PW SKILLS

C++
Output and Variables

Lecture- 1

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Today's checklist

1) Basic Printing, \n, printing numbers also with + and –.
2) Variables, printing variables, int, float,bool,char and +,–,*,/ of integers.
3) Modulus operator and increment ,decrement operator
4) Variables naming rules.
5) Comments in C++

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Basic program in C++

```
#include<iostream>
using namespace std;
int main(){
    cout<<“hello world”;
    return 0;
}
```

How to move in next line?

Example :

```
cout<<“Hello PW”;
cout<<“Hello CW”;
```

Output will be ?

Hello PW Hello PW

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Use of escape sequence ‘\n’ and endl

Example :

```
cout<<“Hello PW”;
cout<<“\n”; or cout<<endl;
cout<<“Hello CW”;
```

Output will be ?

```
# include <iostream>
using namespace std;
int main(){
    cout << "Hello PW";
    cout << endl;
    cout << endl;
    cout << "Hello CW";
}
```

Output

- Hello PW
-
- Hello CW

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Use of escape sequence '\n'

Predict the output :

```
main(){
    cout<<"nn\n\nnnn\n";
    cout<<"nn/n/nnn/n";
}
```

Output

- nn
-
- nn
- nn /n/n nn/n

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Printing Numbers (what computer thinks is a number and what is a number)

cout << " ___ " ;
↓
text

Examples :

```
cout<<4;

cout<<4+3;

cout<<"4+3";
```

Cout << number ;

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Variables and their Declaration

Let us focus on int data type as of now.

1) Variables as containers :

```
#include<iostream>
using namespace std;
int main(){
    int x;
    x = 7;
    cout<<x;
}
```

Output

7

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```cpp
#include<iostream>
using namespace std;
int main(){
    int x;
    x = 7;
    x = 10;
    x = 19;
    cout<<x;
}
```

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Printing Variables in C++ & Updation of Variables

```
int x = 5;
cout<<x;
x = 7;
cout<<x;
x = x + 6;
cout<<x;
x = x - 20;
cout<<x;
```

```
#include<iostream>
using namespace std;
int main(){
    int x;
    x = 19;
    cout<<x<<endl;
    x = x + 10;
    cout<<x;
}
```

Output

- 19
- 29

$x = x + 10$

$x = 19 + 10 \Rightarrow 29$

Printing Variables in C++ & Updation of Variables

```
int x = 5;
cout<<x;
x = 7;
cout<<x;
x = x + 6;
cout<<x;
x = x - 20;
cout<<x;
```

Output

- 5 7 13 -7

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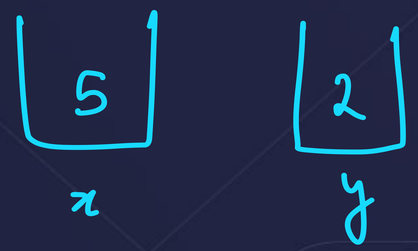
Arithmetic operations on int data type

```
int x = 5;
int y = 2;
cout<<x+y;
cout<<x-y;
cout<<x*y;
cout<<x/y;
```

+ , - , * , /

↓

special



5/2 = 2.5 → 2

29/10 = 2.9 → 2

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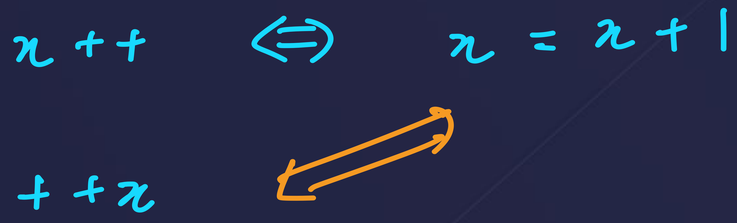
Increment – Decrement operators and Comments

```
int x = 5;
x++;
cout<<x;
x--;
cout<<x;
++x;
cout<<x;
--x;
cout<<x;
```



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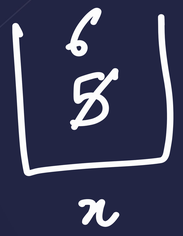
```
int x = 5;
cout << x++ <<endl;
cout << x ;
```

Output

- 5
- 6

✓ `int x = 5;`
✓ `cout << ++x <<endl;`
✓ `cout << x ;`



Output

- 6
- 6

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Example : Take two integers ~~input~~, **a** and **b** : **a>b**, and find the remainder when **a** is divided by **b**.

