**CS2100 Assignment #2**

AY2024/25 Semester 1

**Deadline: Monday, 14 October 2024, 1:00pm**

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) $m29∙M31=$ [2 marks]

**Q4.** (Total: 4 marks)

(a) $F⋅G^{'}=∑m( )$ [2 marks]

(b) $G'⨁H=∑m$( ) [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]

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

**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**