Looping Statements & Jumping Statements

1) Looping Statement  Repeat

i) for loop

≡ for(initialization ; condition ; inc/dec) {

≡ executed

}

int x = 1; //initiag

int y = 0; //—

int i = 2 //int

int i = num/2 —) in

condition ↴ (a > b) → 1

↳ 0

int i = 0; i<=10 => 0<=10 ✓

{ inc → pre, post ++a, a++ i=) i+1

dec → pre, post --a, a-- i-1

i = i + 2 ✓

10 → Goodning

```
{ for(int i=1 ; i<=10 ; i++) {
        cout<<"Good morning"<<endl;
  }
```

```
for(int i=1;i<=10;i++){
    cout<<"Good Night"<<endl;
}
```

normally

initiazation → only once

i = 1

1 <= 10 ✓

i=) 2

2 <= 10 ✓

i = 3 , 3 <= 10 ✓

output

- Good N
- G N
- GN
- GN
- GN
- GN

i = 9

i = 10

10 <= 10 ✓

i = 11

11 <= 10 ✗

- GN
- GN
- GN
- GN

n = 5

i = 0, 1, 2, 3, 4

i < n

5 < 5 ✗

n=5

(0 <= n) → (stop)

1 <= n

(0 <= n) → n=5 → 6

```
int n;
cout<<"enter number :."<<endl;
cin>>n;
for(int i=0;i<n;i++){
    cout<<"My name is Khanam"<<endl;
}
```

≡

initialization → one time

1) Condition check

2) Process ✓

3) Inc/dec

n = 3

i = 0

1) i = 0
   0 < 3 ✓
2) i = 1
   1 < 3 ✓
3) i = 2
   2 < 3 ✓
4) i = 3
   3 < 3 ✗

Output

- Mnik
- Mnik
- Mnik

1) Even numbers.

num % 2 == 0 => Even

num % 2 != 0 => Odd

1 2 | 100

1 -> 100

i=1 -> <= 100

```
for(int i=1 ; i<=100 ;i++){
    if(i%2==0)
        cout<<i;
}
```

```
for(int i=1;i<=100;i++){
    if(i%2==0)
    cout<<i<<endl;
}
```

if(-){

}

(1-100)

(1 -100)

101

101 <= 100 ✗

i=1, 1<=100 ✓

1%2==0 ✗

i=2 2<=100 ✓

2%2==0 ✓

i=3 3<=100 ✓

3%2==0 ✗

i=4 4<=100 ✓

4%2==0 ✓

2, 4, 6, 8

i<=(100) ; i=i+2

cout

-> Reverse order

n = 3

n = 5

5, 4, 3, 2, 1

3, 2, 1

(i=n ; i>0 ; i-- ;)

i>0

0>0 ✗

(i>=1)

-> 21 table

21
42
63
84
105
126
147
189
210

190 times

i=21 ; i<=210 ; i++

✗ if(i%21==0)
cout<<i;

i=21 ; i<=210 ; i=i+21

cout<<i;

Homework : n-> 2

2*1 = 2
2*2 = 4
| |
2*10 = 20

Agar comment

Arithmetic progration (AP)

1) 2, 4, 6 . . .   n terms.

1) Even ✓

2) %2 == 0

(5): 2, 4, 6, 8, 10   (10): 2 ... 20

Code → 2 approaches: Mathematical, logic

$a_n = a + (n-1)d$

$a_n = 2 + (n-1)2$

$\Rightarrow \cancel{2} + 2n - \cancel{2}$

$\Rightarrow 2n$ = nth Term

a = first terms (2)

n = user

d = difference (2)

output
- 2
- 4
- .

5

2, 4, 6, 8, 10 ——— n

i=1   1<=5 ✓

i=2   2<=5 ✓

```
int ~~first~~ a = 2;
(i=1; i<=n; i++)
    cout<<a<<endl;
    a = a+2;
)
```

n=5: 1, 2, 3, 4, 5

Homework 1): AP (1, 3, 5, 7 . . n terms) odd

2) AP = 7 11 15 . . n terms.

