + 1; j < n; j++)          {              if (emp[j][0] < emp[min][0])              {                  min = j;              }          }          temp1 = emp[min][0];          emp[min][0] = emp[i][0];          emp[i][0] = temp1;          temp2 = emp[min][1];          emp[min][1] = emp[i][1];          emp[i][1] = temp2;      }      print\_emp(n,emp);  }  int main()  {      int cy,n,i,j,ra;      printf("Enter the Current Year:\n");      scanf("%d",&cy);      printf("Enter Retirement Age:\n");      scanf("%d", &ra);      printf("Enter number of entries:\n");      scanf("%d",&n);      int ret\_emp[n][2];      for(i=0;i<n;i++)      {          printf("Enter Employee number & current age: ");          scanf("%d %d", &ret\_emp[i][1], &ret\_emp[i][0]);          ret\_emp[i][0] = cy + ra - ret\_emp[i][0];      }      selectionsort(n,ret\_emp);      return 0;  } |
| **RESULT:** | |
| **Program 3** | |
| **PROBLEM STATEMENT:** |  |
| **ALGORITHM:** |  |
| **FLOWCHART:** |  |
| **PROGRAM:** |  |
| **RESULT:** | |
| **Program 4** | |
| **PROBLEM STATEMENT:** |  |
| **ALGORITHM:** |  |
| **FLOWCHART:** |  |
| **PROGRAM:** |  |
| **RESULT:** | |
| **Program 5** | |
| **PROBLEM STATEMENT:** |  |
| **ALGORITHM:** |  |
| **FLOWCHART:** |  |
| **PROGRAM:** |  |
| **RESULT:** | |
| **CONCLUSION:** |  |