CAP444
OBJECT ORIENTED PROGRAMMING USING C++

Session #2

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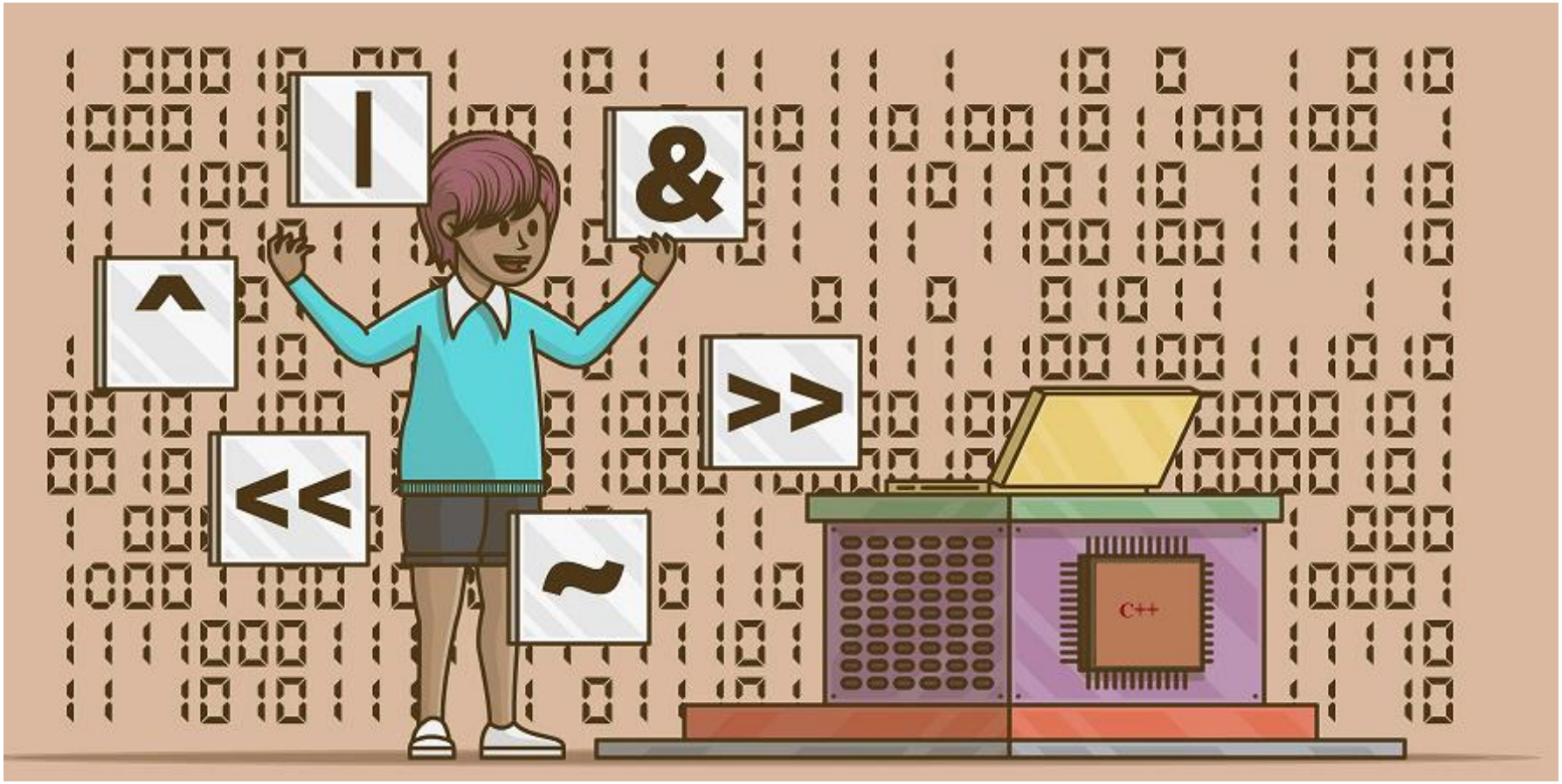
Today we are going to learn about……?