Homework: GP → (Geometric Progression)

1 2 4 8 16 ———

×2 2 2 2 — alag   AP ✗

a = a * 2

2) while loop

diff

Syntax:

```
for(initialization, condition ; inc/dec) -(10)   {
{                                                  ≡
  =                                                }
}
```

Syntax:

```
initiation
while (condition) {        false
      ≡ inc/dec                  (true)
}
≡
```

1 -> 10

```
for (int i= 10 ; i<=(10); i++ ) {
    cout<<i<<endl;
}
```

```
int i=1;
while(i<=10) {
    cout<<i<<endl;
    i++ = 2
}
```

executed

n=5

1) i=1
2) i<=5 ✓
3) i=2
4) 2<=5 ✓
5) i=3
6) 3<=5 ✓
7) i=4
8) 4<=5 ✓
9) i=5
10) 5<=5 ✓
11) i=6
12) 6<=5 ✗

Output

1
2
3
4
5

3) do-while loop.

i=11

~~i<=10~~ ✗

```
do{
  ===
}while(condition)
```

```
int i=11;
  do{
  cout<<i<<endl;
  }while(i<=10)
```

11<=10 ✗

output

11.

1)Predict the output

```
#include <iostream>
using namespace std;

int main() {
    for (int i = 1; i <= 3; i++) {
        cout << "Hello ";
    }
    return 0;
}
```

1) i=1
2) 1<=3 ✓
3) i=2
4) 2<=3 ✓
5) i=3
6) 3<=3 ✓
7) i=4
8) 4<=3 ✗

output
Hello Hello Hello ✓

2)Predict the output

```
#include <iostream>
using namespace std;

int main() {
    int i = 5;
    while (i < 5) {
        cout << "C++ ";
        i++;
    }
    return 0;
}
```

1) i=5
2) 5<5 (false)

output
no output

3)Predict the output

```
#include <iostream>
using namespace std;

int main() {
    int i = 5;
    do {
        cout << "Coding ";
        i++;
    } while (i < 5);
    return 0;
}
```

1) i=5
2) i=6
3) 6<5 ✗

output
coding.

4)Predict the output

```
#include <iostream>
using namespace std;

int main() {
    for (int i = 3; i > 0; i--) {
        cout << i << " ";
    }
    return 0;
}
```

1) i=3
2) 3>0 ✓
3) i=2
4) 2>0 ✓
5) i=1
6) 1>0 ✓
7) i=0
8) 0>0 ✗

output
3 2 1

5)Predict the output

```
#include <iostream>
using namespace std;

int main() {
    int i = 1;
    while (i <= 3) {
        cout << i << " ";
        // i++;  ← Ye line missing hai!
    }
    return 0;
}
```

infinite

1) i = 1
2) 1<=3 ✓
3) 1<=3 ✓
4) 1<=3 ✓

output
1 1 1
=
forever

6)Predict the output

```
int main(){
    int a=10;
    while(a==10)
        a=a-3;
    cout<<a;
}
```

1) a=10
2) 10==10 ✓
3) a=7
4) 7==10 ✗
5) 7

7)Predict the output

```
int main(){
int i;
while(i=1){
cout<<i;
i=i+1;
 }
}
```

infinite

condition initializing

output
1
1

i=2
i=2

8)Predict the output

H/W

```
int main(){
  while('c'<'b'){
        cout<<"C++ Programming";
  }
}
```

H/W

Hint ASCII <

for, while, do-while
H/W

③ Jumping Statement

Exit, skip

break continue

switch

for(int i=1 ; i<=10; i++) {
termination if(i==3) {
break;
}
cout<<i<<endl;
}

1) i=1
2) 1<=10 ✓
3) 1==3 ✗
4) i=2
5) 2<=10 ✓
6) 2==3 ✗
7) i=3

case | output
1
2 .

i = = 9

8) 3 <= 10 ✓
9) 3 == 3 ✓

1
2
3
4
5
6
7 8

→ H/w break.
→ 1 — 100

i=1 → 100
i=2 → 50 even numbers.

i == 50
break

2) Continue (skip)

```
for (int i=1; i<=10; i++) {
    if (i==3) {
        continue.
    }
    cout<<i<<endl.
}
```

skip

output
1
2
4
5
6
7
9
10

1) i=1
2) 1<=10 ✓
3) 1==3 ✗
4) i=2
5) 2<=10 ✓
6) 2==3 ✗
7) i=3
8) 3<=10 ✓
9) 3==3 ✓
10) i=4
11) 4<=10 ✓
12) 4==3 ✗
13)