**Program 1:Orthogonal Matrix**

**package** com.msc.basic;

**import** java.io.BufferedReader;

**import** java.io.IOException;

**import** java.io.InputStreamReader;

**public** **class** OrthogonalMatrix {

**static** **boolean** isOrthogonal(**int** [][]a,**int** n,**int** m)

{

**if**(n!=m)

**return** **false**;

**int** [][]trans =**new** **int**[m][m];

**for**(**int** i=0;i<n;i++)

**for**(**int** j=0;j<n;j++)

trans[i][j]=a[j][i];

**int** [][]product=**new** **int**[n][n];

**for**(**int** i=0;i<n;i++)

{

**for**(**int** j=0;j<n;j++)

{

**int** sum=0;

**for**(**int** k=0;k<n;k++) {

sum=sum+(a[i][k]\*a[j][k]);

}

product[i][j]=sum;

}

}

**for**(**int** i=0;i<n;i++)

{

**for**(**int** j=0;j<n;j++)

{

**if**(i!=j && product[i][j]!=0)

**return** **false**;

**if**(i==j && product[i][j]!=1)

**return** **false**;

}

}

**return** **true**;

}

**public** **static** **void** main(String[] args)**throws** IOException {

**int** n,m;

BufferedReader num=**new** BufferedReader(**new** InputStreamReader(System.***in***));

System.***out***.println("Enter a number of rows");

n=Integer.*parseInt*(num.readLine());

System.***out***.println("Enter a number of columns");

m=Integer.*parseInt*(num.readLine());

**int** [][]a = **new** **int**[n][m];

**for**(**int** i=0;i<n;i++)

{

**for**(**int** j=0;j<m;j++)

{

a[i][j]=Integer.*parseInt*(num.readLine());

}

}

System.***out***.println("Entered matrix is:");

**for**(**int** i=0;i<n;i++)

{

**for**(**int** j=0;j<m;j++)

{

System.***out***.print(a[i][j]+"\t");

}

System.***out***.print("\n");

}

**if**(*isOrthogonal*(a,n,m))

{

System.***out***.println("It is orthogonal matrix");

}

**else** {

System.***out***.println("It is not a orthogonal matrix");

}

}

}

OUTPUT:



