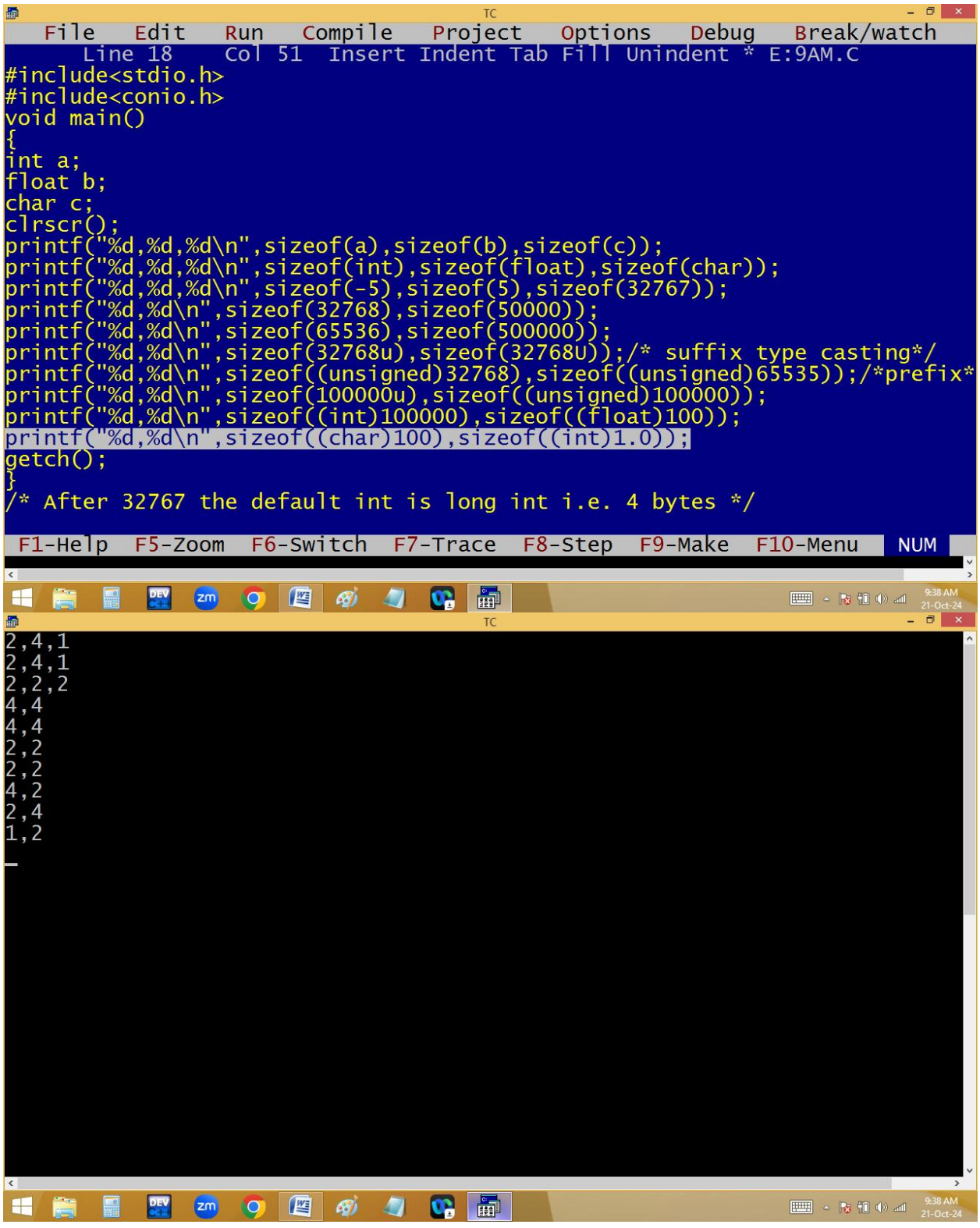
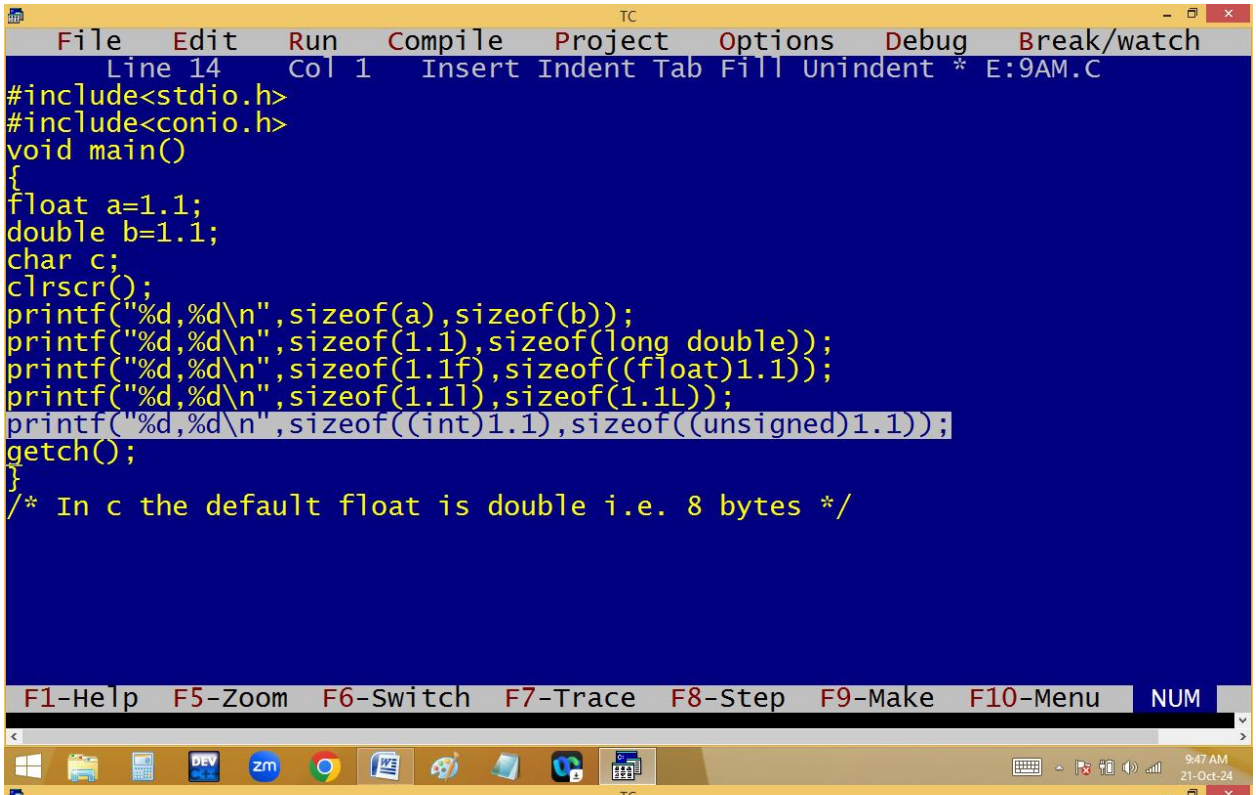
