LogicDesign-Homework 1

Student

Adithya Chander

Total Points

4.6 / 5 pts

Question 1

Problem 1　　　　　　　　　　　　　　　　　　　　**1** / 1 pt

> The rubric is hidden for this question.

Question 2

Problem 2　　　　　　　　　　　　　　　　　　　　**1** / 1 pt

> The rubric is hidden for this question.

Question 3

Problem 3　　　　　　　　　　　🚩　**0.8** / 1 pt

> 💬 **+ 0.8 pts** 3.b) 101010011 (C7 and C8 are equal) Hence no overflow , 3.c) 00001011 (c7 and c8 are equal and hence no overflow) 3.d) 10011111, c7 and c8 are not equal, and Overflow occurs.

Question 4

Problem 4　　　　　　　　　　　🚩　**0.8** / 1 pt

> 💬 **+ 0.8 pts** Decimal values are missing.

Question 5

Problem 5　　　　　　　　　　　　　　　　　　　　**1** / 1 pt

> The rubric is hidden for this question.

HW1 - CS120A

1. 49_{10} to binary, octal, and hexadecimal

binary
b 1 1 0 0 0 1
$2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$
$32+16+0+0+0+1=49$

hexadecimal
b 0011 0001
x 3 1

octal
b 110 001
0 6 1

2. $A7_{16}$ to octal, binary, decimal

binary
xA → b1010
x7 → b0111
xA7 = b1010 0111

octal
b 010 100 111
0 2 4 7

decimal
b 1 0 1 0 0 1 1 1
$2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$
$128 + 32 + 4+2+1 = 167_{10}$
160   7

3. 8 bit two's complement (indicate if overflow occurs or not)

a.
```
  00 11 01 10
+ 01 00 01 01
b 01 11 10 11
no overflow occurs
```

b.
```
  01 11 01 01
+ 11 01 11 10
1 01 01 00 11
overflow occurs
```

c.
```
  00 11 01 10
- 00 10 10 11
    11 01 10
+   01 01 01
b 00 10 11
overflow occurs
```

d.
```
  01 11 01 01
- 11 01 01 10
  00 10 10 01
  00 10 10 10
+ 01 11 01 01
b 10 01 11 11
no overflow occurs
```

4. Determine decimal values given binary

a) 1's complement

b 0111 0110
↓
b 1000 1001

b 10100 111
↓
b 01011 000

b) 2's complement

b 0101 1110
b 1010 0001
+1
b 1010 0010

b 1011 0011
b 0100 1100
+1
b 0100 1101

5. construct truth tables for:

$f = y'z' + x'y + x'yz'$
$g = xy' + x'z' + x'y$
$h = (x'+y')(x+y+z')$

functions g and h are equal since truth table output is identical.

x	y	z	x'	y'	z'	y'z'	x'y	x'yz'	xy'	x'z'	x'y	(x'+y')	(x+y+z')	f	g	h
0	0	0	1	1	1	1	0	0	0	1	0	1	1	1	1	1
1	0	0	0	1	1	1	0	0	1	0	0	1	1	1	1	1
0	1	0	1	0	1	0	1	1	0	1	1	1	1	1	1	1
1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0
1	0	1	0	1	0	0	0	0	1	0	0	1	1	0	1	1
0	1	1	1	0	0	0	1	0	0	0	1	1	1	1	1	1
1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Adithya Chander
10/13/2024
Section 001/025