

# Homework 1

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CS270 Fall 2020

Brennen Green

## 1 Practice Problems 2.17, 2.19, 2.24, 2.29, 2.47

(2.17)

Hexadecimal	Binary	$B2U_4(x)$	$B2T_4(x)$
0xA	1010	$2^3 + 2^1 = 10$	$-2^3 + 2^1 = -6$
0x1	0001	$2^0 = 1$	$2^0 = 1$
0xB	1011	$2^3 + 2^1 + 2^0 = 11$	$-2^3 + 2^1 + 2^0 = -5$
0x2	0010	$2^1 = 2$	$2^1 = 2$
0x7	0111	$2^2 + 2^1 + 2^0 = 7$	$2^2 + 2^1 + 2^0 = 7$
0xC	1100	$2^3 + 2^2 = 12$	$-2^3 + 2^2 = -4$

(2.19)

x	$T2U_4(x)$
-1	15
-5	11
-6	10
-4	12
1	1
8	8

(2.24)

Original	Truncated	Original	Truncated	Original	Truncated
1	1	1	1	1	1
3	3	3	3	3	3
5	5	5	5	5	5
C	4	12	4	-4	-4
E	6	14	6	-2	-2

(2.29)

x	y	x + y	$x + \frac{t}{5} y$	Case
10100	10001	100101	00101	1
11000	11000	110000	10000	2
10111	01000	111111	11111	2
00010	00101	000111	00111	3
01100	00100	010000	10000	4

(2.47)

Bits	e	E	$2^E$	$f$	M	$2^E \times M$	V	Decimal
0 00 00	0	-1	1/2	$\frac{0}{4}$	$\frac{4}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	0.125
0 00 01	0	-1	1/2	$\frac{1}{4}$	$\frac{5}{4}$	$\frac{5}{8}$	$\frac{5}{8}$	0.625
0 00 10	0	-1	1/2	$\frac{1}{2}$	$\frac{3}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	0.75
0 00 11	0	-1	1/2	$\frac{3}{4}$	$\frac{7}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	0.875
0 01 00	1	0	1	$\frac{0}{4}$	$\frac{4}{4}$	$\frac{4}{4}$	$\frac{1}{1}$	1.00
0 01 01	1	0	1	$\frac{1}{4}$	$\frac{5}{4}$	$\frac{5}{4}$	$\frac{5}{4}$	1.25
0 01 10	1	0	1	$\frac{1}{2}$	$\frac{3}{2}$	$\frac{3}{2}$	$\frac{3}{2}$	1.50
0 01 11	1	0	1	$\frac{3}{4}$	$\frac{7}{4}$	$\frac{7}{4}$	$\frac{7}{4}$	1.75
0 10 00	2	1	2	$\frac{0}{4}$	$\frac{4}{4}$	$\frac{8}{4}$	$\frac{2}{1}$	2.00
0 10 01	2	1	2	$\frac{1}{4}$	$\frac{5}{4}$	$\frac{10}{4}$	$\frac{5}{2}$	2.50
0 10 10	2	1	2	$\frac{1}{2}$	$\frac{3}{2}$	$\frac{6}{2}$	$\frac{3}{1}$	3.00
0 10 11	2	1	2	$\frac{3}{4}$	$\frac{7}{4}$	$\frac{14}{4}$	$\frac{7}{2}$	3.50
0 11 00	3	2	4	$\frac{0}{4}$	$\frac{4}{4}$	$\frac{12}{4}$	$\frac{3}{1}$	3.00
0 11 01	3	2	4	$\frac{1}{4}$	$\frac{5}{4}$	$\frac{15}{4}$	$\frac{15}{4}$	3.75
0 11 10	3	2	4	$\frac{2}{4}$	$\frac{6}{4}$	$\frac{18}{4}$	$\frac{9}{2}$	4.50
0 11 11	3	2	4	$\frac{3}{4}$	$\frac{7}{4}$	$\frac{21}{4}$	$\frac{21}{4}$	5.25

## 2 Homework Problems 2.77

1. K = 17

$$17 \times x$$

$$16 \times x + x$$

$$(n \ll 4) + x$$

2. K = -7

$$-7 \times x$$

$$x - (8 \times x)$$

$$x - (x \ll 3)$$

3.  $K = 60$

$$\begin{aligned}
 &60 \times x \\
 &(64 \times x) - (4 \times x) \\
 &(x \ll 6) - (x \ll 2)
 \end{aligned}$$

4.  $K = -112$

$$\begin{aligned}
 &-112 \times x \\
 &(16 \times x) - (128 \times x) \\
 &(x \ll 4) - (x \ll 7)
 \end{aligned}$$

### 3 L2\_show-bytes.c

The number 40506 is equivalent to the binary number 1001 1110 0011 1010 this would be represented in Hexadecimal as 0x9E3A this means the representation in big-endian would be similar to the following

Address	Byte
0x7fff73c4f1cc	9E
0x7fff73c4f1cd	3A
0x7fff73c4f1ce	. . .
0x7fff73c4f1cf	. . .