Course Name: A Level (1st Sem) **Subject: CO**

Topic: Number Representation Contd. **Date: 24-04-20**

IEEE 754 32-Bit method: Following are the steps that we follow to represent a Floating Point number in 32bit register:

1. **Binary Conversion**
2. **Normalization**
3. **Representation**

Ex. 1- Represent the number (+362.625) in 32 bit register using IEEE 754 method.

Here the number is (+362.625). Its integer part is 362 and fractional part is .625

Step1- We convert the binary of both parts.

$(362)_{10} = (101101010)_2$ & $(.625)_{10} = (101)_2$

Hence the entire number becomes $(+362.625)_{10} = (101101010.101)_2$

Step2- We normalize the converted binary in to the [m x r^e] format. For this, we move the decimal point to the extreme left leaving one single 1 omitted.

Thus it becomes 1.01101010101×2^8 {since the decimal point has been moved 8 places left}

Step3- We prepare our parts for representation.

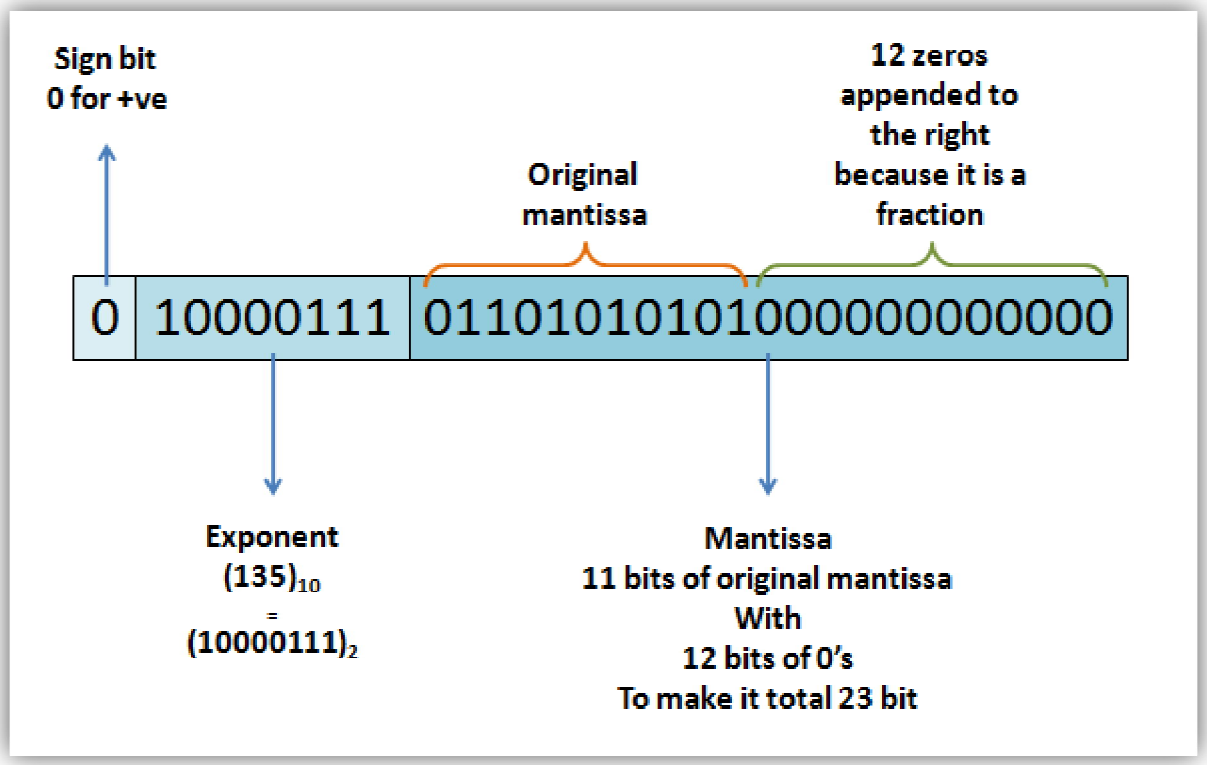
The sign = 0 {for positive}

Mantissa = 01101010101 {the fractional part leaving the MSB 1 omitted}

Exponent = (8 + 127) = 135 {See the NOTE}

NOTE: The fact behind adding 127 to the exponent is a bit more interesting. Since IEEE hasn't defined the exact side where the fractional point should be moved while normalization. A left movement will produce a +ve exponent while a right movement will produce a -ve exponent. Now to make sure that the exponent is always +ve while storing in the register, we do add 127 (2^8 / 2) to our produced exponent.

Now the representation



NOTE: Another example of this representation will be discussed tomorrow for –ve numbers. Till then observe this example.

Assignment:

1. Represent the number (+589.1250) in 32 bit register using IEEE 754 method.