Car parking system

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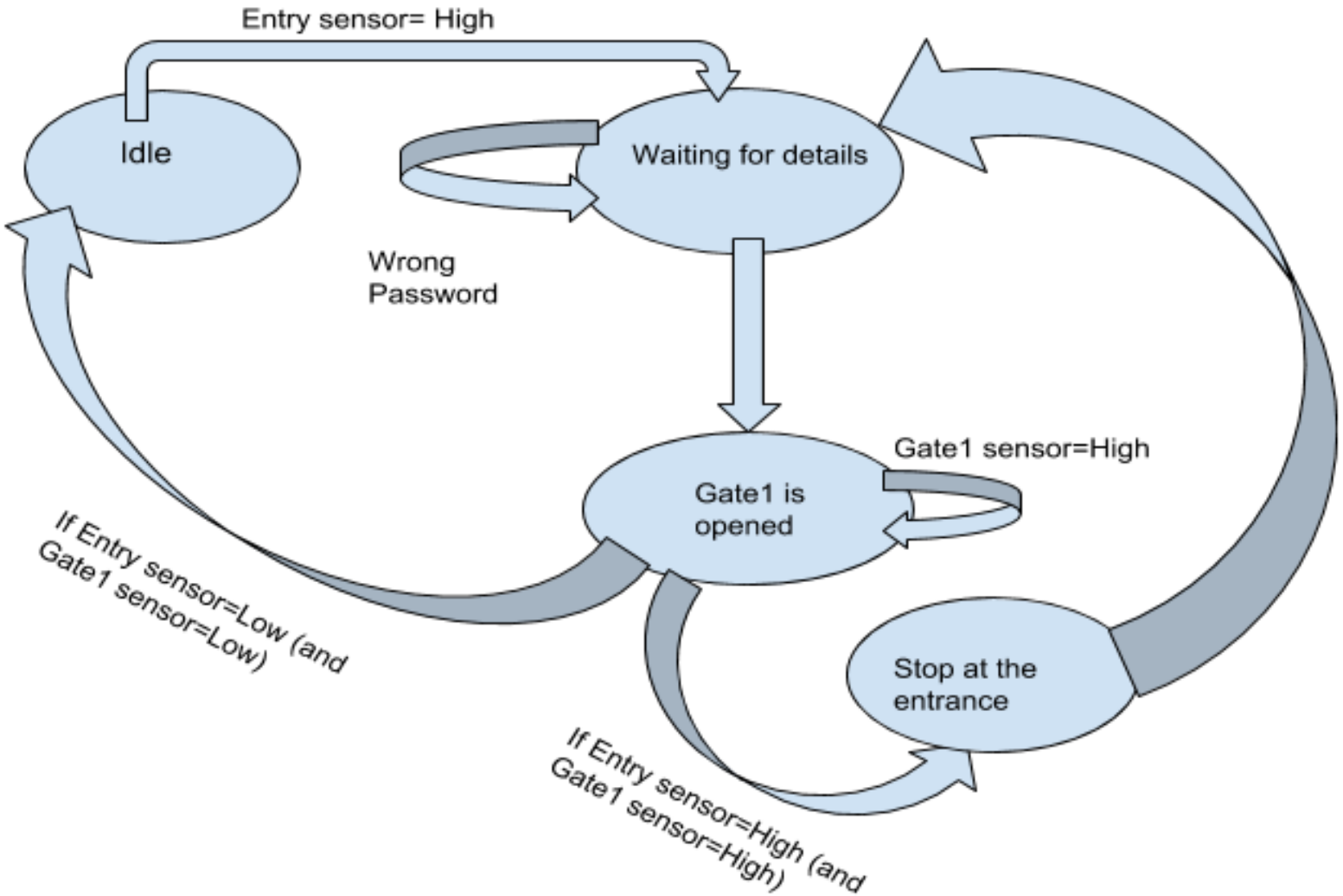
Introduction

The objective of this project is to implement a car parking system. A sensor is used to detect the presence of a vehicle. Once detected, the username and password is asked. If they match, the vehicle is allowed to enter. When a car is entering, if another car tries to enter, the new car is asked to enter its details.

