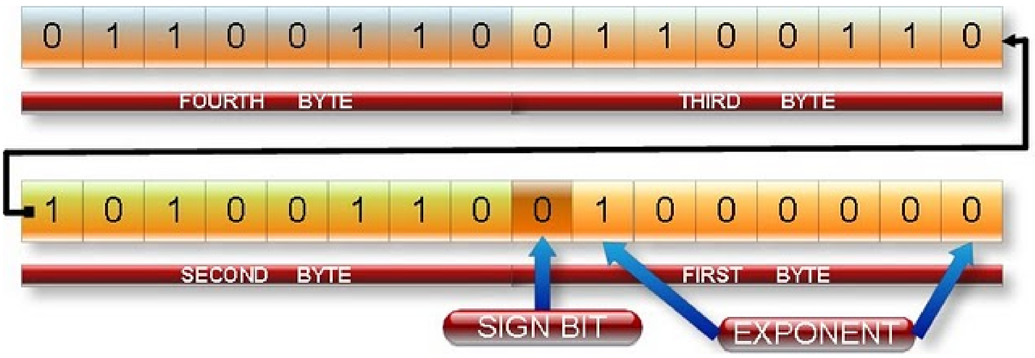
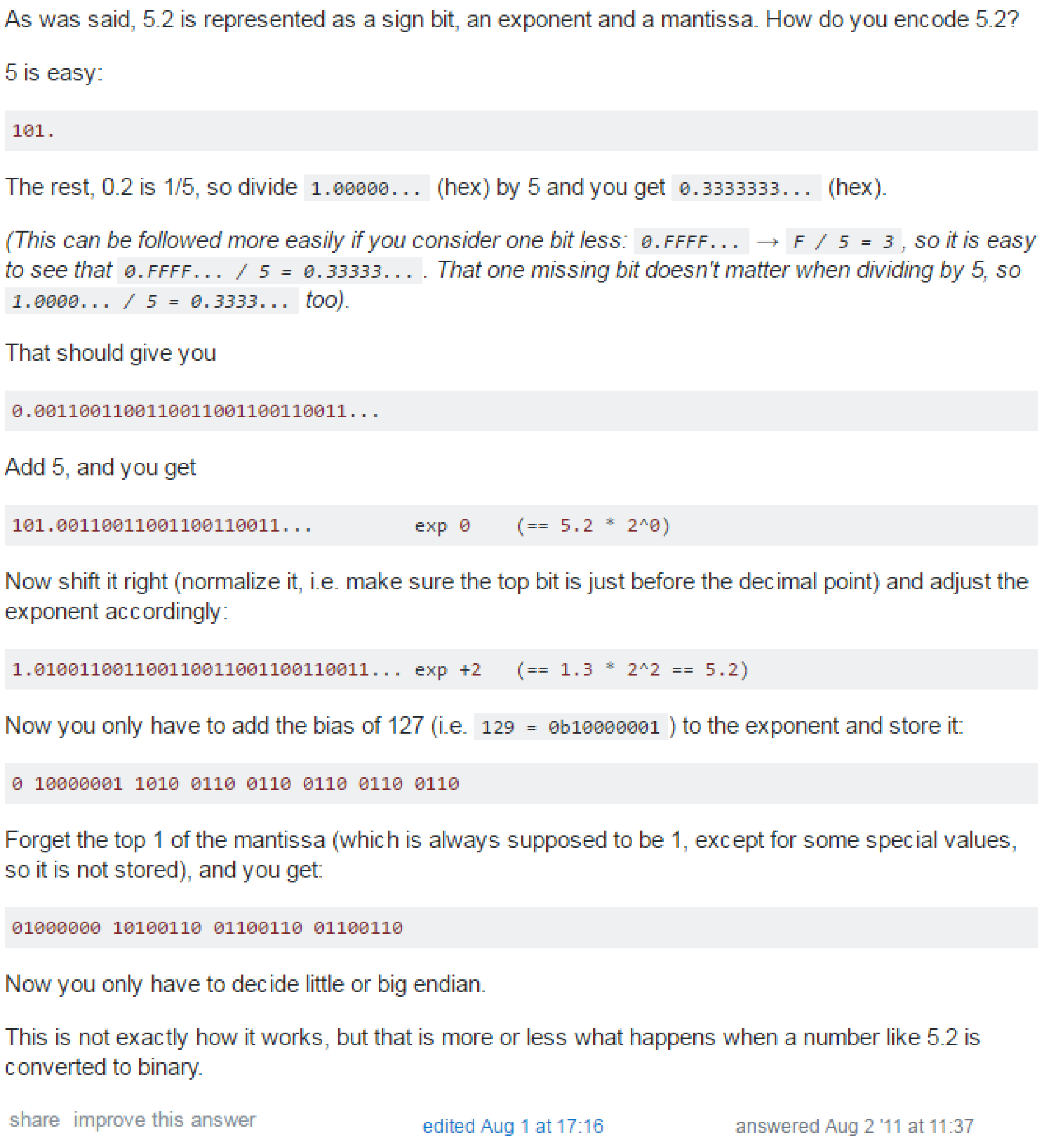
float类型在内存中的存储

- **浮点数5.2在内存中的存储方式**





As was said, 5.2 is represented as a sign bit, an exponent and a mantissa. How do you encode 5.2?

5 is easy:

```
101.
```

The rest, 0.2 is 1/5, so divide `1.00000...` (hex) by 5 and you get `0.3333333...` (hex).

(This can be followed more easily if you consider one bit less: `0.FFFF...` → `F / 5 = 3`, so it is easy to see that `0.FFFF... / 5 = 0.33333...`. That one missing bit doesn't matter when dividing by 5, so `1.0000... / 5 = 0.3333...` too).

That should give you

```
0.0011001100110011001100110011...
```

Add 5, and you get

```
101.00110011001100110011...         exp 0    (== 5.2 * 2^0)
```

Now shift it right (normalize it, i.e. make sure the top bit is just before the decimal point) and adjust the exponent accordingly:

```
1.010011001100110011001100110011... exp +2   (== 1.3 * 2^2 == 5.2)
```

Now you only have to add the bias of 127 (i.e. `129 = 0b10000001`) to the exponent and store it:

```
0 10000001 1010 0110 0110 0110 0110 0110
```

Forget the top 1 of the mantissa (which is always supposed to be 1, except for some special values, so it is not stored), and you get:

```
01000000 10100110 01100110 01100110
```

Now you only have to decide little or big endian.

This is not exactly how it works, but that is more or less what happens when a number like 5.2 is converted to binary.

share improve this answer   edited Aug 1 at 17:16   answered Aug 2 '11 at 11:37

注意：

浮点类型的最高有效位是7位。