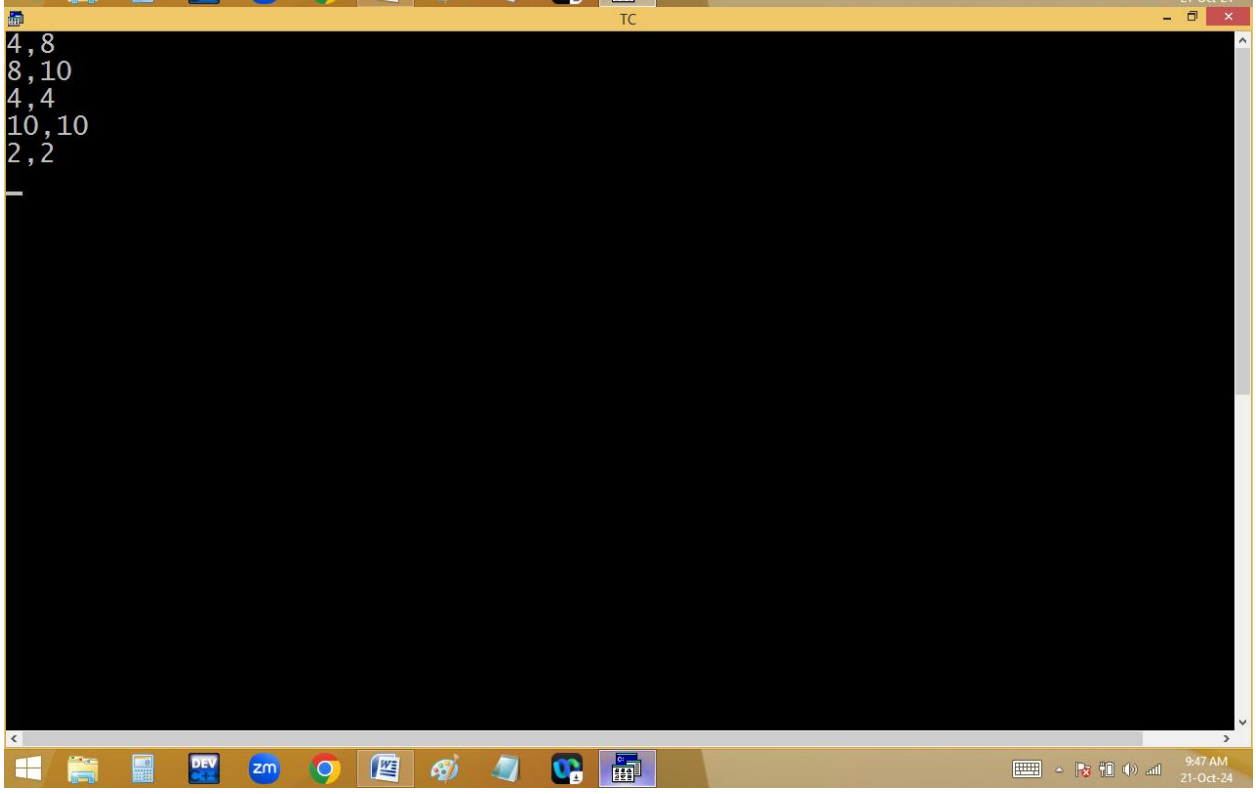
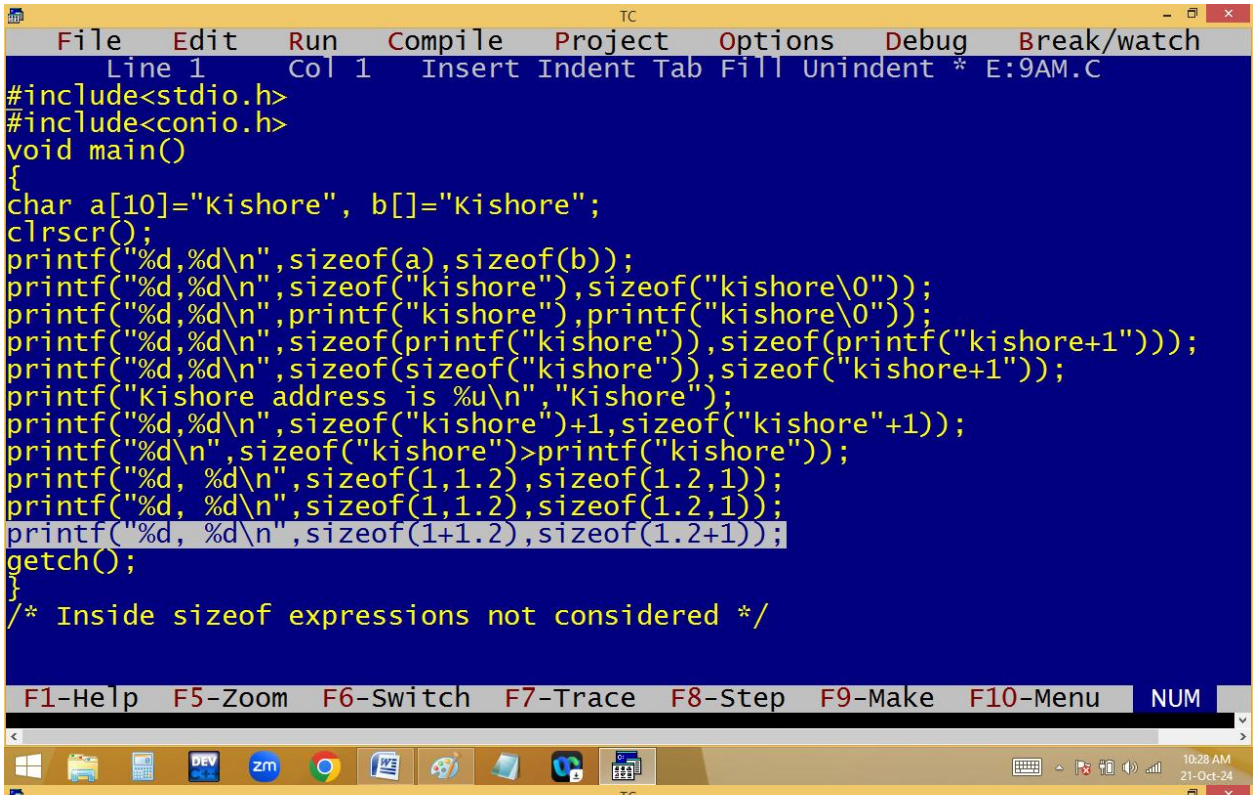
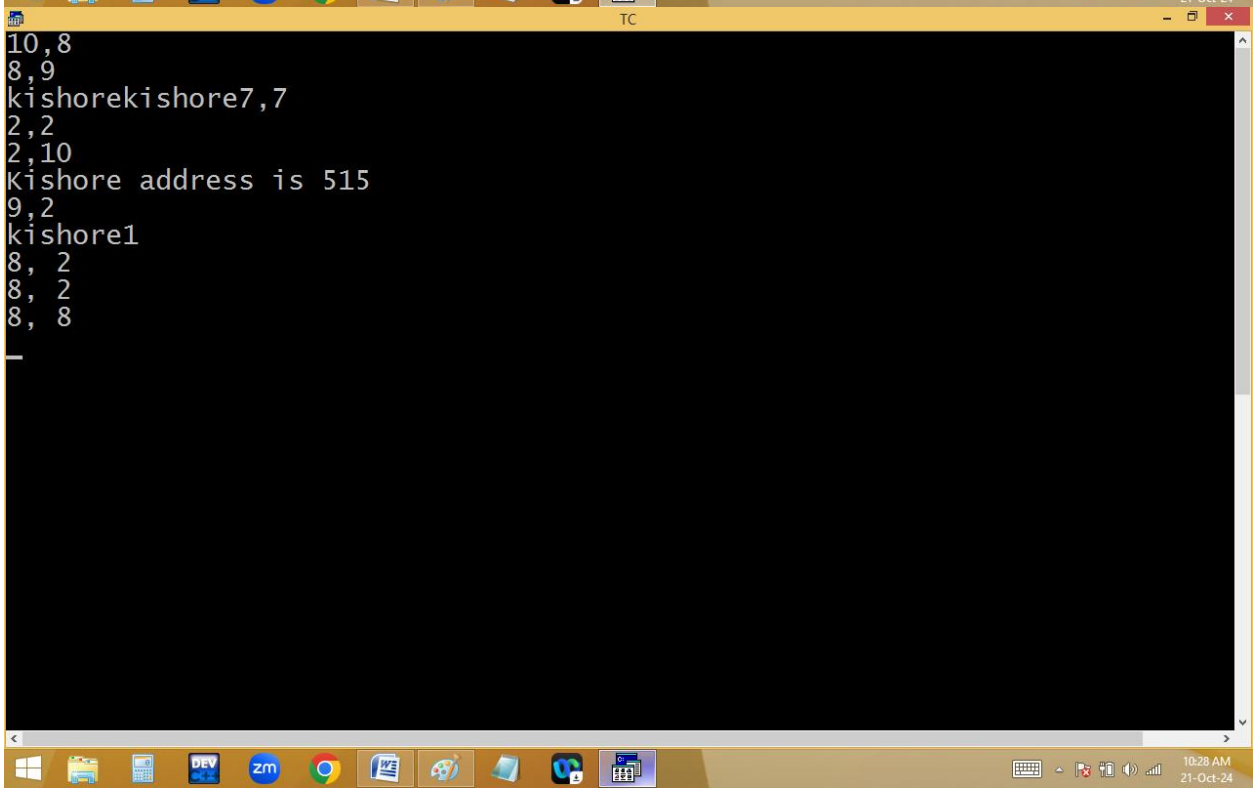
Sizeof() operator: It return the no of bytes required for a variable / value / data type.

