Computer Science & IT

C programming

Data Types & Operators

Lecture No. 04

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Recap

- Topic — operator
- Topic — precedence & Associativity
- Topic — Division & mudulo (%)
- Topic — unary `-`
- Topic

Slide

Topics to be Covered

Topic

Topic

Topic

Topic

Topic

Increment & Decrement (Imp)

Relational operator

Logical operator

Scope of variable

Slide

1. Focus.
2. Clarity of Thought
3. persistence

Toipc: ++ and --

int a=5

* ++ unary operator
  - post Increment ✓
  - pre Increment
* -- unary operator
  - post Decrement
  - pre Decrement

* Applied on variable ✓
  * Constant & expression (Not applied)

L-value

* It modify or update value of variable.

Slide

Toipc: ++ and --

int a = 5

a | 5 |

Single expression

r a++; // a will be 6 | ++a; // a will 6

Increment & Decrement

int a = 5

a--; // a will be 4 | --a; // a will be 4

Slide

Toipc: ++ and --

#6 output ?

```
# include<stdio.h>
int main(){
    int a=5;
    int b;
    printf("%d", (a+4));
    printf("%d", a++);
    printf("%d", b=++a);
return 0;
}
```

b 7

a 5 6 7 assignment

9, 5, 7

// a will Not modify

, b = 7

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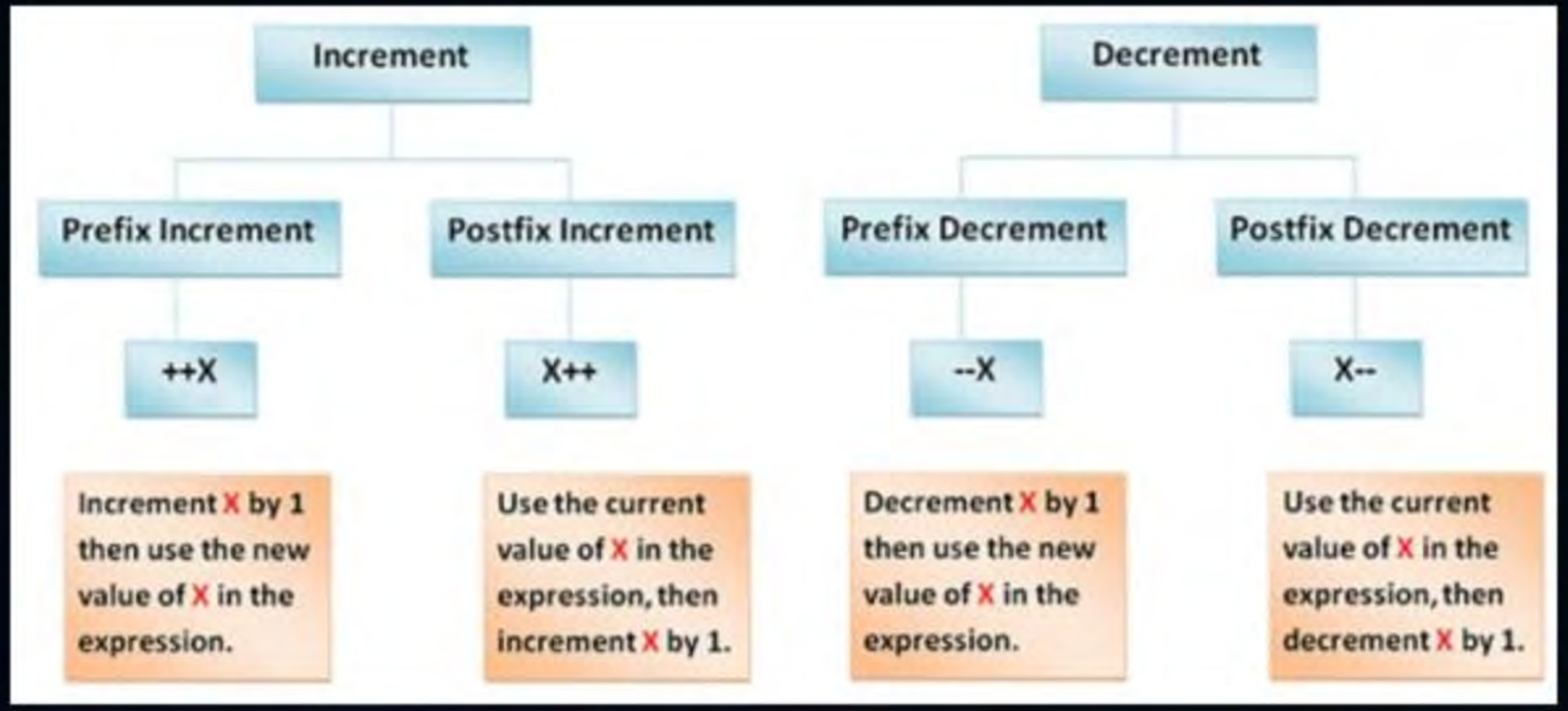
Toipc: Increment & decrement Operator



Slide

Toipc: Question

```
#include <stdio.h>
     int main ()  {
      int x=5;
      int y;
      y = ++x;
     printf("%d %d", x, y);
    }
```

x | 5 | 6 |

y | 6 |

timing - pre Increment first Increment

then use in expression

6 6

The output of the program

(A) 5,5

(B) 5,6

(C) 6,5

(D) 6,6

Slide

Toipc: Question

```
#include <stdio.h>
     int main ()  {
      int x=5;
      int y;
      y = ++x;
     printf("%d %d", x, y);
    }
```

