Floating Point Numbers

IEEE-754 representation

Single Precision - 32 bits

s	exponent	significand
1 bit	8 bits	23 bits

Double Precision - 64 bits

s	exponent	significand
1 bit	11 bits	52 bits

IEEE-754 fields

- Sign bit: 1 if -ve
- Exponent: value of exponent + 127 (single precision) -special exponent values 0 and 255 used to code for 0 and Nan and Infinity
- Significand: Leading bit is implicit - this field contains the bits *after* the binary point

Elaboration (float)

Exponent	Significand	*Object represented*
0	0	0
1-254	anything	floating-point number
255	0	infinity
255	nonzero	Nan
0	nonzero	denormalized number

C Examples

```
#include <conio.h>
#include <stdio.h>
union dami {
            float f;
            long  l;
            } tt[4];
void main()
  {
  FILE *fp;
  fp= fopen ("xxx.txt", "w");
  clrscr();
  tt[0].f = 1.0;
  tt[1].f = -1.0;
  tt[2].f = 0.0;
  tt[3].f = 1.25;
  fprintf(fp,"%08lx\n", tt[0].l);
  fprintf(fp,"%08lx\n", tt[1].l);
  fprintf(fp,"%08lx\n", tt[2].l);
  fprintf(fp,"%08lx\n", tt[3].l);
  }
```

Result:

3f800000
bf800000
00000000
3fa00000