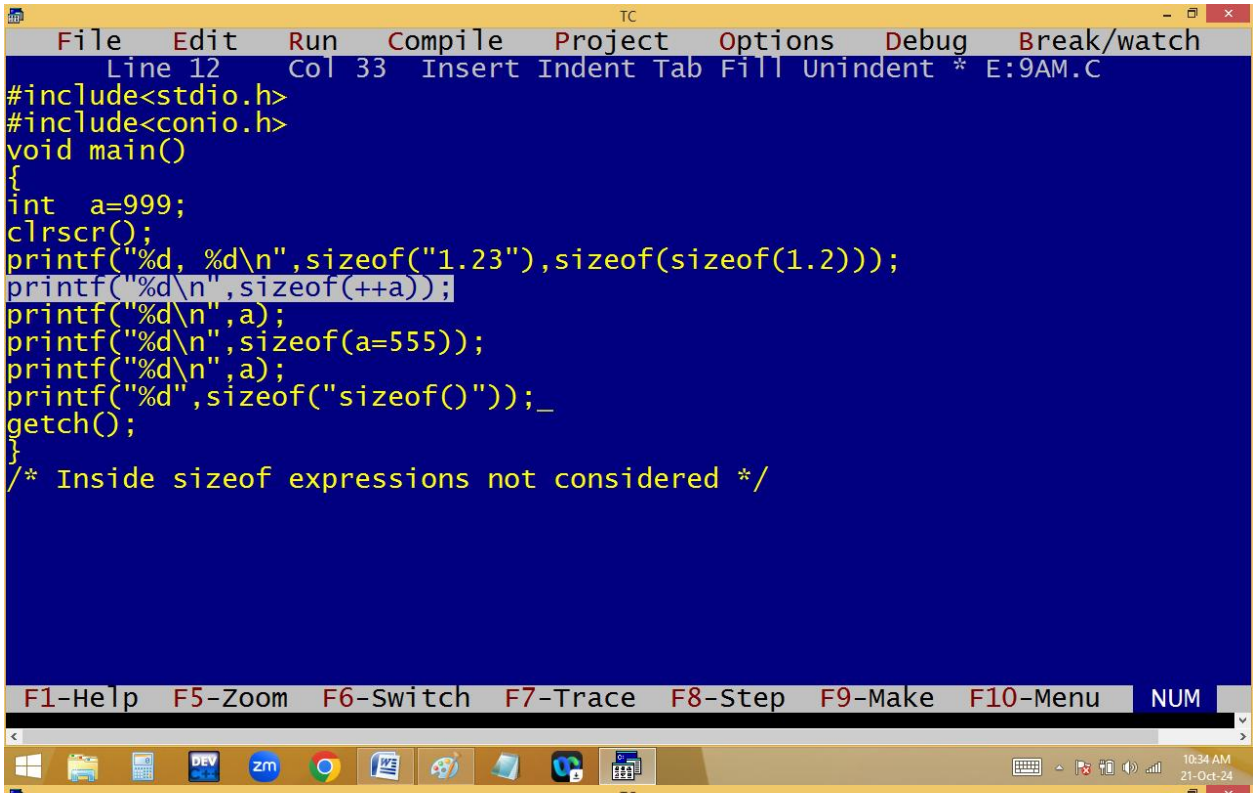


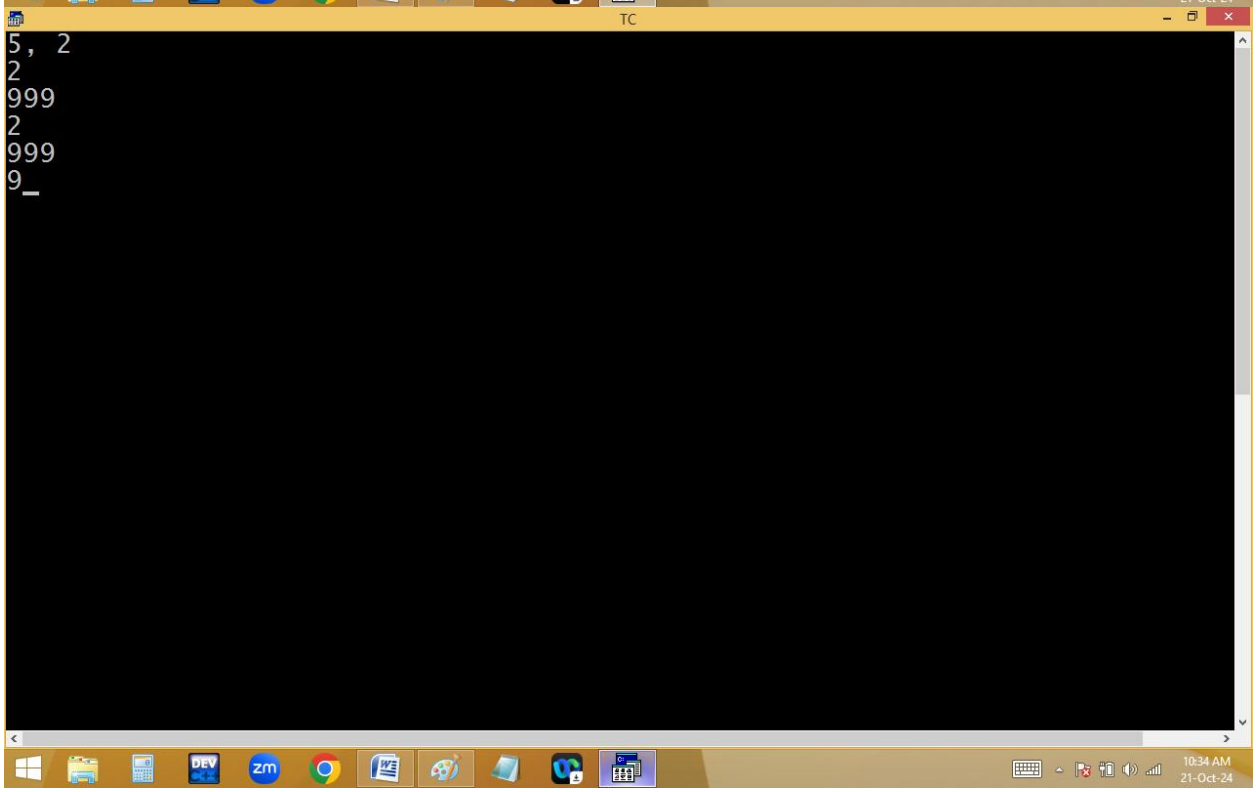

TC
File Edit Run Compile Project Options Debug Break/watch
Line 14 Col 1 Insert Indent Tab Fill Unindent * E:9AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
float a=1.1;
double b=1.1;
char c;
clrscr();
printf("%d,%d\n",sizeof(a),sizeof(b));
printf("%d,%d\n",sizeof(1.1),sizeof(long double));
printf("%d,%d\n",sizeof(1.1f),sizeof((float)1.1));
printf("%d,%d\n",sizeof(1.1l),sizeof(1.1L));
printf("%d,%d\n",sizeof((int)1.1),sizeof((unsigned)1.1));
getch();
}
/* In c the default float is double i.e. 8 bytes */
F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Menu NUM

