CS2100 TERM TEST #1 ANSWER SHEET

AY2014/5 Semester 2

NAME:

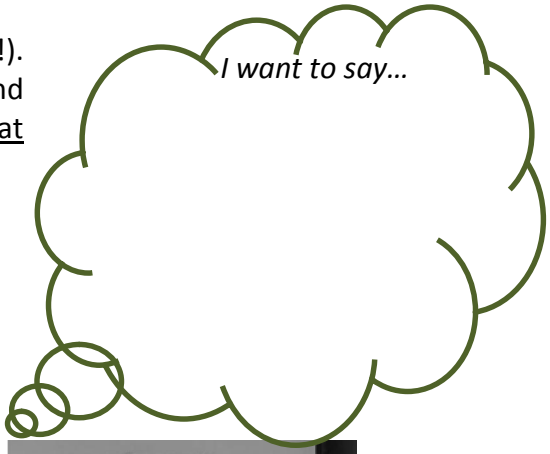
/ 30

TOTAL SCORE

MATRIC. NO.: | A | 0 | | | | | | | |

TUTORIAL GROUP:

Write your particulars above legibly using a **pen** (not pencil!). Ensure that your matriculation number is correct and complete (your matriculation number comes with a letter at the end). You may use pencil for your answers below.



Bonus question:

The colours of 2 of the 3 umbrellas are:

1. **Red, orange, blue**
2.

Explanation and comments on page 3.

1. **D** **2.** **B**

3. **E** **4.** **D** **5.** **A**

6. [4]

(a) 26.37_{10} = **222.101_3**

(b) 10111_2 = **11100_{Gray}**

(c) $(A \oplus B \oplus C) \oplus (A \oplus B \oplus C)'$ = **1**

7. [3]

1	1	0	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0

Decimal value = **-36.625**

Please turn over…

8. [4]

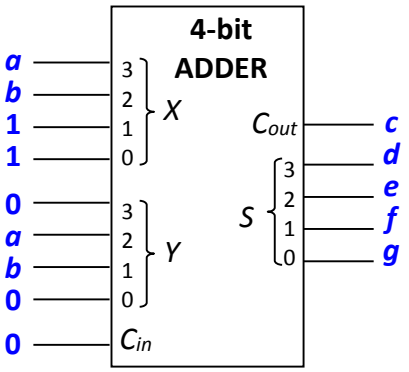
Z* = *D*·*E* + *D*·*B' [4]

The function cannot be implemented using the given decoder, as each output of a 2×4 decoder with 1 enable and active low inputs is of this form: *X'* + *Mi*

where *Mi* is maxterm-*i* of a 2-variable function.

The function ***D*·*E* + *D*·*B'*** cannot be expressed in this form.

9. [3]



10. [6]

(a) Self-complementing? Answer: **Yes**

(b)

TA* = *B* + *C'

JC* = *A

KC* = *B'

(c) Next state after 000: **110**

Next state after 111: **001**

Explanation and Workings

4.

A	*B*	*C*	*G*
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	X
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

5. $B = C = D$
   Hence, $ABCD$ = 0000, 0111, 1000, or 1111 → $\mathbf{\Sigma m(0, 7, 8, 15)}$

7. C2128000 = 1 100 0010 0 001 0010 1000 0000 … 0

   Sign = 1; Exponsnet = 132 – 127 = 5; Mantissa = 1.00100101

   $-1.00100101_2 \times 2^5 = -100100.101_2 =$ $\mathbf{-36.526_{10}}$

8. $A'{\cdot}B{\cdot}C'{\cdot}D{\cdot}E + (D'+B)' + B{\cdot}D{\cdot}E = B{\cdot}D{\cdot}E + D{\cdot}B' = D{\cdot}E + D{\cdot}B'$

10.

A	*B*	*C*	A^+	B^+	C^+	*TA*	*TB*	*JC*	*KC*
0	0	0	X(1)	X(1)	X(0)	X(1)	X(1)	X(0)	X(1)
0	0	1	0	1	0	0	1	X	1
0	1	0	1	0	0	1	1	0	X
0	1	1	1	0	1	1	1	X	0
1	0	0	0	1	1	1	1	1	X
1	0	1	1	1	0	0	1	X	1
1	1	0	0	0	1	1	1	1	X
1	1	1	X(0)	X(0)	X(1)	X(1)	X(1)	X(1)	X(0)

TA

A \ *BC*	00	01	11	10
0	X	0	1	1
1	1	0	X	1

TA = B + C'

JC

A \ *BC*	00	01	11	10
0	X	X	X	0
1	1	X	X	1

JC = A

KC

A \ *BC*	00	01	11	10
0	X	1	0	X
1	X	1	X	X

KC = B'