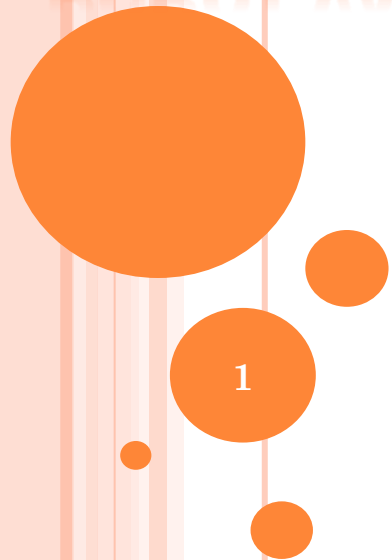


ROBOT VACUUM CLEANER SASD



T7

201011373 최지환

201011376 한지승

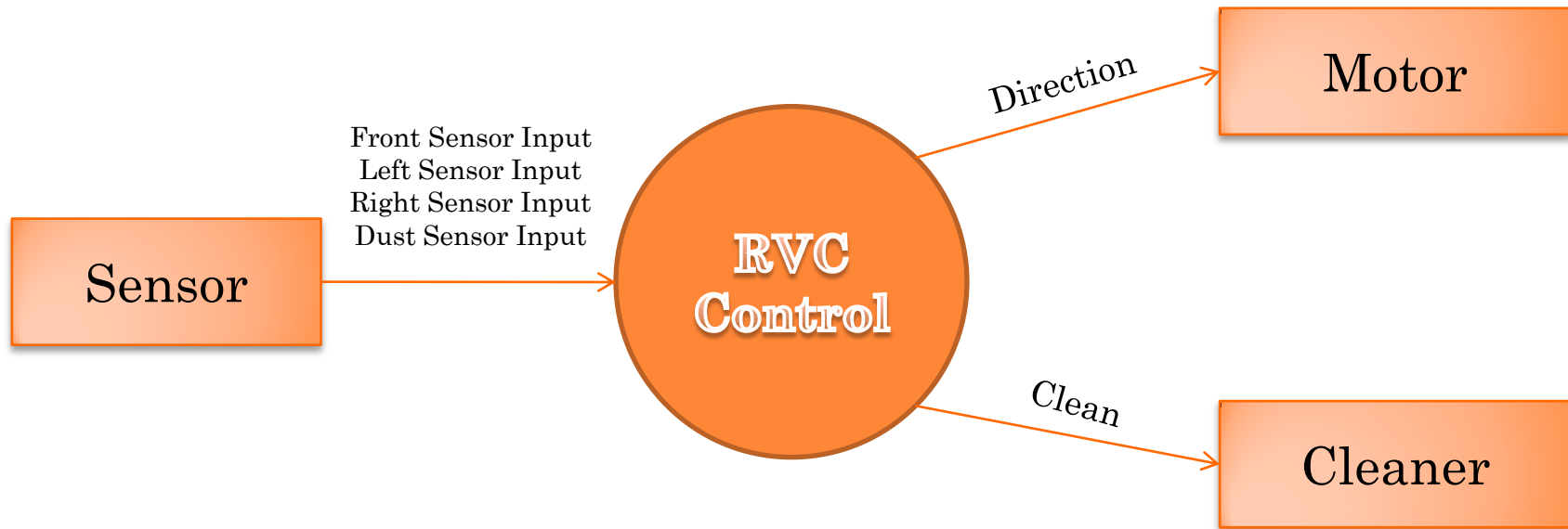
200611449 강동원

200611514 임진용

Statement of Purpose

- 바닥을 자동적으로 청소하는 기계이다.
- 작동 중엔 앞으로만 움직인다.
- 장애물을 감지하면, 청소를 멈추고, 방향을 전환하고 다시 앞으로 움직인다.
- 먼지걸 감지하면 청소하기위해 파워업을 한다.
- 하드웨어 컨트롤만 고려하고 자세한 디자인은 생략한다.
- 자동클리닝기능만 고려한다.

