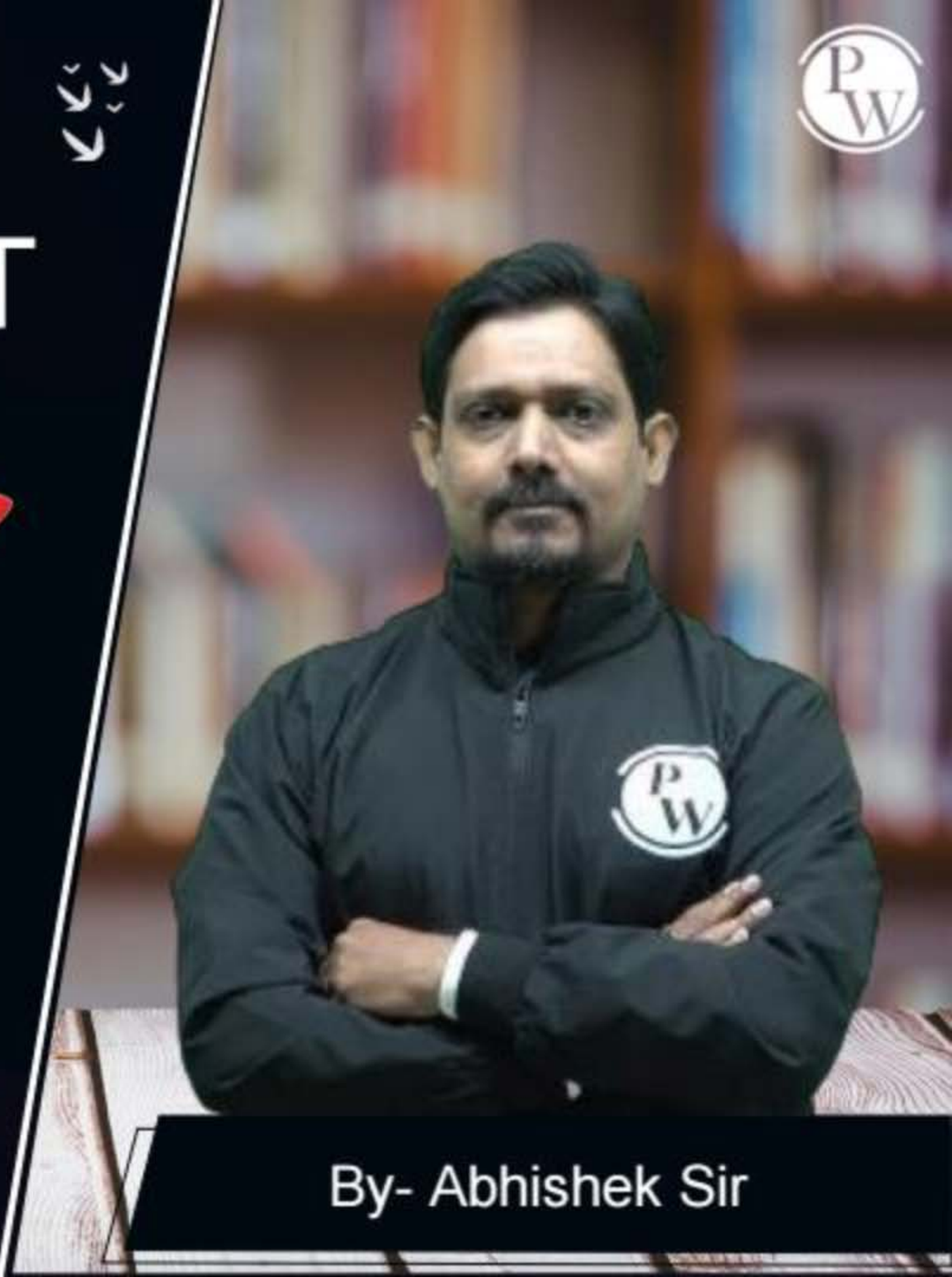
Computer Science & IT

C Programming

Control Flow Statement

Lecture No. 03



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Recap of Previous Lecture

- Topic — if else
- Topic — Switch
- Topic
- Topic
- Topic

Slide

Topics to be Covered

- Topic — Switch
- Topic — Iterative statement [for loop]
- Topic
- Topic
- Topic

Slide

Break

Switch cases if break is Not present the all subsequent cases evaluates true.

