

L9 practice problems

1. The following English expression describes the way a logic circuit needs to operate in order to drive a seatbelt warning indicator in a car.

If the driver is present and the driver is not buckled up and the ignition switch is on, then turn on the warning light.

Using active high inputs driver_present, buckled_up and ignition_on, design a circuit to produce the active high output warning_light.

- (a) Construct the truth table.
- (b) Write the Boolean expression for warning_light.

(Question from Tocci, Widmer and Moss, 10th ed. Example 3-24)

2. Repeat Question 1. But this time with active low inputs driver_present*, buckled_up*, ignition_on* and active low output warning_light*.

Note the meaning of active low. E.g. driver_present*=0 when the driver is present.

3. Repeat Question 1. But this time with active low inputs driver_present*, buckled_up*, active high input ignition_on and active high output warning_light.

4. A logic circuit has four inputs A, B, C*, D* and one output F.

* denotes active low signals.

The output F is only asserted when either A or C* is asserted (but not both), and either B or D* is negated (but not both).

Construct the truth table for F and obtain its canonical sum-of-minterm expression.