Date: / /
Page:

Day - 74

Recursion - 3

* **Factorial**

$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$

⇒
```
Fact = 1
for( i=1; i<=5; i++)
    fact *= i;
```

5
4
3
2
base case → 1

⇒ So, for solving it by recursion —

fact(1) = 1
fact(2) = 2 × fact(1)
f(3) = 3 × f(2)
f(4) = 4 × f(3)
f(5) = 5 × f(4)
f(n) = n × f(n-1)

⇒
```
int fact (int n){
    if (n==1){
        return 1
    }
    return n*fact(n-1);
}
```

5! = 5 × 4!
4! = 4 × 3!
3! = 3 × 2!
2! = 2 × 1!
1! = 1

* **Sum of N numbers**

N=6

6
5
4
3
2
base → 1

⇒
sum(1) = 1
s(2) = 2 + sum(1)
s(3) = 3 + s(2)
⋮ ⋮ ⋮
s(n) = n + s(n-1)

Date : / /
Page:

Code

```
int sum(int n){
    if(n==1)
        return 1;
    return n + sum(n-1);
}
```

* Power of 2

=) $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$

Pow(2,1) = 2

Pow(2,2) = 2 x Pow(2,1)

P(2,3) = 2 x P(2,2)

P(2,4) = 2 x P(2,3)

[P(2,n) = n x P(2,n-1)]

num	n
2	5
2	4
2	3
2	2
→ 2	1

Base cond.

Code

```
int Pow(int num, int n){
    if(n == 1)
        return num;
    return num * Pow(num, n-1);
}
```

* Sum of Square of N no.

=) n = 4

$4^2 + 3^2 + 2^2 + 1^2 = 30$

SqSum(1) = 1

SqSum(2) = (2*2) + SqSum(1)

SqSum(3) = 3^2 + SqSum(2)

S(4) = 4^2 + S(3)

⋮ ⋮ ⋮

S(n) = n^2 + S(n-1)

→ 4
3
2
→ 1
Base con

Date: / /
Page:

Code

```
int sqSum ( int n){
    if (n==1)
        return 1;
    return (n*n) + sqSum (n-1);
}
```