HW2

1a) 10 extended fingers would represent 10 ones, so you could represent all numbers up to: 2^9+2^8+2^7+2^6+2^5+2^4+2^3+2^2+2^1+2^0 = 1023. Adding toes would represent 20 ones, giving a maximum value of 1,048,575 in decimal.

1b) A terabyte represents 10^12 bytes. So a 3 TB hard drive would store 3,000,000,000,000 bytes according to the manufacturer. The computer would show 3 tebibytes, equivalent to 3\*2^40 = 3,298,534,883,328. This would result in a difference of 298,534,883,328 of seemingly “lost” bytes.

1c)

4816 🡪 binary

410 = 01002 810 = 10002

**4816 = 0100 10002**

DEAD16 🡪 binary

D16 = 1310 = 11012

E16 = 1410 = 11102

A16 = 1010 = 10102

D16 = 1310 = 11012

**DEAD16 = 1101 1110 1010 11012**

52116 🡪 binary

510 = 01012

210 = 00102

110 = 00012

**52116 = 0101 0010 00012**

1d)

11012 🡪 hexadecimal

11012 = 1310 = **D16**

101101012 🡪 hexadecimal

1011|0101

10112 = 1110 = B16

01012 = 510 = 516

**101101012 = B516**

110100110102 🡪 hexadecimal

110|1001|1010

01102 = 610 = 616

10012 = 910 = 916

10102 = 1010 = A16

**110100110102 = 69A16**

1e)

FF16 🡪 decimal

FF16 = F16\*1610^1 + F16\*1610^0

F16\*1610^1 + F16\*1610^0 = 1510\*1610^1 + 1510\*1610^0

1510\*1610^1 + 1510\*1610^0 = **25510 = FF16**

3C16 🡪 decimal

3C16 = 316\*1610^1 + C16\*1610^0

316\*1610^1 + C16\*1610^0 = 310\*1610^1 + 1210\*16^0

310\*1610^1 + 1210\*1610^0 = 6010

22216 🡪 decimal

22216 = 216\*1610^2 + 216\*1610^1 + 216\*1610^0

216\*1610^2 + 216\*1610^1 + 216\*1610^0 = 210\*1610^2 + 210\*1610^1 + 210\*1610^0

210\*1610^2 + 210\*1610^1 + 210\*1610^0 = **54610 = 22216**