CE 100 ACCURACY OF COMPUTATION

BASE 2

SIGN
1 0 1 1

-3

2's COMPLEMENT
-2 110
+3 011
0001 +1

```
  1 1
  0110
+ 1011
------
 10001
```

0110 6

FLIP 1001
+1
1010 -6

BIAS

SHIFT OF ~~RANGE~~
TO ALLOW ~~EASY~~
COMPARISON

REAL ~~FLOAT~~

32 BITS

1 SIGN | 8 BITS EXP | 23 BITS NUMBER

23.25

10111,01

16 8 4 2 1 ½ ¼

23.2

exp

1. _____ × 2^4

1. 011101 × 2^4

0 | 0 0 0 0 0 1 0 0 | 01101

4 | 23 BITS

1. 0000.....

37994642.37

+ .0000000001

Decimal value	Binary (two's-complement representation)
0	000
1	001
2	010
3	011
-4	100
-3	101
-2	110
-1	111

Type	Size in Bytes	Range
byte	1 byte	-128 to 127
short	2 bytes	-32,768 to 32,767
int	4 bytes	-2,147,483,648 to 2,147,483, 647
long	8 bytes	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
float	4 bytes	approximately ±3.40282347E+38F (6-7 significant decimal digits) *Java implements IEEE 754 standard*
double	8 bytes	approximately ±1.79769313486231570E+308 (15 significant decimal digits)
char	2 byte	0 to 65,536 (unsigned)