CS2100 Assignment #2
AY2024/25 Semester 1
Deadline: <u>Monday, 14 October 2024, 1:00pm</u>
TEMPLATE FOR SUBMISSION

Full name: [   ]   Tutorial grp: **T** [   ]

Q1. (Total: 15 marks)

Cycle time: [   ] ps   [4 marks]

Clock frequency: [   ] GHz   [3 marks]

Time taken for `beq` instruction: [   ] ps   [3 marks]

Optimization: new [   ]   [5 marks]

Explain your answers below.

[   ]

Q2. (Total: 5 marks)

Q3. (Total: 3 marks)

(a) $M31 =$ [1 mark]

(b) $m29 \cdot M31 =$ [2 marks]

Q4. (Total: 4 marks)

(a) $F \cdot G' = \sum m($) [2 marks]

(b) $G' \oplus H = \sum m($) [2 marks]

Q5. (Total: 3 marks)

Draw your circuit below.

Q6. (Total: 7 marks)

(a)   Number of PIs in the K-map of Z: ☐   [1 mark]

(b)   Number of EPIs in the K-map of Z: ☐   [1 mark]

(c)   Number of distinct simplified SOP expressions for Z: ☐   [1 mark]

(d)   One simplified SOP expression for Z: [2 marks]

```
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│                                                      │
│                                                      │
│                                                      │
└──────────────────────────────────────────────────────┘
```

(e) One simplified POS expression for Z: [2 marks]

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┌──────────────────────────────────────────────────────┐
│                                                      │
│                                                      │
│                                                      │
└──────────────────────────────────────────────────────┘
```

Q7. (Total:3 marks)

(a)   [1 mark]

A	B	C	D	$IsZero$
0	0	0	0	
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	

(b)   Simplified SOP expression   [2 marks]

$IsZero = $ ☐

Workings

Write your workings here. They will not be graded, but the grader might look at it to figure out where you went wrong.

Workings for Q3

K-map for Q6