Name: Antarin Ghosal

Ha 5.6

```c
/*Author : Antarin Ghosal
Program :WAP to find out the sum of the secondary diagonal elements of a matrix.*/


#include<stdio.h>

int main(){
    int arr1[3][3]={{1,2,3},{4,5,6},{7,8,9}},i,j,sum=0;

    for(i=0;i<3;i++){
            sum+=arr1[i][3-i-1];
    }

    printf("%d",sum);

    return 0;
}
```

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15
```

Ha 5.7

```c
/*Author : Antarin Ghosal
Program : WAP to check whether a given matrix is symmetric or not.*/


#include<stdio.h>

int main(){
    int arr1[10][10],i,j,m,n,arr2[10][10],flag;

    printf("Enter the number of rows : ");
    scanf("%d",&m);

    printf("Enter the number of coloumns : ");
    scanf("%d",&n);

    //takes input
```

```
    for(i=0;i<m;i++){
        for(j=0;j<n;j++){
            printf("Enter the [%d][%d] element : ",i,j);
            scanf("%d",&arr1[i][j]);
        }
    }

    //finds transpose
    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            arr2[j][i]=arr1[i][j];
        }
    }

    //checks for symmetric
    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            if(arr1[i][j]==arr2[i][j])
                flag=1;
            else flag=0;
        }
    }

    if(flag==1){
        printf("The given matrix is Symmetric !!");
    }
    else{
        printf("The given matrix is NOT symmetric.");
    }

    return 0;
}
```

```
Enter the number of rows : 3
Enter the number of coloumns : 3
Enter the [0][0] element : 1
Enter the [0][1] element : 2
Enter the [0][2] element : 3
Enter the [1][0] element : 4
Enter the [1][1] element : 5
Enter the [1][2] element : 6
Enter the [2][0] element : 7
Enter the [2][1] element : 8
Enter the [2][2] element : 9
The given matrix is NOT symmetric.
```

```
Enter the number of rows : 2
Enter the number of coloumns : 2
Enter the [0][0] element : 1
Enter the [0][1] element : 2
Enter the [1][0] element : 2
Enter the [1][1] element : 1
The given matrix is Symmetric !!
```

Ha 5.8

```c
/*Author : Antarin Ghosal
Program : WAP to check whether a given matrix is orthogonal or not.*/


#include<stdio.h>

int main(){
    int arr1[10][10],i,j,m,n,arr2[10][10],mularr[10][10],iarr[10][10],flag;

    printf("Enter the number of rows : ");
    scanf("%d",&m);

    printf("Enter the number of coloumns : ");
    scanf("%d",&n);

    //creating identity matrix
    for(i=0;i<m;i++){
        for(j=0;j<n;j++){
            if(i==j)
                iarr[i][i]=1;
            else iarr[i][j]=0;
        }
    }


    //takes input
    for(i=0;i<m;i++){
        for(j=0;j<n;j++){
            printf("Enter the [%d][%d] element : ",i,j);
            scanf("%d",&arr1[i][j]);
        }
    }

    //finds transpose
    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            arr2[i][j]=arr1[j][i];
        }
    }

    //multiplying A and At.
    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            mularr[i][j]=arr1[j][i]*arr2[i][j];
        }
    }

    //checking if A*At=I or not
    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            if(mularr[i][j]==iarr[i][j])
                flag=0;
            else flag=1;
        }
```

```
    }

    if(flag==1){
        printf("The given matrix is Orthogonal !!");
    }
    else{
        printf("The given matrix is NOT orthogonal.");
    }

    return 0;
}
```

```
Enter the number of rows : 3
Enter the number of coloumns : 3
Enter the [0][0] element : 1
Enter the [0][1] element : 23
Enter the [0][2] element : 24
Enter the [1][0] element : 25
Enter the [1][1] element : 6
Enter the [1][2] element : 7
Enter the [2][0] element : 8
Enter the [2][1] element : 9
Enter the [2][2] element : 10
The given matrix is Orthogonal !!
```

```
Enter the number of rows : 2
Enter the number of coloumns : 2
Enter the [0][0] element : 1
Enter the [0][1] element : 2
Enter the [1][0] element : 3
Enter the [1][1] element : 3
The given matrix is Orthogonal !!
```

La 5.7

```
/*Author : Antarin Ghosal
Program : WAP to find out the sum of the elements stored in a matrix.*/


#include<stdio.h>

int main(){
    int i,j,arr[3][3]={1,2,3,4,5,6,7,8,9},sum=0;

    for (i=0;i<3;i++){
        for (j=0;j<3;j++){
            sum+=arr[i][j];
        }
    }

    printf("%d",sum);

    return 0;
}
```

La 5.8

```c
/*Author : Antarin Ghosal
Program : WAP to find out the transpose of a given matrix.*/


#include<stdio.h>

int main(){
    int i,j,arr2[3][3];
    int arr1[3][3]={{1,2,3},{4,5,6},{7,8,9}};

    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            arr2[i][j]=arr1[j][i];
        }
    }

    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            printf("%d ",arr2[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

```
1 4 7
2 5 8
3 6 9
```

Sa 6.5

```c
/*Author : Antarin Ghosal
Program : WAP to add two matrices and display it.*/


#include<stdio.h>

int main(){
    int arr1[3][3]={{1,2,3},{4,5,6},{7,8,9}};
```

```
    int arr2[3][3]={{9,8,7},{6,5,4},{3,2,1}};
    int sumarr[3][3],i,j;

    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            sumarr[i][j]=arr1[i][j]+arr2[i][j];
        }
    }

    for(i=0;i<3;i++){
        for(j=0;j<3;j++){
            printf("%d ",sumarr[i][j]);
        }
    printf("\n");
    }

    return 0;
}
```

```
10 10 10
10 10 10
10 10 10
```

Sa 6.6

```
/*Author: Antarin Ghosal
Program: WAP to multiply two matrices and display it.*/

#include<stdio.h>
int main()
{
    int r,c,a[100][100],b[100][100],d[100][100];
    int i,j,k,sum,e;
    printf("Enter the number of rows:");
    scanf("%d",&r);
    printf("\nEnter the number of columns:");
    scanf("%d",&c);


    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            printf("\nEnter a[%d][%d]:",i,j);
            scanf("%d",&a[i][j]);
        }
    }

    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
```

```
            printf("\nEnter b[%d][%d]:",i,j);
            scanf("%d",&b[i][j]);
        }
    }

    for(i=0;i<r;i++){
        for(j=0;j<c;j++)
        {
            sum=0;
            e=1;
            for(k=0;k<c;k++)
            {
                e=a[i][k]*b[k][j];
                printf("%d",e);
                sum+=e;
            }
            d[i][j]=sum;
            sum=0;
        }
    }

    printf("\nThe multiplication of the two matrix is:\n");

    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            printf("%d  ",d[i][j]);
        }
        printf("\n");
    }


    return 0;
}
```

```
The multiplication of the two matrix is:
84  90  96
201  216  231
318  342  366
```

```
The multiplication of the two matrix is:
9  12
9  12
```

Sa 6.7

```
/*Author : Antarin Ghosal
```

```c
/*Program : WAP to find the Trace(sum of the diagonal element) of a given mxn matrix.*/


#include<stdio.h>

int main(){
int arr1[3][3]={{1,2,3},{4,5,6},{7,8,9}},i,j,sum=0;

    for(i=0;i<3;i++){
            sum+=arr1[i][i];
    }

    printf("%d",sum);

    return 0;
}
```

```
15
```