The exit time is noted by the sensor at the exit gate and the difference of 'enter time' and 'exit time' is used to find the cost the car has to pay.

The Finite State Machine



Description

The sensors:

- Entry sensor: To check whether any vehicle is waiting to enter.
- Gate sensor: It senses whether the entry gate is open, i.e., whether a car is currently entering or not.
- Exit sensor: It is used to check when the car is leaving the parking slot.

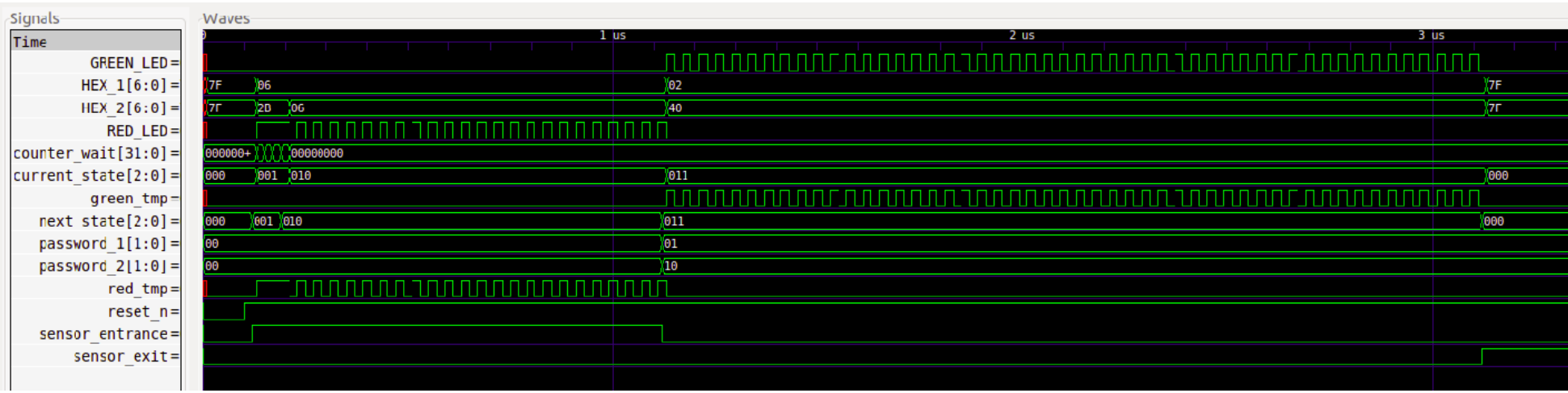
The states:

- Idle: No car is waiting at the entrance.
- Waiting for password: A car has been detected at the entrance and we are waiting for the car owner to enter the username and the password.
- Gate is opened: The gate has been opened for the car which just now entered its details.
- Stop at the entrance: If a vehicle comes to the entrance while a car is passing through the gate, the car at the entrance has to be stopped.
- Exit gate opened:

Current Progress

- Designed finite state machine for the basic version of the car parking system. Current version utilizes passwords in order to authenticate new cars entering.
- Simulated Basic version of car parking system using iverilog. Created sample scenario using a verilog testbench.
- Used GTKWave to view the .vcd dump from the verilog module.

Iverilog Simulation



Further Improvements

- Current System has no capacity for the car park, we will extend this project to limit the number of cars entering and keep track of capacity.
- Dynamic Pricing: Based on the amount of time spent in the car park, the car is automatically charged money once it exits the parking system.
- Hardware implementation: Utilize proximity sensors for the input and exit sensors. LEDs will be used to display opening of gate, closing of gate, invalid authentication etc. Testing the code on icoboard.