1) Given the number 4.172 meters
I interpret this number at 4 whole meters
And the 0.172 part I interpret as a portion of a whole meter
My first question is this; is 0.172 (the fractional part) still in meters or is this in cm?

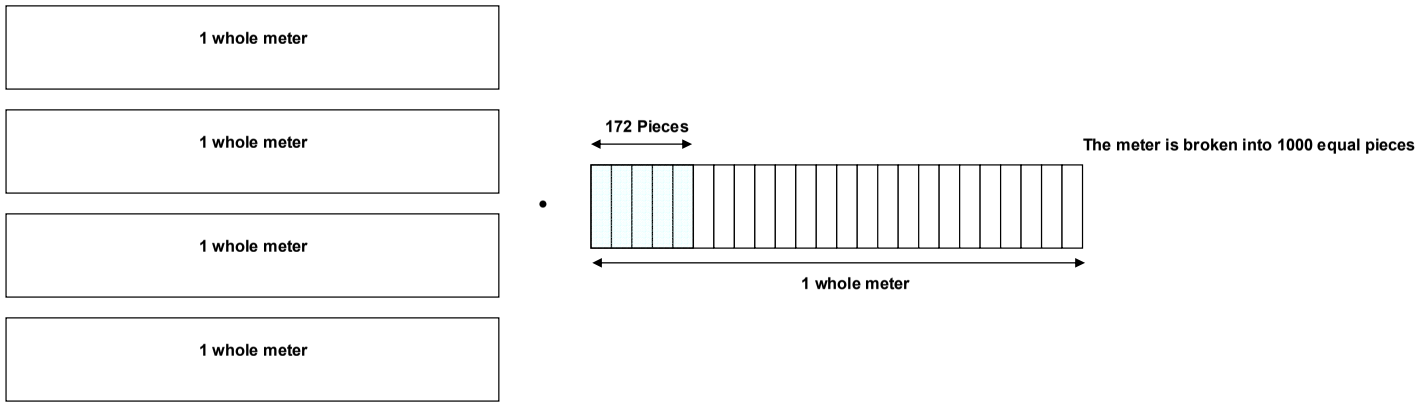
2) Assuming that 0.172 is in meter then to understand the 0.172m a little better I have done the following:-

1	**•**	**1 / 10**	**1 / 100**	**1 / 1000**
0	**•**	**1**	**7**	**2**

I have re-writtern this fractional part as **172/1000**

My understanding at this point is that the denomniator (1000) represents my whole meter and the numerator represents the portion of the whole meter
Is this correct?

3) I have tried to put all this together graphically to get the following:-



Is the above logic correct?

4) If my number was now 3.1458m
Then I know I have 3 whole meters & 1458/10000 of a meter
Is this correct?

5) If however my number was 31.72m 21.03cm 2.16mm - then following the same logic described above I would get

31.72m = 31 72/100m
21.03cm = 21 3/100cm
2.16mm = 2 16/100mm

6) Final question is this, where I work people often work in meters, anything less than a meter is quoted in cm and less than a cm it is quoted in mm
but if there was a measurement less than a mm would it be correct to quote it in micrometers if I was to follow the same convention i.e meters - cm - mm - up?
Also if there was a measurment less than a micrometer would it be correct to quote it in nanometers if I was to follow the same convention i.e.meters - cm - mm - up - nm