***Program 4:* *Printing Pattern***

***Question***

***Write a C Program to display the following by reading the number of rows as input***

***1***

***1 2 1***

***1 2 3 2 1***

***1 2 3 4 3 2 1***

**#include<stdio.h>**

**int main()**

**{**

**int i,j,k,l,n;**

**printf ("Enter th no:\n");**

**scanf("%d",&n);**

**for(i=1;i<=n;i++)**

**{**

**for(k=n;k>=i;k--)**

**printf(" ");**

**for(j=1;j<=i;j++)**

**printf("%d",j);**

**for(l=j-2;l>0;l--)**

**printf("%d",l);**

**if(l<0)**

**printf(" ");**

**printf("\n");**

**}**

**return 0;**

**}**

***Program 5:* *Binary Search***

***Question***

***Implement Binary Search on Integers.***

**#include<stdio.h>**

**#include<stdlib.h>**

**int main()**

**{**

**int arr[10],num,i,n,mid,low,high,found=0,pos= -1;**

**printf("\n Enter the number of elements in array:\n");**

**scanf("%d",&n);**

**printf("\nenter the elements:\n");**

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

**{**

**scanf("%d",&arr[i]);**

**}**

**printf("\n enter the element that has to be searched:\n");**

**scanf("%d",&num);**

**low=0,high=n-1;**

**while(low<=high)**

**{**

**mid=(low+high)/2;**

**if(arr[mid]==num)**

**{**

**printf("\n %d is found at position: %d\n",num,mid);**

**found=1;**

**break;**

**}**

**else if(arr[mid]>num)**

**{**

**high=mid-1;**

**}**

**else**

**{**

**low=mid+1;**

**}**

**}**

**if (low > high && found==0)**

**printf("\n %d does not exist in the array ",num);**

**return 0;**

**}**

***Program 6:* *Matrix Multiplication***

***Question***

***Implement Matrix multiplication and validate the rules of multiplication.***

**#include<stdio.h>**

**#include<stdlib.h>**

**int main(void)**

**{**

**int iM, iN, iP, iQ, i, j, k, iaMat1[10][10], iaMat2[10][10];**

**int iaProd[10][10] = {0};**

**printf("\nEnter the order of Matrix1\n");**

**scanf("%d%d",&iM,&iN);**

**printf("\nEnter the order of Matrix2\n");**

**scanf("%d%d",&iP,&iQ);**

**if( iN != iP)**

**{**

**printf("\nMatrix Multiplication not possible\n");**

**exit(0);**

**}**

**printf("\nEnter the elements of Matrix 1\n");**

**for(i=0;i<iM;i++)**

**for(j=0;j<iN;j++)**

**scanf("%d",&iaMat1[i][j]);**

**printf("\nEnter the elements of Matrix 2\n");**

**for(i=0;i<iP;i++)**

**for(j=0;j<iQ;j++)**

**scanf("%d",&iaMat2[i][j]);**

**for(i=0;i<iM;i++)**

**{**

**for(j=0;j<iQ;j++)**

**{**

**for(k=0;k<iN;k++)**

**{**

**iaProd[i][j] += iaMat1[i][k] \* iaMat2[k][j];**

**}**

**}**

**}**

**printf("\nMatrix 1\n");**

**for(i=0;i<iM;i++)**

**{**

**for(j=0;j<iN;j++)**

**{**

**printf("%d\t",iaMat1[i][j]);**

**}**

**printf("\n");**

**}**

**printf("\n");**

**printf("\nMatrix 2\n");**

**for(i=0;i<iP;i++)**

**{**

**for(j=0;j<iQ;j++)**

**{**

**printf("%d\t",iaMat2[i][j]);**

**}**

**printf("\n");**

**}**

**printf("\n");**

**printf("\nThe Product matrix is is \n");**

**for(i=0;i<iM;i++)**

**{**

**for(j=0;j<iQ;j++)**

**{**

**printf("%d\t",iaProd[i][j]);**

**}**

**printf("\n");**

**}**

**printf("\n");**

**return 0;**

**}**

***Program 7:Compute Sine and Cosine of an Angle***

***Question***

***Compute sin(x)/cos(x) using Taylor series approximation. Compare your result with the built-in***

***library function. Print both the results with appropriate inferences.***

**#include<stdio.h>**

**#include<stdlib.h>**

**#include<math.h>**

**int main()**

**{**

**float fAngD, fAngR;**

**float fTerm, fNum, fDen, fSVal,fCVal;**

**int i,iNum;**

**printf("\nEnter the Angle : ");**

**scanf("%f",&fAngD);**

**printf("\nEnter the Number of terms : ");**

**scanf("%d",&iNum);**

**printf("\nInput Angle = %g\n",fAngD);**

**printf("No of terms = %d\n",iNum);**

**fAngR= (fAngD\*M\_PI)/180 ;**

**fNum=fAngR;**

**fDen=1.0;**

**fSVal =0.0;**

**fTerm=fNum/fDen;**

**for(i=1;i<=iNum;i++)**

**{**

**fSVal = fSVal + fTerm;**

**fNum = -fNum \* fAngR \* fAngR ;**

**fDen = fDen \* (2\*i) \* (2\*i+1);**

**fTerm = fNum/fDen;**

**}**

**fNum=1.0;**

**fDen=1.0;**

**fCVal =0.0;**

**fTerm=1.0;**

**for(i=1;i<=iNum;i++)**

**{**

**fCVal = fCVal + fTerm;**

**fNum = -fNum \* fAngR \* fAngR ;**

**fDen = fDen \* (2\*i) \* (2\*i-1);**

**fTerm = fNum/fDen;**

**}**

**printf("\nCalculated value is :\nSin(%g)/Cos(%g) = %g\n",fAngD, fAngD, fSVal/**

**fCVal);**

**printf("\nBuilt In function value is :\nSin(%g)/Cos(%g) = %g\n", fAngD, fAngD,**

**sin(fAngR)/cos(fAngR));**

**return 0;**

**}**