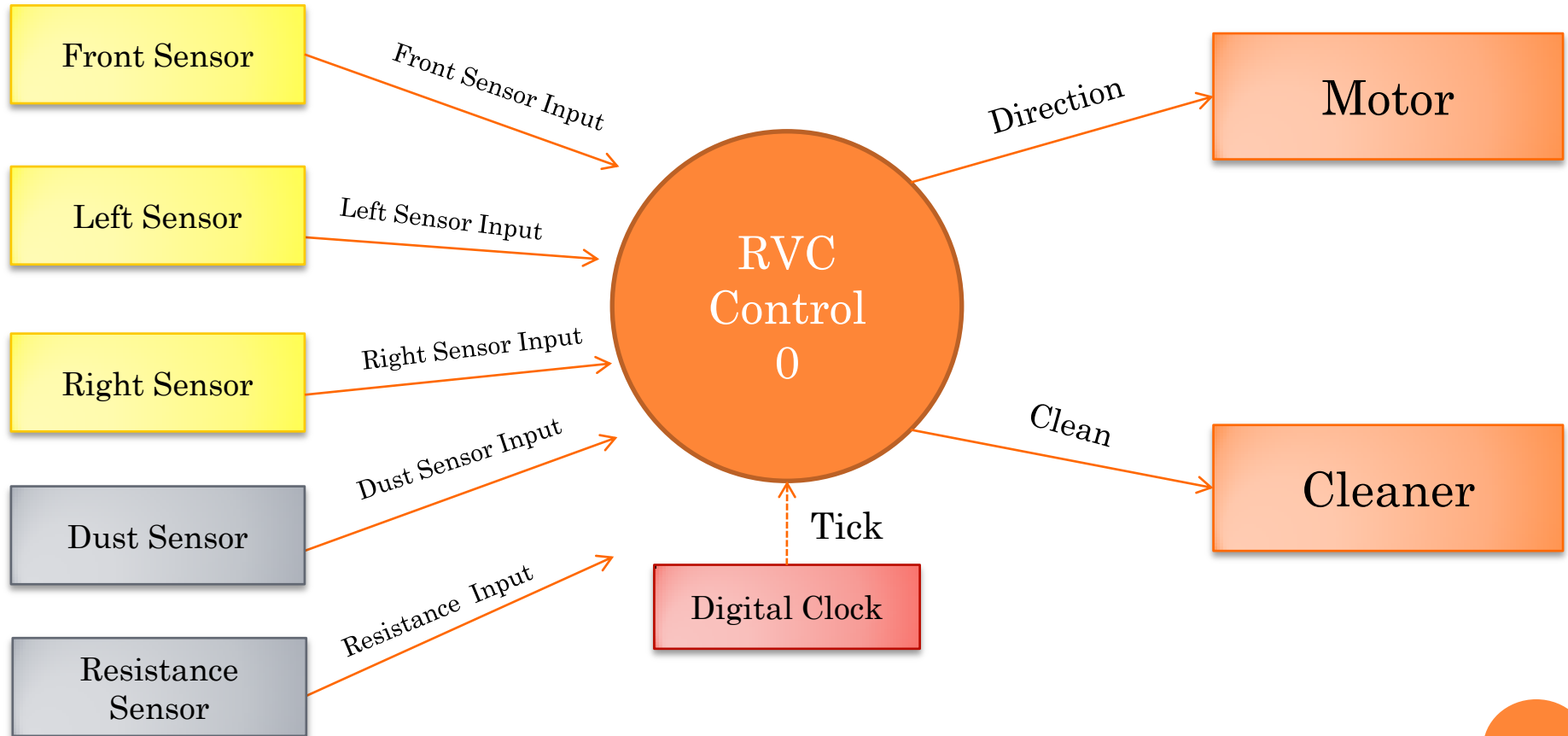
System Context Diagram



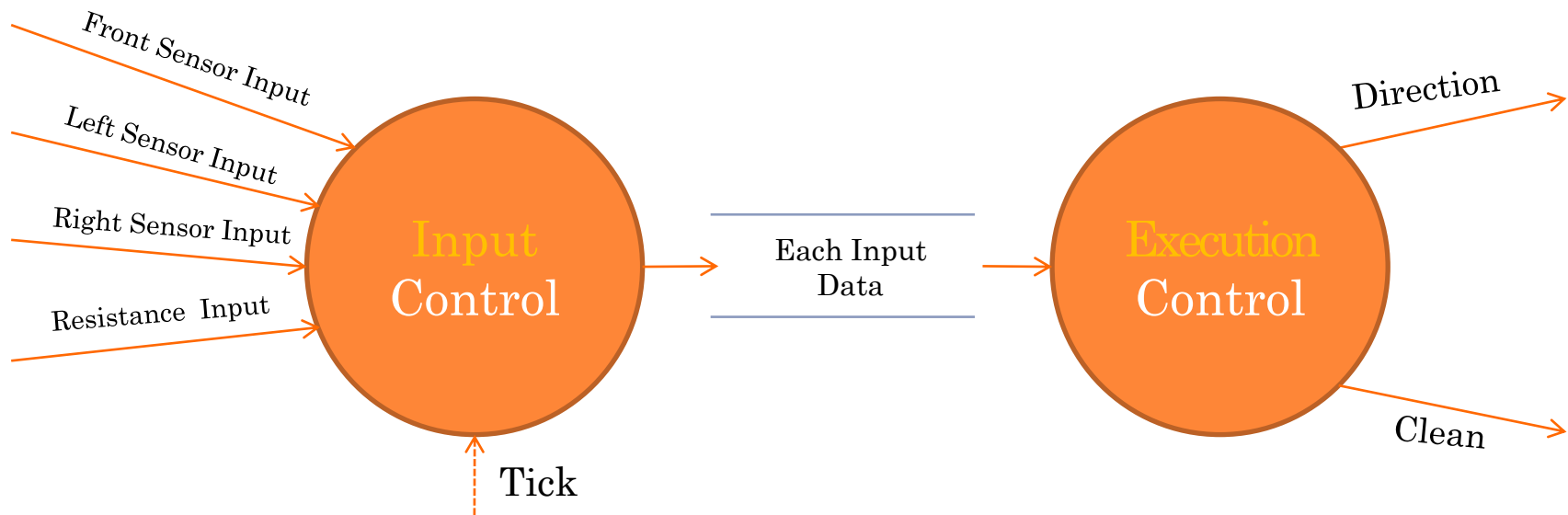
Event List

Input Event	Description
Front Sensor Input	Detect obstacles in front of the RVC
Left Sensor Input	Detect obstacles in the left side of the RVC periodically
Right Sensor Input	Detect obstacles in the right side of the RVC periodically