Operators

- Arithmetic operators
- Assignment operators
- Comparison operators
- Logical operators
- Bitwise operators
- Increment /decrement operators
- insertion operator/ extraction operator

Arithmetic operators

Operator	Name	Example
+	Addition	x + y
-	Subtraction	x - y
*	Multiplication	x * y
/	Division	x / y
%	Modulus	x % y

Assignment Operators

Operator	Example	Same As
=	x = 5	x = 5
+=	x += 3	x = x + 3
-=	x -= 3	x = x - 3
*=	x *= 3	x = x * 3
/=	x /= 3	x = x / 3
%=	x %= 3	x = x % 3
&=	x &= 3	x = x & 3
|=	x |= 3	x = x | 3
^=	x ^= 3	x = x ^ 3
>>=	x >>= 3	x = x >> 3
<<=	x <<= 3	x = x << 3

Comparison operators

Operator	Name	Example
==	Equal to	x == y
!=	Not equal	x != y
>	Greater than	x > y
<	Less than	x < y
>=	Greater than or equal to	x >= y
<=	Less than or equal to	x <= y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Logical operators

Operator	Name	Description	Example
&&	Logical and	Returns true if both statements are true	x < 5 && x < 10
||	Logical or	Returns true if one of the statements is true	x < 5 || x < 4
!	Logical not	Reverse the result, returns false if the result is true	!(x < 5 && x < 10)


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Bitwise operators

Operator	Description
&	AND Operator
|	OR Operator
^	XOR Operator
~	Ones Complement Operator
<<	Left Shift Operator
>>	Right Shift Operator

AND Operator (&)

If both side bit is on result will be On

a	b	a & b
0	0	0
0	1	0
1	0	0
1	1	1

Steps to solve:-

- **a = 12 (find binary form:1100)**
- **b = 25 (find binary form:11001)**

How to find Binary:

64	32	16	8	4	2	1	
		0	1	1	0	0	12
		1	1	0	0	1	25
			1	0	0	0	8

a & b=

01100 (12)

11001 (25)

01000 (8) Ans.

What will be output?

```
#include <iostream>

using namespace std;

int main()
{
    int a=20;
    int b=25;
    cout<<(a&b);
return 0;
}
```

A. 15
B. 16
C. 20

OR Operator (|)

If any side bit is on result will be On

a	b	a | b
0	0	0
0	1	1
1	0	1
1	1	1

Steps to solve:-

- **a = 12 (find binary form:1100)**
- **b = 25 (find binary form:11001)**

How to find Binary:

64	32	16	8	4	2	1	
		0	1	1	0	0	12
		1	1	0	0	1	25
		1	1	1	0	1	29

a | b=

01100 (12)

11001 (25)

11101 (29) Ans.

What will be output?

```
#include <iostream>

using namespace std;

int main()
{
   int a=20;
   int b=15;
   cout<<(a|b);
return 0;
}
```

A. 31
B. 32
C. 22
D. 32

XOR Operator (^)

If both side bit is opposite result will be On

a	b	a | b
0	0	0
0	1	1
1	0	1
1	1	0

Steps to solve:-

- **a = 12 (find binary form:1100)**
- **b = 25 (find binary form:11001)**

How to find Binary:

64	32	16	8	4	2	1	
		0	1	1	0	0	12
		1	1	0	0	1	25
		1	0	1	0	1	21

a ^ b=

01100 (12)

11001 (25)

10101 (21) Ans.

Left Shift Operator(<<)

a=10 (1010)

a<<1

1010.0

10100(20) Ans.

a<<2

1010.00

101000(40) Ans.

Right Shift Operator(>>)

a=10 (1010)

a>>1

1010.

101(5) Ans.

a>>2

1010.

10(2) Ans.

What will be output?

```
#include <iostream>
using namespace std;
int main()
{
  int a=15;
  cout<<(a>>1);
return 0;
}
```

Options:

A. 5

B. 6

C. 7

D. 8

Increment/Decrement Operator

++: Increment

++x

--: Decrement

--x

insertion operator(<<):

The cout is used in conjunction with stream insertion operator (<<) to display the output on a console

extraction operator (>>):

The cin is used in conjunction with stream extraction operator (>>) to read the input from a console.

Any Query?