**5. Design, Develop and Implement a Program in C for the following Stack Applications**

**a. Evaluation of Suffix expression with single digit operands and operators: +, -, \*, /, %, ^**

**b. Solving Tower of Hanoi problem with n disks**

// Evaluation of Suffix Expression

#include<stdio.h>

#include<string.h>

#include<stdlib.h>

#include<math.h>

#define MAX 50

int stack[MAX];

char post[MAX];

int top=-1;

void pushstack(int tmp);

void calculator(char c);

void main()

{

int i;

printf("Insert a postfix notation :: ");

//gets(post);

scanf("%s",post);

for(i=0;i<strlen(post);i++)

{

if(post[i]>='0' && post[i]<='9')

{

pushstack(i);

}

if(post[i]=='+' || post[i]=='-' || post[i]=='\*' || post[i]=='/' || post[i]=='^')

{

calculator(post[i]);

}

}

printf("\n\nResult :: %d",stack[top]);

}

void pushstack(int tmp)

{

top++;

stack[top]=(int)(post[tmp]-48);

}

void calculator(char c)

{

int a,b,ans;

a=stack[top];

stack[top]='\0';

top--;

b=stack[top];

stack[top]='\0';

top--;

switch(c)

{

case '+': ans=b+a;

break;

case '-': ans=b-a;

break;

case '\*': ans=b\*a;

break;

case '/': ans=b/a;

break;

case '^': ans=pow(b,a);

break;

default: ans=0;

}

top++;

stack[top]=ans;

}

// Towers of Hanoi

#include <stdio.h>

void towers(int, char, char, char);

int main()

{

int num;

printf("Enter the number of disks : ");

scanf("%d", &num);

printf("The sequence of moves involved in the Tower of Hanoi are :\n");

towers(num, 'A', 'C', 'B');

return 0;

}

void towers(int num, char frompeg, char topeg, char auxpeg)

{

if (num == 1)

{

printf("\n Move disk 1 from peg %c to peg %c", frompeg, topeg);

return;

}

towers(num - 1, frompeg, auxpeg, topeg);

printf("\n Move disk %d from peg %c to peg %c", num, frompeg, topeg);

towers(num - 1, auxpeg, topeg, frompeg);

}

**Output:**

root:~/dslab #gedit posteval.c

root:~/dslab #cc posteval.c -lm

root:~/dslab # ./a.out

Insert a postfix notation :: 22^32\*+

Result :: 10

root:~/dslab #gedit tower.c

root:~/dslab #cc tower.c

root:~/dslab # ./a.out

Enter the number of disks : 3

The sequence of moves involved in the Tower of Hanoi are :

Move disk 1 from peg A to peg C

Move disk 2 from peg A to peg B

Move disk 1 from peg C to peg B

Move disk 3 from peg A to peg C

Move disk 1 from peg B to peg A

Move disk 2 from peg B to peg C