Classnote

Class 02 - Loops

Problems

1. **Sum of first N natural numbers**
2. **Sum of even numbers up to N**
3. **Factorial**
4. **Count how many numbers from 1 to N are divisible by K**

1. Loops in C

Loop = repeat same work many times.

Types:

1. **for loop** → when we know the limit.
2. **while loop** → check condition first, then run.
3. **do-while loop** → run at least once, then check.

2. for loop example

```
for(int i=5; i<=100; i*=2){
   printf("%d\n", i);
}
```

Start from 5 ; Multiply by 2 each time ; Stops after 100

Output: 5, 10, 20, 40, 80

3. while loop example

```
int var=5;
while(var<=100){
   printf("%d\n", var);
   var*=5;
}
```

Start = 5 ; Multiply by 5 each time ; Prints 5 → 25 → 125

4. do-while loop example

```
int x=0;
do{
   printf("%d\n", x);
   x++;
}while(x<=5);
```

Prints 0 to 5 ; Even if condition is false at start, loop runs once.

5. Sum of 1 to N

```
int n=5, sum=0;
for(int i=1;i<=n;i++){
   sum+=i;
}
```

Adds numbers 1+2+3+4+5 ; Sum = 15

6. Sum of even numbers (0–N)

```
int n=10, sum=0, i=0;
while(i<=n){
   if(i%2==0){
      sum+=i;
   }
   i++;
}
```

Only adds even numbers , 0+2+4+6+8+10 = 30

7. Print odd numbers (1–N)

```
int n=10, i=1;
while(i<=n){
   if(i%2!=0){
      printf("%d ", i);
   }
   i++;
}
```

Prints: 1 3 5 7 9

8. Sum of odd numbers (1–N)

```
int n=10, sum=0, i=1;
while(i<=n){
   sum+=i;
   i+=2;}   // increment by 2
```

1+3+5+7+9 = 25

9. Count multiples of k

```
int n=15, k=3, count=0;
for(int i=1;i<=n;i++){
   if(i%k==0){
      count++;
   }
}
```

Multiples of 3 → 3,6,9,12,15 ; count = 5

10. Factorial (n!)

```
int n=5, fact=1;
for(int i=1;i<=n;i++){
   fact=fact*i;
}
```

1×2×3×4×5 = 120

11. Reverse a number

```
int n=123, rev=0, r;
while(n!=0){
   r=n%10;       // last digit
   rev=rev*10+r; // reverse
   n=n/10;       // cut last digit
}
```

Original: 123 ; Reverse: 321