CSULB
CECS225
Lab2

Show your work at the end of the document and type your answer in the allocated cell.
No work no credit even if the answer is correct.
Everything must be typed (submitted electronically)
Convert your document to pdf and upload.

1. Convert the following decimals to 8-bit signed binary (2's complement):

Decimal	8-bit binary Equivalent							
-49	1	1	0	0	1	1	1	1
-239	X	X	X	X	X	X	X	X
-95	1	0	1	0	0	0	0	1
-200	X	X	X	X	X	X	X	X
-101	1	0	0	1	1	0	1	1

2. Convert the following decimals to 16-bit signed hexadecimal:

Decimal	16-bit hex equivalent			
10477	2	8	E	D
23948	5	D	8	C
-33395	X	X	X	X
-2000	F	8	3	0
-10101	D	8	8	B

3. Convert the following 16-bit signed hexadecimal numbers to a signed (+/-) decimal:

Hex Value	Signed Decimal Equivalent
DE28	56,872
CCC5	52,421
543A	21,562
044F	1,103
F0F0	61,680

4. Convert the following decimal to the equivalent number in the radix given using the fewest digits.

Radix	Decimal	Radix Equivalent value
8	4579	10473
4	243	3303
12	3000	18A0
6	97	241
3	100	10201

5. Convert the following numbers

From	To	The result
$A9_{16}$	Binary	$1010\ 1111_2$
$2A6_{16}$	Decimal	678_{10}
489_{10}	Hex	$1E9_{16}$
496_{10}	BCD	$0011\ 0101\ 0110_2$

011101011000_{BCD}	Decimal	758_{10}
10010101_{BCD}	Binary	$0101\ 1111_2$

1.

a. -49

i. 49 / 2 = 24, R = 1
ii. 24 / 2 = 12, R = 0
iii. 12 / 2 = 6, R = 0
iv. 6 / 2 = 3, R = 0
v. 3 / 2 = 1, R = 1
vi. 1 / 2 = 0, R = 1
vii. 0110001_2 → 1001110 + 1 = 1100 1111

b. -239

i. out of range for 8 bits, max is +127, min is -127

c. -95

i. 95 / 2 = 47, R = 1
ii. 47 / 2 = 23, R = 1
iii. 23 / 2 = 11, R = 1
iv. 11 / 2 = 5, R = 1
v. 5 / 2 = 2, R = 1
vi. 2 / 2 = 1, R = 0
vii. 1 / 2 = 0, R = 1
viii. $1101\ 1111_2$ → $0010\ 0000_2$ + 1 = $1010\ 0001_2$

d. -200

i. out of range for 8 bits, max is +127, min is -127

e. -101

i. 101 / 2 = 50, R = 1
ii. 50 / 2 = 25, R = 0
iii. 25 / 2 = 12, R = 1
iv. 12 / 2 = 6, R = 0
v. 6 / 2 = 3, R = 0
vi. 3 / 2 = 1, R = 1
vii. 1 / 2 = 0, R = 1
viii. $1110\ 0101_2$ → $0001\ 1010_2$ + 1 = $1001\ 1011_2$

2.

a. 10477

i. 10477 / 16 = 654, R = 13 = D;
ii. 654 / 16 = 40, R = 14 = E;
iii. 40 / 16 = 2, R = 8 = 8
iv. 2 / 16 = 0, R = 2 = 2

b. 23948

i. 23948 / 16 = 1496, R = 12 = C
ii. 1496 / 16 = 93, R = 8 = 8
iii. 93 / 16 = 5, R = 13 = D
iv. 5 / 16 = 0, R = 5 = 5

c. -33395

i. 33395 / 16 = 2087, R = 3, 15 – 3 = 12 = C + 1 = D

ii. 2087 / 16 = 130, R = 7, 15 – 7 = 8 = 8

iii. 130 / 16 = 8, R = 2, 15 – 2 = 13 = D

iv. 8 / 16 = 0, R = 8, 15 - 8 = 7 = 7

d. -2000

i. 2000 / 16 = 125, R = 0, 15 – 0 = 15 = F + 1 = 0

ii. 124 / 16 = 7, R = 12, 15 – 12 = 3 = 3

iii. 7 / 16 = 0, R = 7, 15 – 7 = 8 = 8

iv. 0 / 16 = 0, R = 0, 15 – 0 = 15 = F

e. -10101

i. 10101 / 16 = 631, R = 5, 15 – 5 = 10 = A + 1 = B

ii. 631 / 16 = 39, R = 7, 15 – 7 = 8 = 8

iii. 39 / 16 = 2, R = 7, 15 – 7 = 8 = 8

iv. 2 / 16 = 0, R = 2, 15 – 2 = 13 = D

3.

