for loop

Syntax → for(init , condition, upgrade)

```
for(int i=0; i<=10; i++)
    Syso(i);
```

while loop syntax

```
init
while(condition){
    //
    upgrade
}
```

```
int i=0
while (i<=10){
    syso(i);
    i ++;
}
```

Printing 5 to N(While Loop)

```
Scanner s = new Scanner(System.in);
int n = s.nextInt();

int i = 5;
while(i <= n){
    System.out.println(i);
    i++;
}
```

HW_Print till n for this Series 5,11,17,23,29..

```
Scanner s = new Scanner(System.in);
int n = s.nextInt();

int i = 5;
while(i <= n){
    System.out.println(i);
    i += 6;
}
```

Permutation

formula $\frac{n!}{(n-r)!}$

$n \to 5$

$r \to 3$

$\frac{5!}{(5-3)!}$

$n-r \to 2$

$\frac{5 \times 4 \times 3 \times 2 \times 1}{2 \times 1} = 60$

$\frac{n!}{(n-r)!}$ $10 \to n$

$5 \to r$

$\frac{10 \times 9 \times 8 \times 7 \times 6 \times 5!}{5!}$ $(n-r)$

$0! = 1$

[! → factorial

$n \times (n-1) \times (n-2) \times \cdots \times 1$

way to solve factorial]

HW_Find Permutation 1

```
Scanner s = new Scanner(System.in);
int n = s.nextInt();
int r = s.nextInt();

int nPr = 1;

for(int i = n; i > (n-r); i--){
    nPr *= i;
}
System.out.println(nPr);
```

n = 8

r = 4

nPr = 1

(n-r) ⇒ (8-4) = 4

i = 8 > 4 T

1 x 8 = 8

i = 7 > 4 T

8 x 7 = 56

i = 6 > 4 T

56 x 6 = 336

i = 5 > 4 T

336 x 5 = 1680

i = 4 > 4 F X

8 P 4 ⇒ 1680

$\frac{n!}{(n-r)!} \Rightarrow \frac{8 \times 7 \times 6 \times 5 \times 4!}{4!} \Rightarrow 1680$

HW_Running sum and average

```
Scanner s  = new Scanner(System.in);
int n = s.nextInt();

// calculate the running sum
int sum = 0;
for(int i = 1; i <= n;i++){
    sum += i;
}

int average = (sum/n);

System.out.println(sum);
System.out.println(average);
```

n = 7

sum = 0

i = 1 ≤ 7 T

0 + 1 = 1

i = 2 ≤ 7 T

1 + 2 = 3

i = 3 ≤ 7 T

3 + 3 = 6

i = 4 ≤ 7 T

6 + 4 = 10

i = 5 ≤ 7 T

10 + 5 = 15

i = 6 ≤ 7 T

15 + 6 = 21

i = 7 ≤ 7 T

21 + 7 = 28

i = 8 ≤ 7 F X

sum = 28 ✓

Avg. = 28/7 ⇒ 4 ✓