(Video 10) Fundamental Datatype - Float, Double and Long Double

Outline:

→ Float, Double and Long Double, size and difference

→ Brief intro to fixed and floating point

→ Coding example

Float, Double, Long Double → represents fractional number

3.14, 0.678, -3267.9696,

0.0000000009 etc.

- Float → 32 bit → 4 byte / 32
- Double → 64 bit → 8 byte / 64
- Long Double → 96 bit → 12 byte / 96

> Their size typically dependes from system to system.

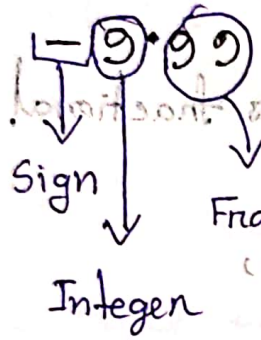
- Float → IEEE 754 single Precision Floating Point
- Double → IEEE 754 Double Precision Floating Point
- Long Double → Extended Precision Floating Point.

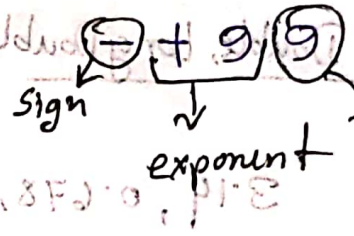
2 type representation for ~~floating~~ Fractions.

Fixed Point

Floating Point

[Let we are available with 4 places]





Minimum Value = -9.99

Maximum Value = +9.99

any number in beth this range is possible

Formula: $(0.M) * Base^{Expo}$

min value: $-(0.9) * 10^{+9}$

max value: $+(0.9) * 10^{+9}$

Huge range even more

compared to fixed point.

```c
# include <stdio.h>
int main() {
    float van1 = 3.14159265358979 32;
    double van2 = 3.14159265358979 32;
    long double van3 = 3.1415926535897932134 56;
    printf("%d \n", sizeof(float));        // 4 byte
    printf("%d \n", sizeof(double));       // 8 byte
    printf("%d \n", sizeof(long double));  // 12 byte

    printf("%.16f \n", van1);    // .16 → 16 digit after point
    printf("%.16lf \n", van2);   // .16 → 16 digit, lf → small l
    printf("%.21Lf \n", van3);   // .21 → 21 digit, Lf → capital L
}
```

7 digit পর্যন্ত precisely print করবে। এর পর থেকে garbage value দিবে

Float → 7 digits

1 . 2 3 4 5 6 7

□.□□□□□□

Double → 16 digits

Long Double → 19 digits

> point এর পরের থেকে count করতে হবে।

```c
#include<stdio.h>
int main()
{
    int var1 = 4/9;
    printf("%d\n", var1);      // 0

    float var2 = 4/9;          // -> 2টা integer এ ভাগ করে বাকির জন্য ont হয়ে যায়।
    printf("%f\n", var2);      // 0.00

    float var3 = 4.00f/9.00f;
    printf("%.2f\n", var3);    // 0.44

}
```