```
int a = 10;
int b = 3;
int r;
```

```
   3
3 | 10
    9
   ---
    1
```

Quotient
Divisor) Dividend
=
Remainder

** Dividend = Divisor X Quotient + Remainder

a = b*q + r

a b q r

→ r = a - b*q

```cpp
#include<iostream>
using namespace std;
int main(){
    int a = 16; // a means dividend
    int b = 3; // b is divisor
    int q = a/b; // q is quotient
    int r; // r is remainder
     // a = (b*q) + r
    r = a - (b*q);
    cout<<r;
}
```

$$r = a - (b * \frac{a}{b}) = 0$$

Output

1

$$r = 16 - (3*5)$$

$$r = 16 - 15 = 1$$

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Modulus Operator(%)

if $a > b \rightarrow a \% b \rightarrow$ remainder

$a = b$

$a < b \rightarrow a \% b = ??$

Used to find the remainder

```
int a=10;
int b=4;
int Remainder = a%b
```

if $a < b$ then

$a \% b = a$

$2 \% 4 = 2$

```
    2 4
4 | 9 9
    8
    --
    1 9
    1 6
    --
      3
```

```
4 | 2
```

```
    2
4 | 1 0
    8
    --
    2
```

Properties

BODMAS
↓
* / + −

1) if $a < b \rightarrow a \% b = a$

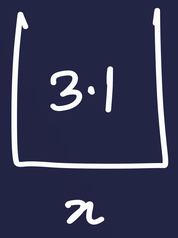
2) $a \% (-b) = a \% b$

3) $(-a) \% b = -(a \% b)$

4) $(-a) \% (-b) = (-a) \% b = -(a \% b)$

Float data type

```
float x = 3.1;
```



1) `cout << 5/2;` 2

2) `cout << 5.0/2;` 2.5

3) `cout << 5/2.0;` 2.5

4) `cout << 5.0/2.0;` 2.5

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Arithmetic operations on float data type

```
float x = 5;

float y = 2;

cout<<x+y;  → 7

cout<<x-y; →  3

cout<<x*y; → 10

cout<<x/y; → 2.5
```

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Example : Calculating percentage of 5 subjects

```
float x1 = 90; // x1 can be physics
float x2 = 91; // x2 can be chemistry
float x3 = 92; // x3 can be maths
float x4 = 93; // x4 can be english
float x5 = 94; // ohh wait comments ke baare me to bataya hi nahi xD
float percent = (x1 + x2 + x3 + x4 + x5)/5;
cout<<percent;
// change the marks and run each time
```

Example : Calculating Area of a Circle

```
float radius = 5;
float pi = 3.1415;
float area = pi*radius*radius;
cout<<area;
```

$8 * 8 * \frac{22}{7}$

$64 * \frac{22}{7}$

64×3.14

$$A = \pi r^2 = \pi * r * r$$

$$= 3.14 * r * r$$

Boolean data type

```
bool x = true;
```

false

true = 1 → on

false = 0 → off

```
cout << (7 < 4);
```

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Example : Find the output

```
#include<iostream>
using namespace std;
    int main(){
    int a = 0,b = 5;
    //cout<<b<<endl;
    cout<<a<<endl;
}
```

Output

0

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Variable Naming rules

1) Variables can start from an alphabet or underscore _ or $.
2) Special characters except _ and $ are not allowed.
3) Some particular keywords are not allowed.
4) Commas or blanks are not allowed.

auto	double	int	break	extern	enum	unsigned	while
case	sizeof	for	const	static	long	continue	float
else	signed	do	short	switch	char	volatile	default
goto	struct	if	union	return	void	register	typedef

float x ;

Variable Naming rules – Examples

Q. Which of the following are invalid variable names and why?

BASICSALARY	_basic	basic-hra
#MEAN	group.	422
population in 2006	over time	mindovermatter
FLOAT	hELLO	queue.
team’svictory	Plot#3	2015_DDay

Example : Calculating Simple Interest

