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Experiment No :- 01

Date
Page

Implementation of different recursive algorithm :-

(a) factorial function
(b) GCD
(c) power function
(d) Fibenacci series
(e) Tower of Hanoic.

Answer :-

a) Factorial function :-

```
#include<stdio.h>
int recoFactorial (int a){
    return(a ==0 ||a==1)?1:(a *recofactorial(a-1));
}
int main(){
    int a ;
    printf("Enter a number :-");
    scanf("%d",&a);
    if(a <0){
        printf("Factorial is not defined for
                negative numbers.");
    }else{
        printf("The factorial of %d is %d", a,
                recofactorial(a));
    }
    return 0;
}
```

output :-

```
Enter a number :-5
The factorial of 5 is 120
```

b GCD:-

```
#include <stdio.h>
int recoGCD (int a, int b){
    return (b==0)? a : recoGCD (b, a%b);
}
int main() {
    int x, y;
    printf("Enter two number :- ");
    scanf("%d %d", &x, &y);
    printf("GCD = %d", recoGCD (x,y));
    return 0;
}
```

output:-

```
Enter two numbers :- 4 8
GCD = 4
```

c power function:-

```
#include<stdio.h>
int recoPower(int a, int b){
    return (b==1)? a: a *recoPower(a, b-1);
}
int main () {
    int x, y ;
    printf ("Enter two numbers;-");
    scanf ("%d %d", &x, &y);
    printf("%d ^ %d is %d ",x,y,(y==0) ? 1:
                              recoPower (x,y));
    return 0;
}
```

output :-

```
Enter two numbers :- 4 5
4^5 is 1024
```

(d) Fibenacci series :-

```
#include <stdio.h>
int recoFibenacci(int a, int b, int c){
      printf("%d, ", a);
      return(c==0)?0:recoFibenacci(b, a+b, c-1);
}
int main(){
    int a;
    printf("Enter the number of elements to display :-");
    scanf("%d", &a);
    recoFibenacci(0,1, a-1);
}
```

output:-

```
Enter the number of elements to display :-10
0,1,1,2,3,5,8,13,21,34,
```

(e) Tower of Hanoic :-

```
#include<stdio.h>
void towerofHanoic(int n, char from, char to, char aux){
    if(n==1){
        printf("move disk 1 from %c to %c \n",
               from, to);
        return;
    }
    towerofHanoic(n-1, from, aux, to);
```

```
        printf("Move disk %d from %c to %c \n",
                n, from, to);
        towerOfHanoic(n-1, aux, to, from);
}
int main() {
        int n;
        printf("Enter number of disks :- ");
        scanf("%d", &n);
        towerOfHanoic(n, 'A', 'C', 'B');
        return 0;
}
```

output :-

```
Enter number of disks :- 3
Move disk 1 from A to C
move disk 2 from A to B
Move disk 1 from C to B
move disk 3 from A to C
move disk 1 from B to A
move disk 2 from B to C
Move disk 1 from A to C
```