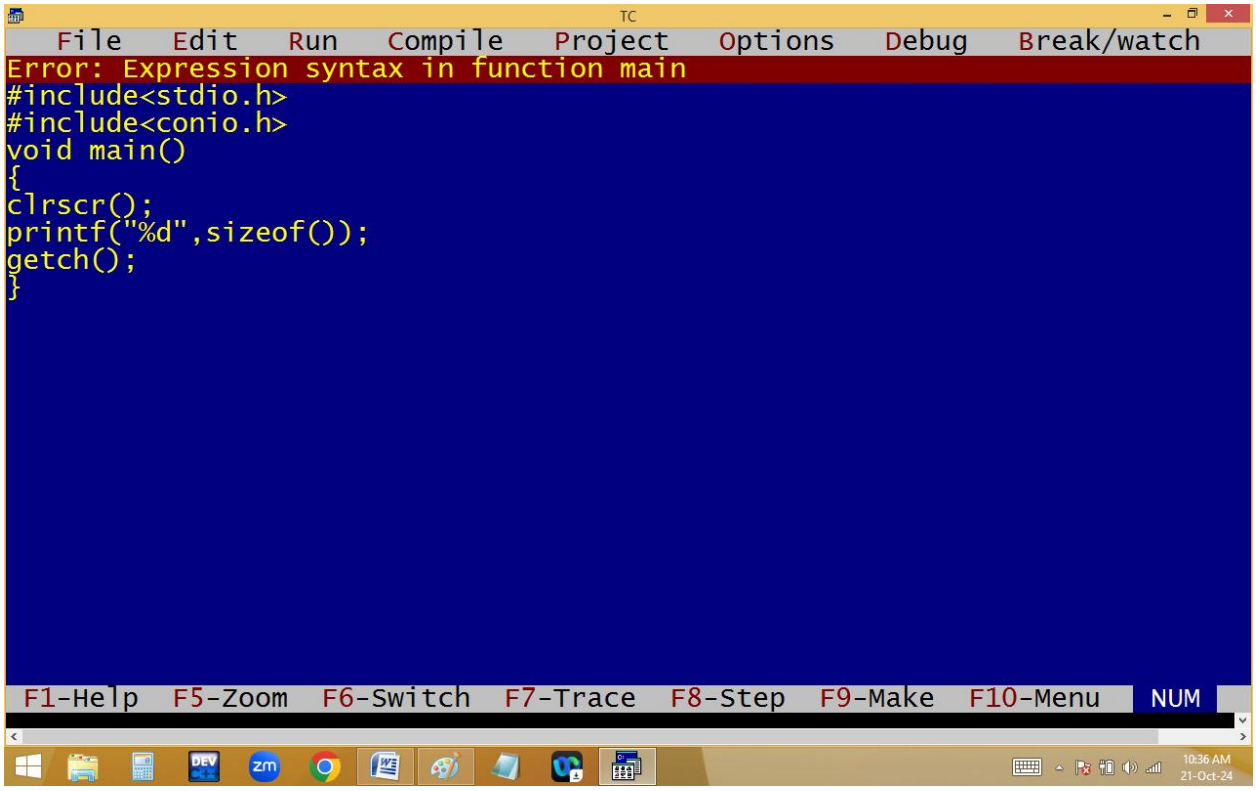

TC
4,8
8,10
4,4
10,10
2,2


TC
File Edit Run Compile Project Options Debug Break/watch
Line 1 Col 1 Insert Indent Tab Fill Unindent * E:9AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
char a[10]="Kishore", b[]="Kishore";
clrscr();
printf("%d,%d\n",sizeof(a),sizeof(b));
printf("%d,%d\n",sizeof("kishore"),sizeof("kishore\0"));
printf("%d,%d\n",printf("kishore"),printf("kishore\0"));
printf("%d,%d\n",sizeof(printf("kishore")),sizeof(printf("kishore+1")));
printf("%d,%d\n",sizeof(sizeof("kishore")),sizeof("kishore+1"));
printf("Kishore address is %u\n","Kishore");
printf("%d,%d\n",sizeof("kishore")+1,sizeof("kishore"+1));
printf("%d\n",sizeof("kishore")>printf("kishore"));
printf("%d, %d\n",sizeof(1,1.2),sizeof(1.2,1));
printf("%d, %d\n",sizeof(1,1.2),sizeof(1.2,1));
printf("%d, %d\n",sizeof(1+1.2),sizeof(1.2+1));
getch();
}
/* Inside sizeof expressions not considered */
F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Menu NUM


TC
10,8
8,9
kishorekishore7,7
2,2
2,10
Kishore address is 515
9,2
kishore1
8, 2
8, 2
8, 8


TC
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 33 Insert Indent Tab Fill Unindent * E:9AM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a=999;
clrscr();
printf("%d, %d\n",sizeof("1.23"),sizeof(sizeof(1.2)));
printf("%d\n",sizeof(++a));
printf("%d\n",a);
printf("%d\n",sizeof(a=555));
printf("%d\n",a);
printf("%d",sizeof("sizeof()"));
getch();
}
/* Inside sizeof expressions not considered */
F1-Help F5-Zoom F6-Switch F7-Trace F8-Step F9-Make F10-Menu NUM


TC
5, 2
2
999
2
999
9



BITWISE OPERATORS

Bitwise operator's works on bits.

Turbo-c is a 16 bit compiler. Due to this bitwise operations are limited to 16 bits only [2^0 to 2^{15}].

Bitwise operators operate **integer** type values only.

We have to calculate only the **on** bits [**1**].

When the first bit[**Sign bit**] is **1** then the number is **Negative** and it is **0** then the number is **positive**.

They are very much used in system software development.

Note: Bitwise operator is low level feature.

C-Language supports following bitwise operators.

& -Bitwise and

| - Bitwise or

^ - XOR ==> Exclusive OR

~ - Compliment operator

<< - Left shift operator

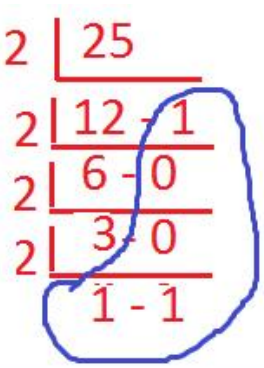
>> - Right shift operator

& - Bitwise and: In this both bits are 1's then result bit is 1. Otherwise result bit is 0.