```
float p,r,t,si;
p = 100;
r = 10;
t = 2;
si = (p*r*t)/100;
cout<<si;
```

$$SI = \frac{PRT}{100}$$

$$\frac{1000 \times 2.2 \times 2}{100} = 44$$

```
float p = 1000
float r = 27.5
float t = 3.5
float si;
```

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Try This!

Predict the output :

```
int main(){
    float a = 5, b = 2;
    int c;
    c = a % b;
    cout<<c;
    return 0;
}
```

Output

1 ~~0~~

Error

modulus operator → a % b → int

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What's this line?

```
#include <iostream>
int main(){
    return 0;
}
```

Compilation Process

MingW Compiler

VS Code Text Editor

Code → English / C++

Compiler

Computer

0's 1's

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MCQ Time !

MCQ 1

Which of the following statements is false

(1) Each new C++ instruction has to be written on a separate line false

(2) Usually all C++ statements are entered in small case letters true

(3) Blank spaces may be inserted between two words in a C++ statement true

(4) Blank spaces cannot be inserted within a variable name true

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MCQ 2

If a is an integer variable, a = 5 / 2 ; will return a value

(1) 2.5

(2) 3

(3) 2

(4) 0

```
int a;
a = 5/2;
```

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MCQ 3

What will be the value of d if d is a float after the operation d = 2 / 7.0?

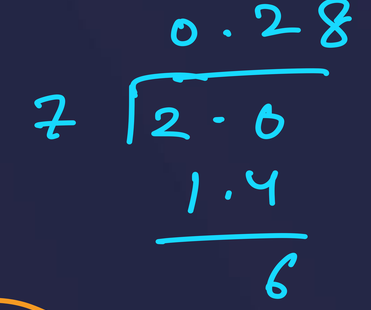
(1) 0

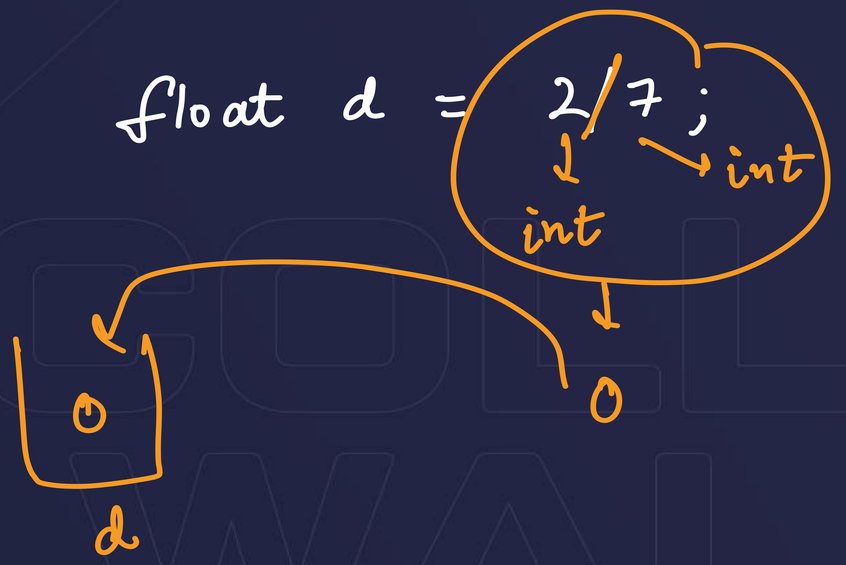
(2) 0.2857

(3) Cannot be determined

(4) None of the above

```
float d;
d = 2/7.0;
```





THANK YOU

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