

Lab 4

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Semester II (2017)

1 Quine-McCluskey algorithm I

You work for a very large European car manufacturer. Your team has designed a new very powerful diesel engine but it fails new emissions regulations set by Eurocrats in certain scenarios. Smart engine management provides a solution where it defines the circumstances when the engine must enter *Eco Mode*. A 4-bit value from a sensor bank indicates when this should occur:

- 0 – Cold engine
- 2 – Engine overheat
- 5 – Poor quality fuel ($CN < 51$)
- 6 – Low fuel pressure
- 9 – Low lambda (O_2) sensor reading
- 11 – Emissions test detected ;-)

Thus implement a digital logic system that satisfies the following:

- $F(x_0, x_1, x_2, x_3) = \sum m(0, 2, 5, 6, 9, 11)$

Hints:

- Implement a circuit to show that it works
- Do *NOT* use a Karnaugh-map