

Customer requirements - product definition:

Building a command-and-control system for an autonomous electric car with a fan that rotates at different speeds. The work was divided between 6 teams.

Team A (my team) - "I/O" unit and "route generator" unit.

I/O unit

In the I/O unit we will define all the inputs of the system and forward the commands to the other units of the system.

Inputs:

- ON/OFF Switch - activation of the system – 1 bit.
- Reset Switch - reset the system – 1 bit.
- Fan switch - turn fan on/off - 1 bit.
- Route type - Circular/Square/Forward and Backward – 2 bits.

Outputs:

- Route type – 2 bits.
 - 00 > Route 1 – Forward and Backwards
 - 01 > Route 2 – Square
 - 10 > Route 3 – Circle
 - 11 > Route 4 – Stop – no movement.
- Fan switch – 1 bit.

Outputs will be transfer to the "Route generator unit", "Display generator unit" and "Fan controller."

Route generator unit

The route generator determines which operation (motion) the car will make to complete the selected route type.

Inputs:

- ITI – the itinerary (route type) – 2 bits.
- CLK – default clock.

Outputs:

- Motion – 2 bits.
 - 00 > Motion 1 – Forward.
 - 01 > Motion 2 – Backwards.
 - 10 > Motion 3 – Turn left.
 - 11 > Motion 4 – Stop – no movement.

The output will be transfer to the four-wheel controller unit" and the "sound generator unit".

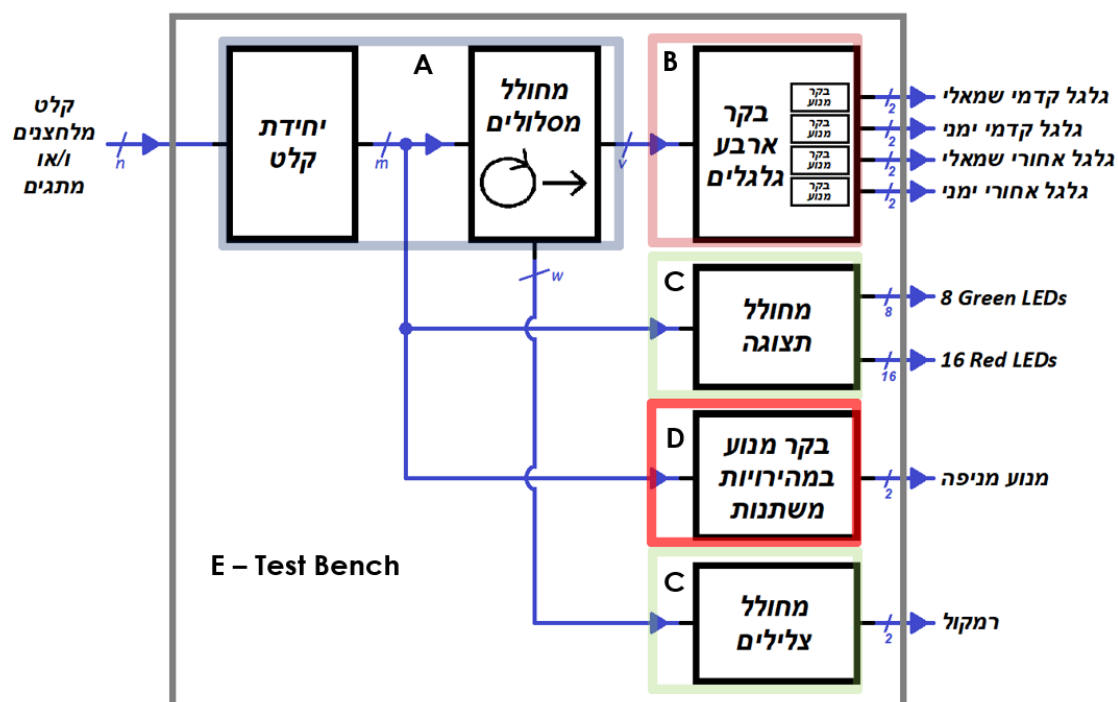
Team B - starting engines and starting the route, Writing the module that allows traveling in three types of templates.

Team C - external display and control operating interface, writing modules that allows LEDs and sounds to be activated according to the route type.

Team D - display operating interface, writing a module that produces sounds and lights depending on information from the sensors such as driving into a wall or obstacle.

Team E - writing test bench for each of the models and all of them together.

Project diagram:



work levels:

1. Understanding the customer needs and setting target dates.
2. General planning of the units and definition of inputs and outputs.
3. Writing code, compilation, and simulations.
4. Live experiment and submission.