Break statement takes control outside of switch block.

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switch(expression)

```
#include <stdio.h>
      int main(){
       int a = 5;
        switch(a-1){
                  case 4: printf("%d",5);
                  case 5: printf("%d",5);
                  case 6: printf("%d",6);
       }
      }
```

expression

4

Output

556

Reason

after case 4 since No break is present all Subsequent cases are true.

Slide

switch(expression)

```
#include <stdio.h>
int main(){
        switch(13/4){
        case 3: printf("%d",4); break ;
        case 4: printf("%d",2); break ;
        case 5: printf("%d",5); break ;
        }
    }
```

13/4 = 3

Output

4

Reason

Slide

switch(expression)

```
#include <stdio.h>
int main(){
        switch(13/4.0){
        case 3: printf("%d",4); break ;
        case 4: printf("%d",2); break ;
        case 5: printf("%d",5); break ;
        }
    }
```

Integer/float = float

Output

Compiler Error

Reason

Switch (Integer)

Slide

switch(expression)

```c
#include <stdio.h>
int main(){
        switch('d'){
         case 'a': printf("%d",4); break ;
         case 'b': printf("%d",2); break ;
         default: printf("None");
         case 'c': printf("%d",5); break ;
        }
}
```

ASCII output

Output

None5

Reason :

No position fixed for default. Because No break is present case 'c' also true

Slide

switch(expression)

```
#include <stdio.h>
int main(){
        switch(4){
        case 2: printf("%d",4); break ;
        case 1+1: printf("%d",2); break ;
        default: printf("None");
    }
}
```

Output

Error

Reason

Duplicate case Not allowed

switch(expression)

```
#include <stdio.h>
int main(){
        int a=2;
         switch(4){
         case 2: printf("%d",4); break ;
         case a: printf("%d",2); break ;
         default: printf("None");
      }
}
```

a is a variable

Case label should be a constant can't be a variable.

Output

Error

Case label is Not integer constant

Reason

Slide

GATE 2012

What will be the output of the following C program segment?

```
Char inChar = 'A' ;
switch (inChar ) {
case 'A' : printf ("Choice A\ n");
      case 'B' :
      case 'C' : printf("Choice B");
      case 'D' :
      case 'E' :
      default  : printf ("No Choice") ; }
```

(A) No choice
(B) Choice A
(C) Choice A
Choice B No choice
(D) Program gives no output as it is erroneous

What is Iterative Statement ?

* Suppose we want print each student Name in class
* we want to print 'marksheet for every student
* we want to print ASCII value for every character

What is Iterative Statement ?

Print My name 100 times

Slide

Second Way is loop

Print My name 100 times

1. for loop :
2. while loop :
3. do while :

loop control statement

1. break;
2. continue
3. goto

For loop: Syntax

Print My name 100 times

```
for (expr1 ; expr2 ; expr3) {

}
```

2019/

```
for (γ(); γ(); γ())
```

```
for ( function1(); function2(); function3()) {

}
```

Slide

For loop: Syntax

Print My name 100 times

```
for (expr1 ; expr2 ; expr3) {
    Stmt;
}
```

expr1 :
Initialization
1 time

expr2 :
condition checking → Expected Relational expression

Body of loop executed when condition evaluates to true (Non Zero)

Slide

For loop: Syntax

Print My name 100 times

```
for (expr1 ; expr2 ; expr3) {
    stmt;
}
```

$expr_3$: should be increment/decrement and executed after Completion of every statement in function body.

Slide

For loop: Syntax

Different range of numbers

```
for(i =1;i<=10;i++)
      printf("Name")
```

i = 1 : expr1 1 time execute

i <= 10 : every time loop test this

i++; i = i + 1;

for (i = 1; i <= 10; i++) {
    printf ("Name");
}

Name will be printed 10 time

for this program after printing i++ will execute

Slide

For loop: Syntax

Different range of numbers

```
int i;
for(i =11; i<=21; i++)
      printf("Name")
```

No. of times loop execute

21 − 11 + 1

10 + 1 = 11

11 Correct

Incremental

i = 11 — a

i <= 21 − b

} b − a + 1

Loop Access array element

Array Index start from 0

Slide

a b $5-2+1=4$

```
for(i=2; i<=5; i++)
    printf("I am a good student");
```

i=2	2<=5
i=3	3<=5
i=4	4<=5
i=5	5<=5

For loop: Syntax

Different range of numbers

```
int i;
for(i =-10; i<=21; i++)
        printf("Name")
```

