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 |

1. 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 |

1. 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 |

1. Convert the following numbers

|  |  |  |
| --- | --- | --- |
| From | To | The result |
| A916 | Binary | 1010 1111­2 |
| 2A616 | Decimal | 67810 |
| 48910 | Hex | 1E916 |
| 49610 | BCD | 0011 0101 0110­2 |
| 011101011000BCD | Decimal | 75810 |
| 10010101BCD | Binary | 0101 11112 |

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. 01100012 🡪 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 11112 🡪 0010 00002 + 1 = 1010 0001­2

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 0101­2 🡪 0001 1010­2 + 1 = 1001 10112

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. A916 = 10\*161 + 9\*160 = 16910

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 1001­2

b. 2A616

i. 2\*162 + 10\*161 + 6\*100 = 67810

c. 48910

i. 489 / 16 = 30, R = 9

ii. 30 / 16 = 1, R = 14

iii. 1 / 16 = 0, R = 1

iv. 1E9

d. 49610

i. 3 = 0011

ii. 5 = 0101

iii. 6 = 0110

iv. 0011 0101 0110

e. 011101011000BCD

i. 0111 0101 1000

ii. 0111 = 7

iii. 0101 = 5

iv. 1000 = 8

v. 75810

f. 10010101BCD

i. 1001 0101

ii. 1001 = 1 + 8 = 9

iii. 0101 = 1 + 4 = 5

iv. 9510

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 11112