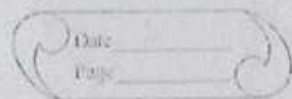


22/12/25

Experiment No :- 01



Implementation of different recursive algorithm:-

① factorial function

② GCD

③ Power function

④ Fibonacci series

⑤ Tower of Hanoi.

Answer :-

1) 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 recGCD (int a, int b) {
    return (b==0) ? a : recGCD (b, a%b);
}
int main() {
    int x, y;
    printf("Enter two number :- ");
    scanf("%d %d", &x, &y);
    printf("GCD = %d", recGCD (x, y));
    return 0;
}
```

Output:-

Enter two numbers :- 4 8
GCD = 4

c) Power function:-

```
#include <stdio.h>
int recPower (int a, int b) {
    return (b==1) ? a : a * recPower (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 :
        recPower (x, y));
    return 0;
}
```

Output:-

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

① Fibonacci Series :-

```
#include <stdio.h>
```

```
int recoFibonacci(int a, int b, int c) {
```

```
    printf("%d, ", a);
```

```
    return (c == 0) ? 0 : recoFibonacci(b, a+b, c-1);
```

```
}
```

```
int main() {
```

```
    int a;
```

```
    printf("Enter the number of elements to display :-");
```

```
    scanf("%d", &a);
```

```
    recoFibonacci(0, 1, a-1);
```

```
}
```

output:-

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

② Tower of Hanoi :-

```
#include <stdio.h>
```

```
void towerofHanoi(int n, char from, char to, char aux) {
```

```
    if (n == 1) {
```

```
        printf("move disk 1 from %c to %c\n",  
              from, to);
```

```
    return;
```

```
}
```

```
towerofHanoi(n-1, from, aux, to);
```

```

printf("Move disk %d from %c to %c\n",
      n, from, to);
towerOfHanoi(n-1, aux, to, from);
}
int main() {
    int n;
    printf("Enter number of disks :- ");
    scanf("%d", &n);
    towerOfHanoi(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

```