Eg: **25 & 15 = 9**

25 = 0000 0000 0001 1001

15 = 0000 0000 0000 1111



---

25 & 15 = 9

25 = 0000 0000 0001 1001

15 = 0000 0000 0000 1111

&

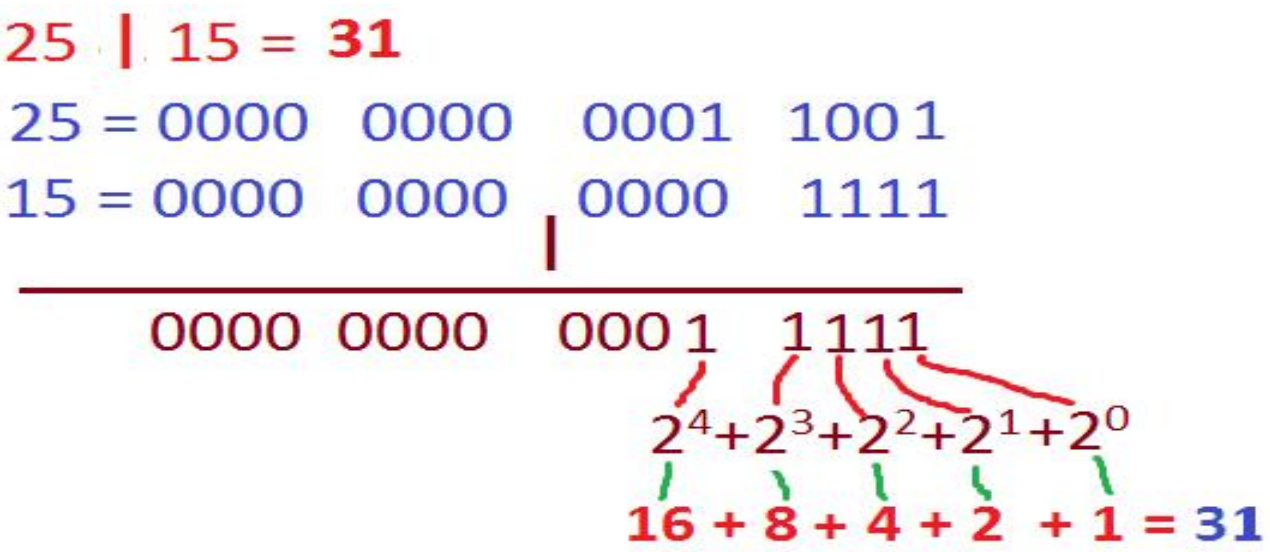
0000 0000 0000 1001

$2^3 + 2^0$

8 + 1 = **9**

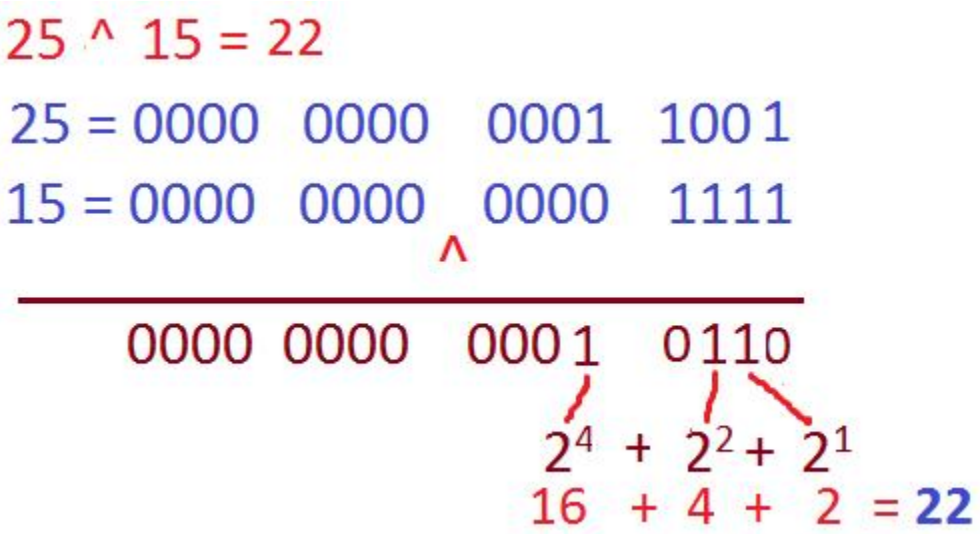
| - Bitwise or: In this both bits are 0's then result bit is 0. Otherwise result bit is 1.

Eg: 25 | 15 = 31



^ - XOR [Exclusive OR]: In this both bits are same then result bit is 0. Otherwise result bit is 1.

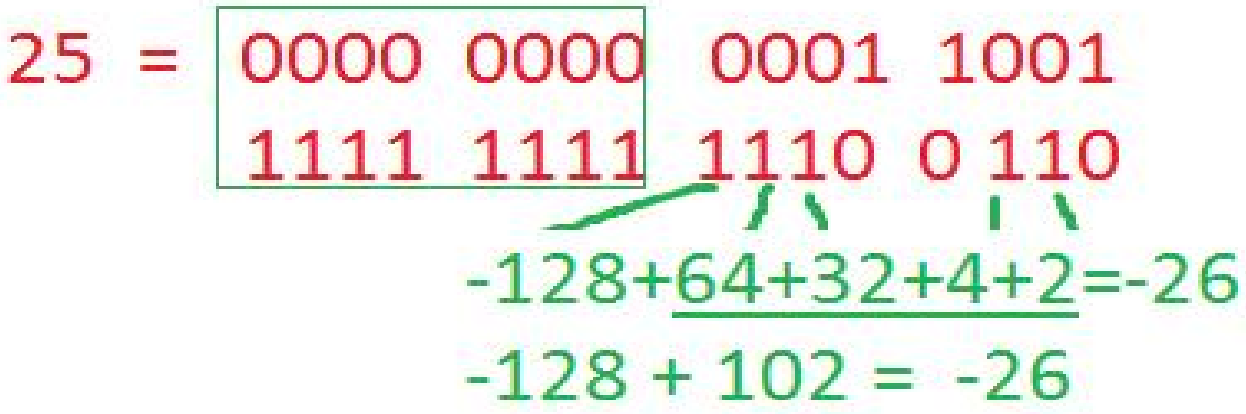
Eg: 25 ^ 15 = 22



~ - Compliment operator: In compliment operation the bits are complimented. i.e.