a. DE28

i. D = 13 * 163 = 53248

ii. E = 14 * 162 = + 3584

iii. 2 = 2 * 161 = +32

iv. 8 = 8 * 160 = 8

b. CCC5

i. C = 12 * 163 = 49152

ii. C = 12 * 162 = + 3072

iii. C = 12 * 161 = + 192

iv. 5 = 5 * 160 = + 5

c. 543A

i. 5 = 5 * 163 = 20480

ii. 4 = 4 * 162 = + 1024

iii. 3 = 3 * 161 = + 48

iv. A = 10 * 160 = +10

d. 044F

i. 0 = 0 * 163 = 0

ii. 4 = 4 * 162 = + 1024

iii. 4 = 4 * 161 = + 64

iv. F = 15 *160 = +15

e. F0F0

i. F = 15 * 163 = 61440

ii. 0 = 0 * 162 = + 0

iii. F = 15 * 161 = + 240

iv. 0 = 0 * 160 = + 0

4.

a. 45799

i.4579 / 8 = 572, R = 3

ii. 572 / 8 = 71, R = 4
iii. 71 / 8 = 8, R = 7
iv. 8 / 8 = 1, R = 0
v. 1 / 8 = 0, R = 1

b. 2434
i. 243 / 4 = 60, R = 3
ii. 60 / 4 = 15, R = 0
iii. 15 / 4 = 3, R = 3
iv. 3 / 4 = 0, R = 3

c. 300012
i. 3000 / 12 = 250, R = 0
ii. 250 / 12 = 20, R = 10 □ A
iii. 20 / 12 = 1, R = 8
iv. 1 / 12 = 0, R = 1

d. 976
i. 97 / 6 = 16, R = 1
ii. 16 / 6 = 2, R = 4
iii. 2 / 6 = 0, R = 2

e. 1003
i. 100 / 3 = 33, R = 1
ii. 33 / 3 = 11, R = 0
iii. 11 / 3 = 3, R = 2
iv. 3 / 3 = 1, R = 0
v. 1 / 3 = 0, R = 1

5.

a. $A9_{16} = 10*16^1 + 9*16^0 = 169_{10}$
i. 169 / 2 = 84, R = 1
ii. 84 / 2 = 42, R = 0
iii. 42 / 2 = 21, R = 0
iv. 21 / 2 = 10, R = 1
v. 10 / 2 = 5, R = 0
vi. 5 / 2 = 2, R = 1
vii. 2 / 2 = 1, R = 0
viii. 1 / 2 = 0, R = 1
ix. 1010 1001_2

b. $2A6_{16}$
i. $2*16^2 + 10*16^1 + 6*10^0 = 678_{10}$

c. 489_{10}
i. 489 / 16 = 30, R = 9
ii. 30 / 16 = 1, R = 14
iii. 1 / 16 = 0, R = 1
iv. 1E9

d. 496_{10}
i. 3 = 0011

ii. 5 = 0101
iii. 6 = 0110
iv. 0011 0101 0110

e. 011101011000_{BCD}
i. 0111 0101 1000
ii. 0111 = 7
iii. 0101 = 5
iv. 1000 = 8
v. 758_{10}

f. 10010101_{BCD}
i. 1001 0101
ii. 1001 = 1 + 8 = 9
iii. 0101 = 1 + 4 = 5
iv. 95_{10}
v. 95 / 2 = 47, R = 1
vi. 47 / 2 = 23, R = 1
vii. 23 / 2 = 11, R = 1
viii. 11 / 2 = 5, R = 1
ix. 5 / 2 = 2, R = 1
x. 2 / 2 = 1, R = 0
xi. 1 / 2 = 0, R = 1
xii. 0101 1111_2