The output of the program

(A) 5,5 (B) 5,6 (

C) 6,5 (D) 6,6

Answer

D

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Toipc: Question

What is the output of the program?

```
#include <stdio.h>
      int main ()  {
       int x=5;
       int y;
       y = x++;
      printf("%d %d", x, y);
     }
```

Output of the program is_____

(A) 5,5
(B) 5,6
(C) 6,5 ✓ (C)
(D) 6,6

after y = x++;

x 6 y 5

6 5

post Increment : In this expression statement x old value (5) will be used after evaluation of expression x will be Incremented to 6

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Toipc: Question

What is the output of the program?

```
#include <stdio.h>
      int main ()  {
       int x=5;
       int y;
       y = x++;
      printf("%d %d", x, y);
     }
```

Output of the program is_____

(A) 5,5 (B) 5,6

(C) 6,5 (D) 6,6

Slide

poe

```
int x=5
int y;
y= --x;
printf("%d,%d",
x,y)
```

4,4

```
int x=5;
int y;
y= x--;
printf("%d,%d
,x,y);
```

4,5

Toipc: ++ and --

```
#include <stdio.h>

int main(){
    int x = 5, y, b=10;

    y  = x++;
    y = ++x;
    y = x++*b;
    y = ++x*b;
    y  = x--;
    y = --x;
    y = x--*b;
    y = --x*b;

    printf("%d\n",x);
    printf("%d",y);

    return 0;
}
```

Toipc: Assigment Operator

Assigment operator

a → 0110110 ← garbage value

int a; a is name of variable

Compiler associate a memory location with a, of size 4B

printf("%d", a); ← garbage value

a = 5; ← assignment a | 5 |

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Toipc: Assigment Operator

RHS

int a;
a = 5;

LHS

a | 5 | address

1000 ← Assumed value

only variable has L-value

L-value of variable : Locahon of a updated to 10

a = 10; a | 10 | 1000

R-value of variable : a's r-value = ~~10~~

int b = a;

Assignment operator a is on RHS

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Constant $5 = 5 + 1;$ H.W

$5++;$

Expression $(5+6+7)++;$ Error

} L-value Required

a += 5; = a = a + 5;

a *= 1 ⇒ a = a * 1;

a /= 10 ⇒ a = a/10;

a %= 5 ⇒ a = a%5;

a -= 10 ⇒ a = a - 10;

Additive Assignment

Multiplicative Assignment

Divisom Assignment

Modulo Assignment

Subtract Assignment

Toipc: GATE 2017

Consider the following C program.

```
#include<stdio.h>
int main () {
    int m=10;
    int n, n1;
    n=++m;
    n1=m++;
    n--;
    --n1;
    n-=n1;
    printf("%d", n);
    return 0;
}
```

The output of the program is _____

m | 10 | 11 | 12

n | 11 | 10

n1 | 11 | 10

n -= n1

n = n - n1

n = 10 - 10 = 0

0

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Toipc: Relational Operator

10 = 11

L-value

Required

>, <, >=, <=, ==, !=

Greater

Lesser

Greater than equal

Less than equal

Exactly equal

Not equal

Same value
Ans is 0

10>5

1 yes

0 Not

5<4

NO

0

5>=2

yes

1

5<=1

No

10==11

NO

0

5!=6 ; True/yes. 1

3!=2 . True/yes. 1

3!=3 . false/No. 0

Slide

Toipc: Relational Operator

>	<	<=	>=	==	!=
Less than	Greater than	Greater than equal to	Less than equal to	Exactly equal	Not equal to

Slide

Toipc: Relational Operator Example

```
#include<stdio.h>
int x = 40;
int  main() {
      printf("%d\n", 30>40);
      printf("%d\n", 30>=40);
      printf("%d\n", 30==40);
      printf("%d\n", 30!=40);
      printf("%d\n", 40!=30);
      printf("%d\n", 40==40);
      printf("%d\n", 50>50);
      printf("%d\n", 50<=50);
      return 0 ;
}
```

$1\times2^4+1\times2^3+1\times2^2+1\times2^0$

00011101

4 3 2 1 0

0
0
0
1
1
0
1
1

Create Binay string for output and Answer its equivalent decimal value

16
8
4
1
29

Slide

Toipc: Relational Operator Precedence

Order of precedence

/, *, %

+ -

>, <, >=, <=

==, !=

Higher

Left to right

Lower = (1)

printf("%d", 5+6>10);

printf("%d", 11>10)

== & != is having lower precedence than >, <, >=, <=

Aothmetic operator precedence higher than Relational operator.

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Toipc: Relational Operator Precedence

#@

```
#include<stdio.h>
int main(){
    printf("%d", 5>3<4<10!=11>20);
}
```

Left to right

Answer is 1

$= 1<4<10!=11>20$

$= 1<10!=11>20$

$= 1!=11>20$

$= 1!=0 = 1$

11>20 first because higher precedece than !=

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Toipc: Relational Operator Precedence

3	* / %	Multiplication, division, and modulus	left to right
4	+ -	Addition and subtraction	left to right
6	< <= > >=	Relational less than and less than or equal to Relational greater than and greater than or equal to	left to right
7	== !=	Relational equal to and not equal to	left to right

Toipc: Logical Operator

1. AND operator &&

X	Y	X AND Y
0	0	0
0	1	0
1	0	0
1	1	1

2. OR operator ||

3 Not operata (Negation) !

X	!X
0	1
1	0

X	Y	X OR Y
0	0	0
0	1	1
1	0	1
1	1	1

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2 mins Summary

Topic

++, -- operators

Topic

Assignment, L-value, R-value

Topic

Relational operators

Topic

Topic

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THANK - YOU

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