1’s become 0’s and 0’s become 1’s. Due to this +Ve no becomes –Ve and –Ve no becomes +Ve.

eg: **~25 ➔ -26**



25 = 0000 0000 0001 1001
~ = 1111 1111 1110 0110

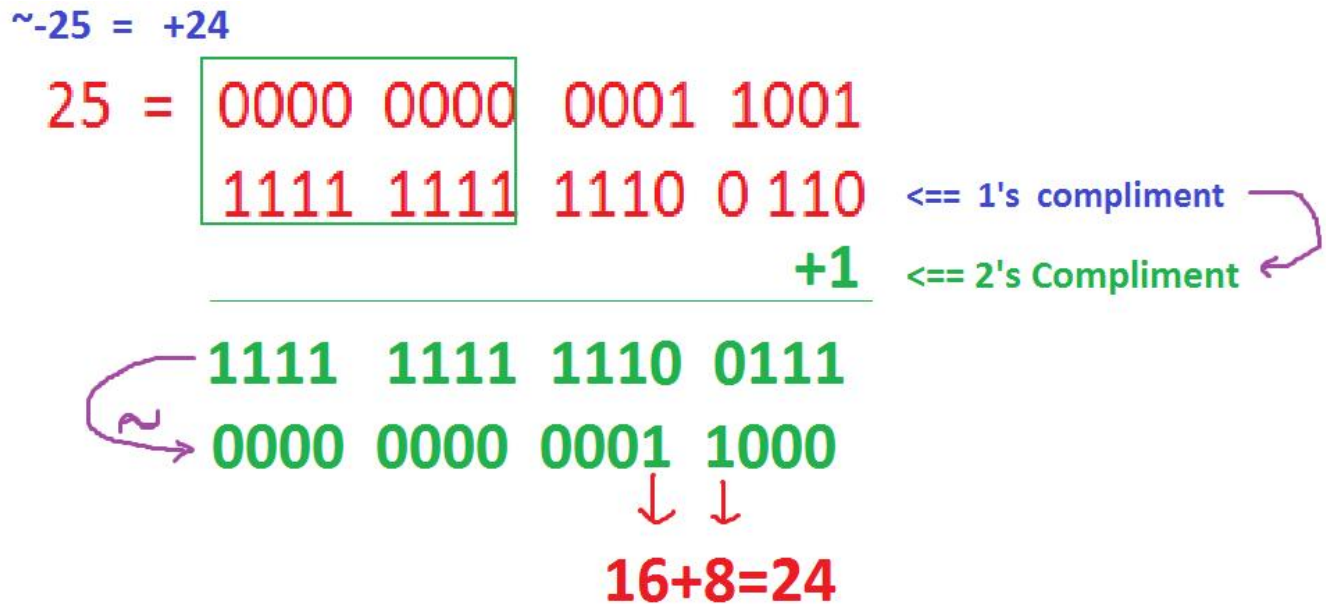
2+4+32+64+128+256+512+1024+2048+4096+8192+16384-32768=-26

~-25 = 0000 0000 0001 1001
1's ~ = 1111 1111 1110 0110
2's ~ = 0000 0000 0000 0001
1111 1111 1110 0111

16+8=24

Note: When starting bit is 1 given no is –Ve.

