

Task 3

In this section, is implemented a Moore's state machine already defined, as shown below.

Using the diagram, the following table of transitions is made.

With the transitions, using Karnaugh's maps, the functions for the states and the output are made as shown below.

With the functions, the state machine is implemented using two D Flip Flops as follows.

Now the same system is implemented using a Mealy's state machine, wich resulting diagram is shown below.

Notice that it requires one less state than Moore's machine because of the direct connection of the from the input to the output. The following transition table is made using the diagram.

With the table, using Karnaugh's maps, are made the functions for the states and the output.

With the defined functions, the state machine is implemented using one D Flip Flop as shown below.

Since the internal logic works with 3.3V power supply, and the external signals work with 5V, level shifters are implemented using BJT transistors. For adapting the inputs of CLK and W, the circuit is shown below.

And for the outputs (Moore and Mealy machines) the driver circuit is as shown below.

The design of the circuits with the corresponding calculations are included in the *Annex*.

Annex

Level shifter for inputs

Level shifter for outputs

Driver for output leds