"There are 10 types of people in this world: those who start salivating upon seeing the first part of this sentence, and those who don't understand binary."

Number Bases

Decimal	Binary	Hex
0	0	0
1	1	1
2	10	2
3	11	3
4	100	4
5	101	5
6	110	6
7	111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

IEC Prefixes

Name	Abbr	Factor
Kibi	Ki	2^{10} = 1,024
mebi	Mi	2^{20} = 1,048,576
gibi	Gi	2^{30} = 1,073,741,824
tebi	Ti	2^{40} = 1,099,511,627,776
pebi	Pi	2^{50} = 1,125,899,906,842,624
exbi	Ei	2^{60} = 1,152,921,504,606,846,976
Zebi	Zi	2^{70} = 1,180,591,620,717,411,303,424
yobi	Yi	2^{80} = 1,208,925,819,614,629,174,706,176

Exercises

1) Fill in the following table:

Decimal	Binary	Hex
31	0b0001 1111	0x1F
27	0b0001 1011	0x1B
17	0b0001 0001	0x11
127	0b0111 1111	0x7f
202	0b1100 1010	0xCA
255	0b1111 1111	0xFF

2) The Koozbanian language has 768 distinct symbols. What is the minimum number of bits needed to represent every symbol? Is there any waste?
10 bits can represent 1024 symbols, so it's sufficient. You'll see that 9 is not enough. 1024-768 = 256 combinations of those 10 bits will be wasted since they have nothing to represent.

3) Represent the following values in IEC format:

2^{18} 256Kibi 2^{3} 8 2^{43} 8 Tebi 2^{20} 1 Mebi

4) Your awesome new computer has 1.5 TiB of byte-addressed memory (1.5Ti possible addresses). How many bits are needed to represent every address?
There are 1.5Ti Bytes and you're addressing by Bytes, so you essentially need to represent 1.5Ti things. 40 bits can get you 1Ti, so all you need is 41, which is 2Ti, exceeding 1.5.

Bonus question:
Say that you have a scale that compares the weight of objects placed on its two sides.
Now suppose that you have 8 pomelos, and all but one of them is the same weight, the one is lighter than the rest. What's the minimum number of weightings it takes to determine which the lighter one is? What if you had 9 pomelos? 10?
Split all the pomelos you have into 3 groups as evenly as possible such that 2 groups have the same number and the other group has less. Compare the 2 groups with the same number. The scale will tell you either that one of them is lighter, or they're the same. If there's a lighter one, throws away the pomelos in the other 2 groups, otherwise keep the group you didn't weigh. Repeat everything with what you have left. You'll find that 8 and 9 can be done with 2 of these weightings, and 10 needs 3. These numbers are in the worst case; you can't just compare 2 pomelos, get lucky, and find that one of them is lighter.You can think of each weighting as a trinary digit (trit) of information.

Mnemonics from the days of your forefathers-

1. Kim's melodious giddiness terrifies people, excepting zealous yodelers
2. Kirby Messed Gigglypuff Terribly, (then) Perfectly Exterminated Zelda and Yoshi
3. Killed meat gives teeth peace except zebra yogurt
4. Kind Men Give Tense People Extra Zeal (for) Yoga
5. Killing melee gives terror; peace exhibits Zen yoga
6. Killing messengers gives terrible people exactly zero, yo
7. Kindergarten means giving teachers perfect examples (of) zeal (&) youth
8. Kissing mediocre girls/guys teaches people (to) expect zero (from) you
9. Kinky Mean Girls Teach P*nis-Extending Zen Yoga
10. Kissing Mel Gibson, Teddy Pendergrass exclaimed: "Zesty, yo!"