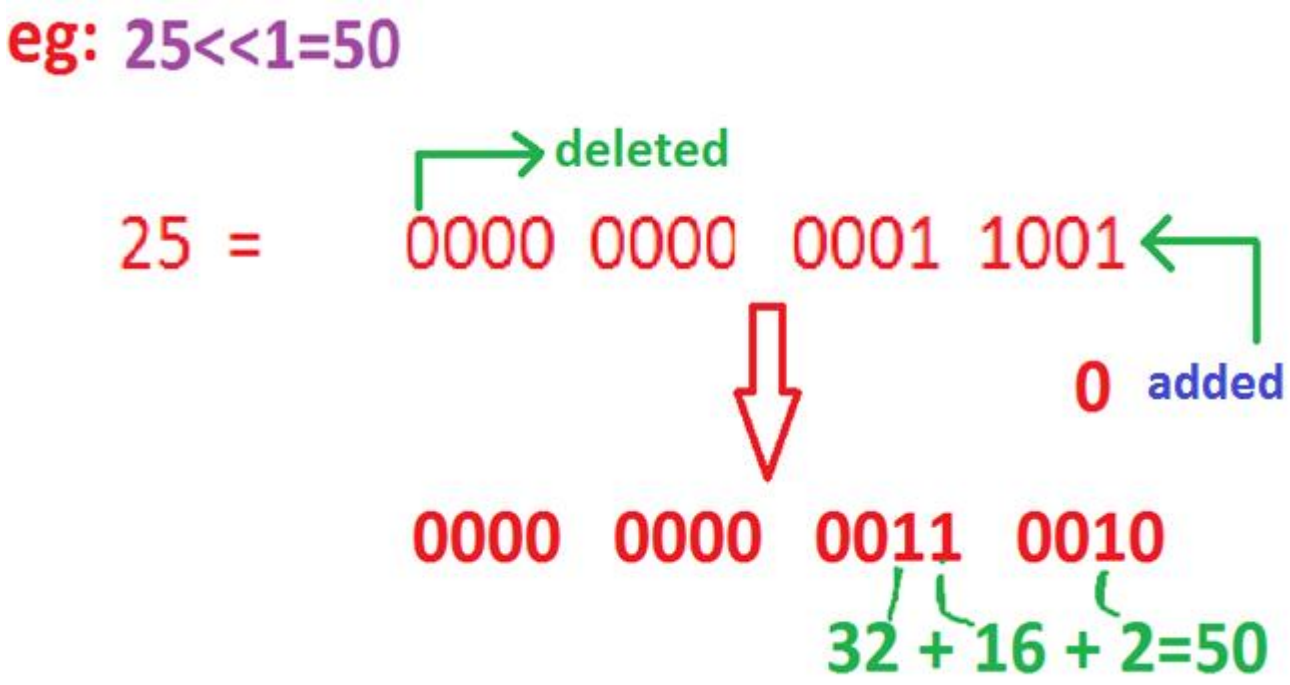
Eg: ~-25 ➔ +24



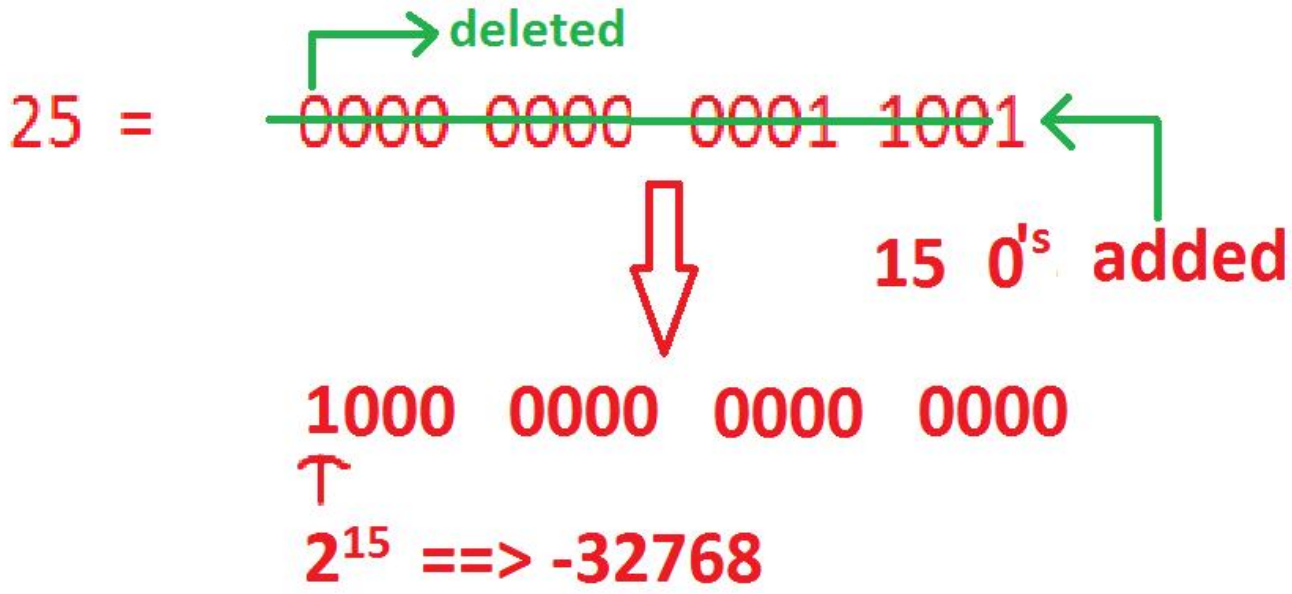
<< - left shift operator:

In left shift operation, the specified no of bits are deleted from left side and the same no of zeros added on right side. In left shift operation, most probably the value is multiplied with 2 that no of times.

Eg:25<<1=50, 25<<2=100, 25<<15 =-32768, 25<<16=0



eg: 25<<15 = -32768



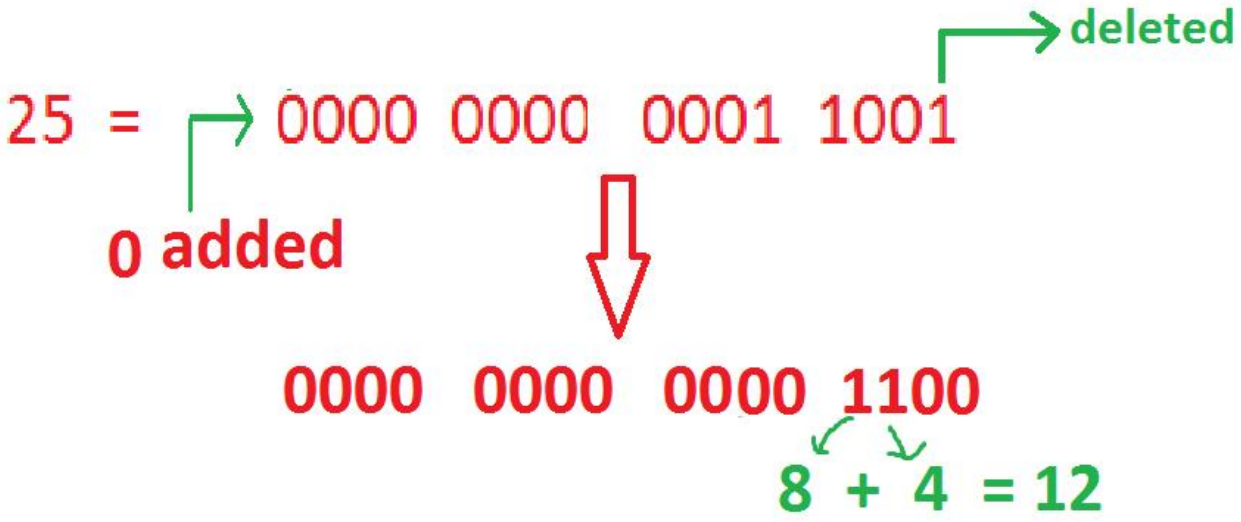
Note: When starting bit 1 no is negative.

>> - Right shift operator:

In right shift operation, the bits are moved to right side i.e. the specified no.of bits are deleted from right side and same no.of zero's are added left side. Due to this always the number is divided with 2 that no of times.

Eg:25>>1=12, 25>>2=6, 25>>3=3, 25>>4=1,25>>5=0

eg: 25 >>1 = 12



eg: 25 >> 5 = 0