

CS364 Coursework 2

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Question 1

1. Suggest a partition of input the domain that is suitable for generating an Equivalence Class Testing test suite. Justify your choice.

Since partitioning is a problem of classification, partitions can be chosen based on the different outputs: Out-of-Range, Invalid, Equal, Parallel or Intersecting. Choosing one input from each would make sense, however, the line configuration implementation has multiple behaviours leading to some outputs. This means that testing one input behaviour for each output class would not cover enough of the problem and some errors can slip through. To rectify this, choose a test case for each behaviour leading to that output. Applied to the line configuration problem, this leaves us with 6 test cases for the Out-of-Range class (one for each separate input), 2 for the Invalid output, and 1 method for the rest of the classes. This leaves us with 5 partitions and 11 test cases, covering all classes of output and behaviours.

2. Give a test suite for Equivalence Class Testing based on your partition.

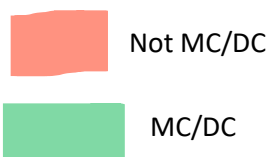
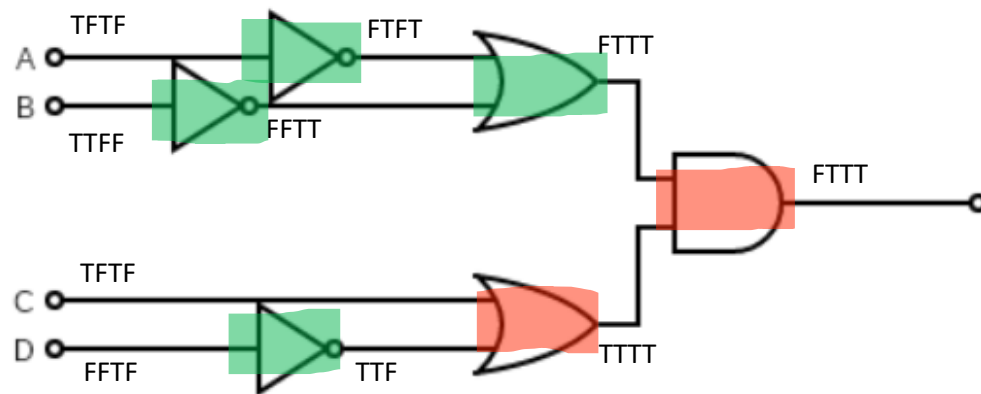
Case	a	b	c	u	v	w	Expected Output
1.1	-1	50	50	50	50	50	Out-of-Range
1.2	50	101	50	50	50	50	Out-of-Range
1.3	50	50	-1	50	50	50	Out-of-Range
1.4	50	50	50	101	50	50	Out-of-Range
1.5	50	50	50	50	-1	50	Out-of-Range
1.6	50	50	50	50	50	101	Out-of-Range
2.1	0	0	50	50	50	50	Invalid
2.2	50	50	50	0	0	50	Invalid
3.1	50	50	50	50	50	50	Equal
4.1	50	50	40	50	50	60	Parallel
5.1	40	50	60	60	50	40	Intersecting

Question 2

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

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	F	T	T	T

- 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.



- 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.

No, the given test cases are not suitable to provide MC/DC coverage. Following the rules that provide MC/DC coverage, all gates must be tested fully, meaning all input and output combinations must be covered. The 3 **not** gates and the top **or** gate do follow these rules, however, the final **and** gate and the lower **or** gate do not. The bottom **or** gate is missing the False-False input, and therefore is also missing its False output, while the final **and** gate is missing its False-False and True-False inputs. To rectify this and test the system under MC/DC coverage, the minimal number of test cases to be added is 2, which are as follows:

Case	A	B	C	D	Output Z
5	T	T	F	T	F
6	F	F	F	T	F

Adding these two test cases fixes the inputs and output for both gates, and thus, the system is now covered by MC/DC coverage.