CS2100 MID-TERM TEST ANSWER SHEET

AY2015/6 Semester 1

NAME:

/ 40

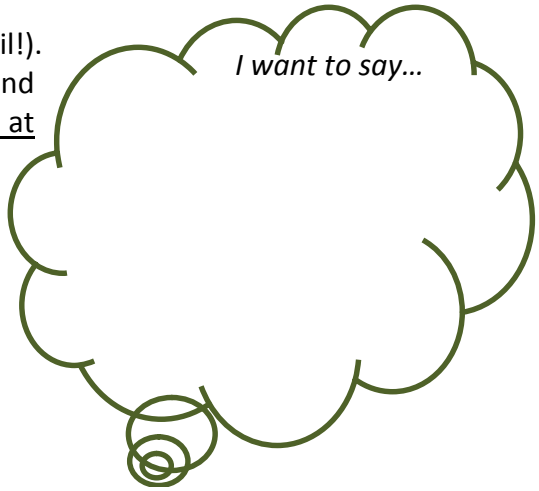
TOTAL SCORE

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.

(Any thought about the module? Share it in the thought bubble on the right. This will not be graded! ☺)



0. A **1.** D **2.** D

3. B **4.** A **5.** C

6. [2]

$S = \Sigma m$ (**1, 2, 3, 4, 5, 6, 7**)

7. [4]

A	*B*	*C*	*D*	*P*	*Q*	*R*
0	0	0	0	**0**	**0**	**1**
0	0	0	1	**0**	**1**	**0**
0	0	1	0	**0**	**1**	**0**
0	0	1	1	**0**	**1**	**1**
0	1	0	0	**0**	**1**	**0**
0	1	0	1	**0**	**1**	**1**
0	1	1	0	**0**	**1**	**1**
0	1	1	1	**1**	**0**	**0**

A	*B*	*C*	*D*	*P*	*Q*	*R*
1	0	0	0	**0**	**1**	**0**
1	0	0	1	**0**	**1**	**1**
1	0	1	0	**0**	**1**	**1**
1	0	1	1	**1**	**0**	**0**
1	1	0	0	**0**	**1**	**1**
1	1	0	1	**1**	**0**	**0**
1	1	1	0	**1**	**0**	**0**
1	1	1	1	**1**	**0**	**1**

Please turn over…

8.
[4]

(a) Efficiency = **½**

(b) Hamming distance = **2**

9.
[6]

(a) (i) P = **0** (ii) P = **1**

(b) Z = ***A'·B + A·C*** or Z = ***B·P' + C·P***

(c) (i) Z = **1** (ii) Z = **0**

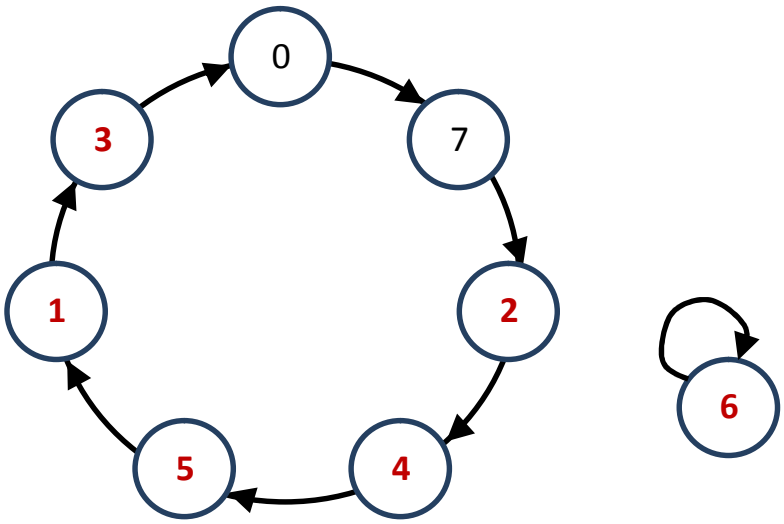
10.
[7]

F = ***A·C'·D' + B·C'·D***

G = ***B·D' + C·D + A***

H = ***A·C'·D' + B·D' + B·C + A·B***

11.
[7]



Is the circuit self-correcting (yes/no)? **No.**

Why?

Once in the unused state (state 6), it cannot get to any of the used states.

Explanation and Workings

Q6.

A	*B*	*C*	*D*	*S*
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

$S = \Sigma m(1 - 7)$

Q9.

A	*B*	*C*	*P*	*Z*
0	0	0	0	X
0	0	0	1	0
0	0	1	0	0
0	0	1	1	X
0	1	0	0	1
0	1	0	1	X
0	1	1	0	X
0	1	1	1	1
1	0	0	0	0
1	0	0	1	X
1	0	1	0	X
1	0	1	1	1
1	1	0	0	X
1	1	0	1	0
1	1	1	0	1
1	1	1	1	X

Q10.

$F = A \cdot C' \cdot D' + B \cdot C' \cdot D$

$G = B \cdot A' \cdot D' + C \cdot A' \cdot D + A \cdot D' + A \cdot D$
$= B \cdot A' \cdot D' + C \cdot A' \cdot D + A$
$= B \cdot D' + C \cdot D + A$

$H = F \cdot B' + G \cdot B$
$= (A \cdot C' \cdot D' + B \cdot C' \cdot D) \cdot B' +$
$(B \cdot D' + C \cdot D + A) \cdot B$
$= \underline{A \cdot B' \cdot C' \cdot D'} + B \cdot D' + B \cdot C \cdot D + \underline{B \cdot A}$
$= A \cdot C' \cdot D' + \underline{B \cdot D' + B \cdot C \cdot D} + B \cdot A$
$= A \cdot C' \cdot D' + B \cdot D' + B \cdot C + A \cdot B$