

## Felipe Guth - 14210231

## I Matrix Multiplication

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//Felipe Guth - 14210231 - C Code
//to compile on linux execute the following: gcc matrixMultiplication.c -o exec -lm
// then execute: ./exec

#include<stdlib.h>
#include<math.h>
#include<stdio.h>

#define MAX 50

//Read Matrix
void readmatrix(int Mat[MAX][MAX],int row,int col, char name[10])
{
int i, j;
printf("\n\n\t\t\t\t\tEnter the elements of Matrix  %s:\n", name);
for( i= 0; i<=row-1; i++)
for( j= 0; j<=col-1; j++)
{
printf ("\n\t\t\t\t\t%s[%d][%d]:" ,name, i, j);
scanf("%d", &Mat[ i ][ j ]);
}
}

// MULTIPLICATION A X B
void multiplica (int Mata[MAX][MAX], int Matb[MAX][MAX], int ria, int colarib, int colb)
{
int i=0,j=0,k=0;
int C[MAX][MAX];
for(i=0;i<ria;i++)
{
for(j=0;j<colb;j++)
{
C[i][j] = 0;
for(k=0;k<colarib;k++)
{
C[i][j] = C[i][j] + Mata[i][k]*Matb[k][j];
}
}
}
for( i=0; i<colarib; i++)
for( k=0; k<ria; k++)
printf ("\n Multiplication Result: C[%d][%d]=%d\n",i,k,C[i][k]);
printf("\n\n");
getchar();
}

main (void) //MAIN MENU *****
{
//Declare variables
{
int A[MAX][MAX],B[MAX][MAX], coluarowsb=0, rowsa=0, colub=0;

printf("\n\n\t\t\t\t\tEnter the number of rows of matrix A: ");
scanf("%d",&rowsa);
printf("\n\n\t\t\t\t\tEnter the number of columns of matrix A and rows of matrix B:");
scanf("%d",&coluarowsb);
printf("\n\n\t\t\t\t\tEnter the number of columns of matrix B:");
scanf("%d",&colub);
readmatrix(A,rowsa,coluarowsb,"A");
}
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        readmatrix(B,coluarowsb,colub,"B");
        multiplica(A,B,rowsa,coluarowsb,colub);

}

```

## II Dissimilarity Matrix

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//Felipe Guth - 14210231 - C Code
//to compile on linux execute the following: gcc dissimilarityMatrix.c -o exec -lm
// then execute: ./exec

#include<stdlib.h>
#include<math.h>
#include<stdio.h>

#define MAX 10

//Read Matrix
void readmatrix(int Mat[MAX][MAX],int row,int col, char name[10])
{
    int i, j;
    printf("\n\n          Enter the elements of Matrix  %s:\n", name);
    for( i= 0; i<=row-1; i++)
        for( j= 0; j<=col-1; j++)
        {
            printf ("\n          %s[%d][%d]:", name, i, j);
            scanf("%d", &Mat[ i ][ j ]);
        }
}

main()
{
    int A[MAX][MAX] = {{0}}, n=0, p=0, no=1,ne=0, aux=0, val=0,cont=0, i=0, j=0;
    float vet[MAX]={0}, D[MAX][MAX]={0};

    printf("\n\n          Enter the number of objects of : )");
    scanf("%d",&n);
    printf("\n\n          Enter the number of dimensions of each object: )");
    scanf("%d",&p);

    readmatrix(A,n,p,"A");

    //calculate the dissimilarity vector
    for(no=1;no<n;no++)
    {
        for(aux=0;aux!=no;aux++)
        {
            val = 0;
            for(ne=0;ne<=p-1;ne++)
            {
                val = val + (A[no][ne]-A[aux][ne])*(A[no][ne]-A[aux][ne]);
            }
            vet[cont] = sqrt(val);
            cont++;
        }
    }
}

```

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    }
}

//build dissimilarity matrix
cont = 0;
for(i=1;i<=n;i++)
{
    for(j=0;j!=i;j++)
    {
        D[i][j] = vet[cont];
        cont++;
    }
}

//Show matrix
for( i=0; i<n; i++)
    for( j=0; j<n; j++)
        printf ("\n Dissimilarity Result: D[%d][%d]= %.2f \n",i,j,D[i][j]);
printf("\n");
getchar();

} //end

```