32 times No. of times loop will execute

a : -10

b : 21

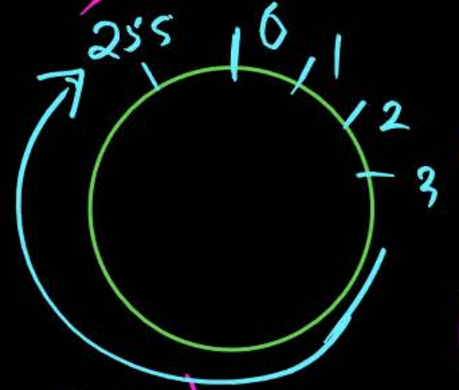
No. of times loop execute

21 - (-10) + 1 = 31 + 1 = 32

Slide

'1';

```
# include<stdio.h>
int main( ) {
char ch;
for (ch=1; (ch); ch++)
    printf ("%c", ch);
return 0;
}
```



ASCII value

output of program

(A) Compiler Error

(B) warning

(C) loop will execute 1 time

(D) loop will execute 255 times

86Hs

ch = 0; → loop will Not execute

ch = 1 - true

ch = 2 — true

⋮

ch = 255 - true

ch = 256 % 256 = 0 ← loop will break;

No. of times loop executed (stmt printed)

(A)
```
int i=1;
for( ; i<=10; i++)
    stmt
```
10 times

(B)
```
int i;
for((i=1; ; i++)
    stmt
```
if No condition → condition always true

Infinite

(C)
```
int i
for(i=1; i<=10; )
    stmt;
```
Infinite loop

(D)
```
for( ; ; )
    stmt
```
Infinite loop

(E)
```
int i;
for(i=1; i<=10; i++);
    stmt;
```
1 times

execute

GATE 2015

```
#include<stdio.h>
int main()
{
    int i, j, k = 0;
    j=2 * 3 / 4 + 2.0 / 5 + 8 / 5;
    k-=--j;
    for (i=0; i<5; i++)
    {
        switch(i+k)
        {
            case 1:
            case 2: printf("\n%d", i+k);
            case 3: printf("\n%d", i+k);
            default: printf("\n%d", i+k);
        }
    }
    return 0;
}
```

No. of times printf function executed is output?

$j = 2*3/4 + 2.0/5 + 8/5$

$= 6/4 + 2.0/5 + 8/5$

$= 1 + 0.4 + 1$

$j = 2.4$

j is integer $j = 2$

GATE 2015

```
#include<stdio.h>
int main()
{
    int i, j, k = 0;
    j=2 * 3 / 4 + 2.0 / 5 + 8 / 5;
    k-=--j;
    for (i=0; i<5; i++)
    {
        switch(i+k)
        {
            case 1:
            case 2: printf("\n%d", i+k);
            case 3: printf("\n%d", i+k);
            default: printf("\n%d", i+k);
        }
    }
    return 0;
}
```

No. of times printf function executed is output?

j updated to 1

$k -= --j$ (pre decrement) $1 = 2 - -1$

$= 1$

$k = k - j = 0 - 1 =$

$k = -1$

GATE 2015

10 point

No. of times printf function executed is ? k=-1

output?

```
#include<stdio.h>
int main()
{
    int i, j, k = 0;
    j=2 * 3 / 4 + 2.0 / 5 + 8 / 5;
    k-=--j;
    for (i=0; i<5; i++)
    {
        switch(i+k)
        {
            case 1:
            case 2: printf("\n%d", i+k);
            case 3: printf("\n%d", i+k);
            default: printf("\n%d", i+k);
        }
    }
    return 0;
}
```

i=	Switch(i+k)		output
i=0	Switch(-1)	default	-1
i=1	Switch(0)	default	0
i=2	Switch(1)	case 1 3 times	1 1 1
i=3	switch(2)	Case 2 3 times	2 2 2
i=4	Switch(3)	Case 3 2 times	3 3

No. of times

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2 mins Summary

Topic — Switch

Topic — for Loop

Topic — practice question

Topic

Topic

Slide

THANK - YOU