

CSC364/CSCM64 Second Coursework

To be solved in groups of at most three.

Submission deadline: 1st April 2022, 23:59 BST.

Submissions must be made through Canvas in PDF format.

Clearly state the names and student numbers of all group members at the beginning of the document.

Please only make one submission per group.

Question 1. [50 marks total] Recall the following computational problem from the second lab:

Line Configuration Classification.

- **Input:** Six integers a, b, c, u, v, w
 - **Output:**
 - Out of Range, if at least one of the six inputs lies outside the interval $[0, 100]$.
 - Invalid Input, if $a = b = 0$ or $u = v = 0$.
 - Equal, if the input is neither “out of range” nor “invalid” and if the straight line L_1 defined by the equation $ax + by = c$ is equal to the straight line L_2 defined by the equation $ux + vy = w$.
 - Parallel, if the input is neither “out of range” nor “invalid” and if the straight line L_1 defined by the equation $ax + by = c$ is parallel but not equal to the straight line L_2 defined by the equation $ux + vy = w$.
 - Intersecting in all other cases.
1. Suggest a partition of input the domain that is suitable for generating an Equivalence Class Testing test suite. Justify your choice.
[25 marks]
 2. Give a test suite for Equivalence Class Testing based on your partition.
[25 marks]

Question 2. [50 marks total]

Consider the assignment

$$Z := (\text{not } A \text{ or not } B) \text{ and } (C \text{ or not } D).$$

Assume that each logical connective in the above formula is implemented using a suitable logic gate. The following test suite is designed to test the implementation:

Input A	T	F	T	F
Input B	T	T	F	F
Input C	T	F	T	F
Input D	F	F	T	F
Output Z				

1. Complete the test suite by filling in the “output”-row.

[8 marks]

2. Use the first four steps of the five-step process introduced in the lectures to decide for each individual gate whether the test suite provides MC/DC-coverage for that gate. Make all four steps clearly visible.

[30 marks]

3. Does the test suite provide MC/DC coverage? In case the test suite does not provide MC/DC coverage, what is the least number of test cases that need to be added to make the test suite into one that does provide MC/DC coverage? Justify your answers.

[12 marks]