# EECS4312 Lab 6

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## Revisions

| Date | Revision | Description |
|---|---|---|
| 4 November 2015 | 1.0 | Initial specification of system, R/E- descriptions, and function table. |
| 5 November 2015 | 2.0 | Fixed function table to include bounds on 'i'. |

# Contents

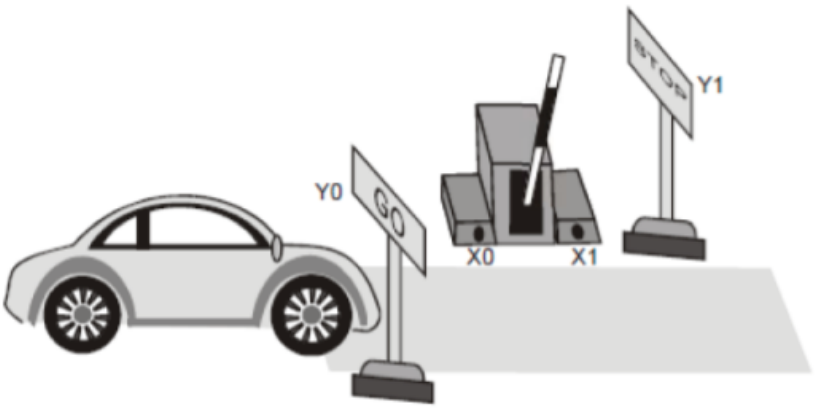


Figure 1: Reference design.

# 1 System Introduction

The Entry/Exit of the parking lot is a single lane passage. By controlling the indicators, the program ensures that only one car can pass through the Entry/Exit so as to prevent a car accident between entering and leaving cars.

# 2 E/R Descriptions

## 2.1 Requirement Descriptions

| | | |
|---|---|---|
| REQ1 | The controller will allow only one car within the passage at a time. | By monitoring sensors the system will ensure both gates will not be open at the same time. |

| | | |
|---|---|---|
| REQ2 | A car wishing to park will have priority over the cars which want to leave. | If both sensors are on, the entering gate will open. |

## 2.2 Environment Descriptions

| | | |
|---|---|---|
| ENV1 | The sensors can only ever read ON or OFF. | Only 2 states for each sensor. |

| | | |
|---|---|---|
| ENV2 | The actuators can only ever be GO or STOP. | Can only ever indicate either 2 states. |

# 3 List of Variables

## 3.1 Controlled Variables

Each of the controlled variables represents an ACTUATOR which has two states; either STOP or GO.

| Name | Description |
|---|---|
| X1 | Car entering sensor. ON when a car passes through the sense. |
| X2 | Car leaving sensor. ON when a car passes through the sense. |

## 3.2 Monitored Variables

Each of the monitored variables represents an SENSOR which has two states; either ON or OFF.

| Name | Description |
|---|---|
| Y1 | Car entering indicator, indicates GO when a car would like to enter. |
| Y2 | Car leaving indicator, indicates GO when a car would like to leave. |

# 4 Car Function Table

The function table presents a variable 'i' in DTIME which captures the value of both, the sensors and actuators, at each DTIME step.

| | | | Y1 | Y2 |
|---|---|---|---|---|
| i = 0 | | | y1(i) = go | y2(i) = stop |
| i >0 | x1(i) = on AND x2(i) = on | | y1(i) = go | y2(i) = stop |
| | x1(i) = off AND x2(i) = on | y1(i-1) = stop AND y2(i-1) = stop | y1(i) = stop | y2(i) = go |
| | | NOT (y1(i-1) = stop AND y2(i-1) = stop) | y1(i) = stop | y2(i) = stop |
| | | y1(i-1) = stop AND y2(i-1) = stop | y1(i) = go | y2(i) = stop |
| | | NOT (y1(i-1) = stop AND y2(i-1) = stop) | y1(i) = stop | y2(i) = stop |
| | x1(i) = off AND x2(i) = off | | y1(i) = go | y2(i) = stop |