Dust Sensor Input	Detect dust on the floor periodically
Time scheduler Input	Check the scheduled time of the RVC periodically
Resistance Sensor Input	Checks the resistance implied by floor to the RVC while moving

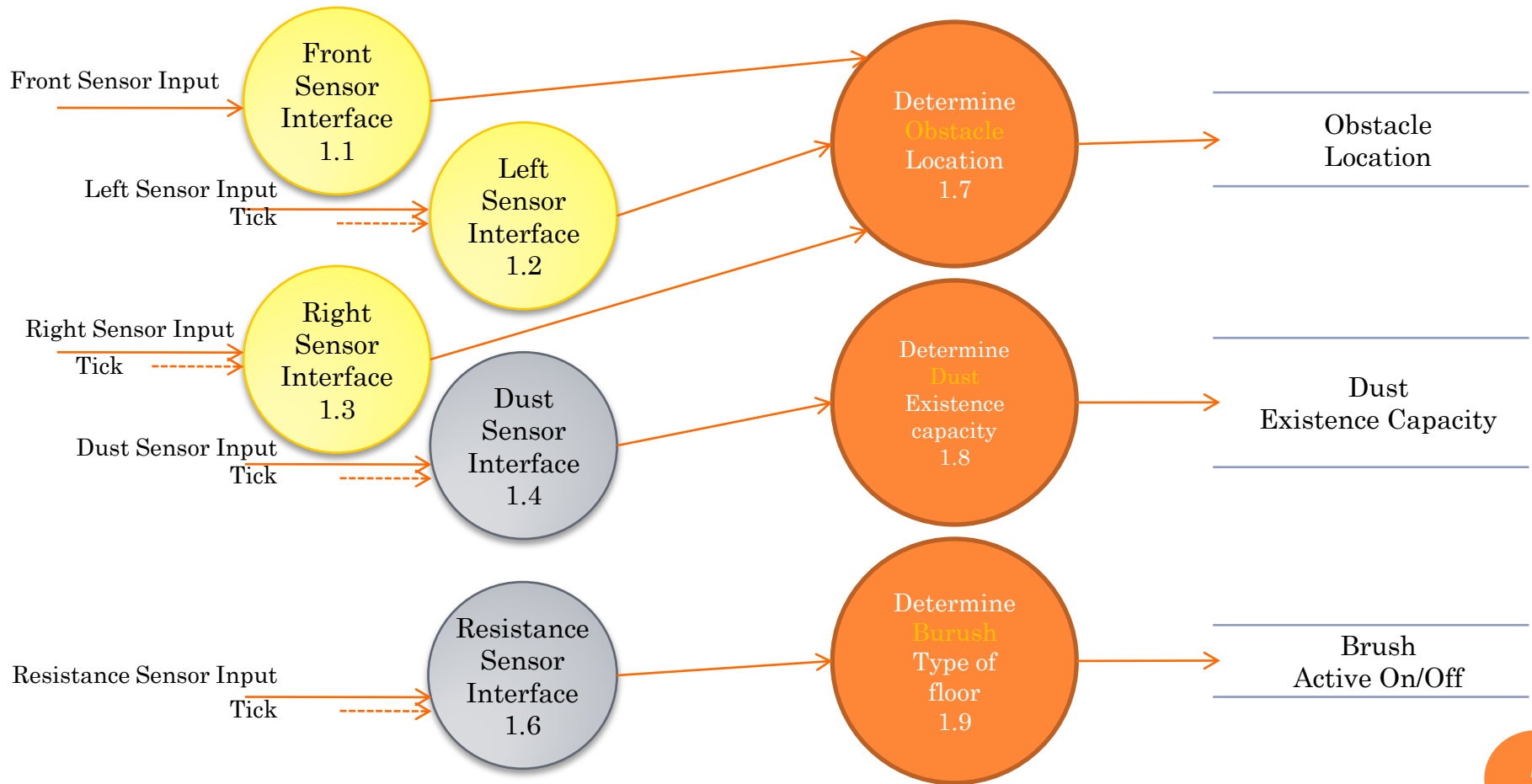
Data Flow Diagram – Level 0.



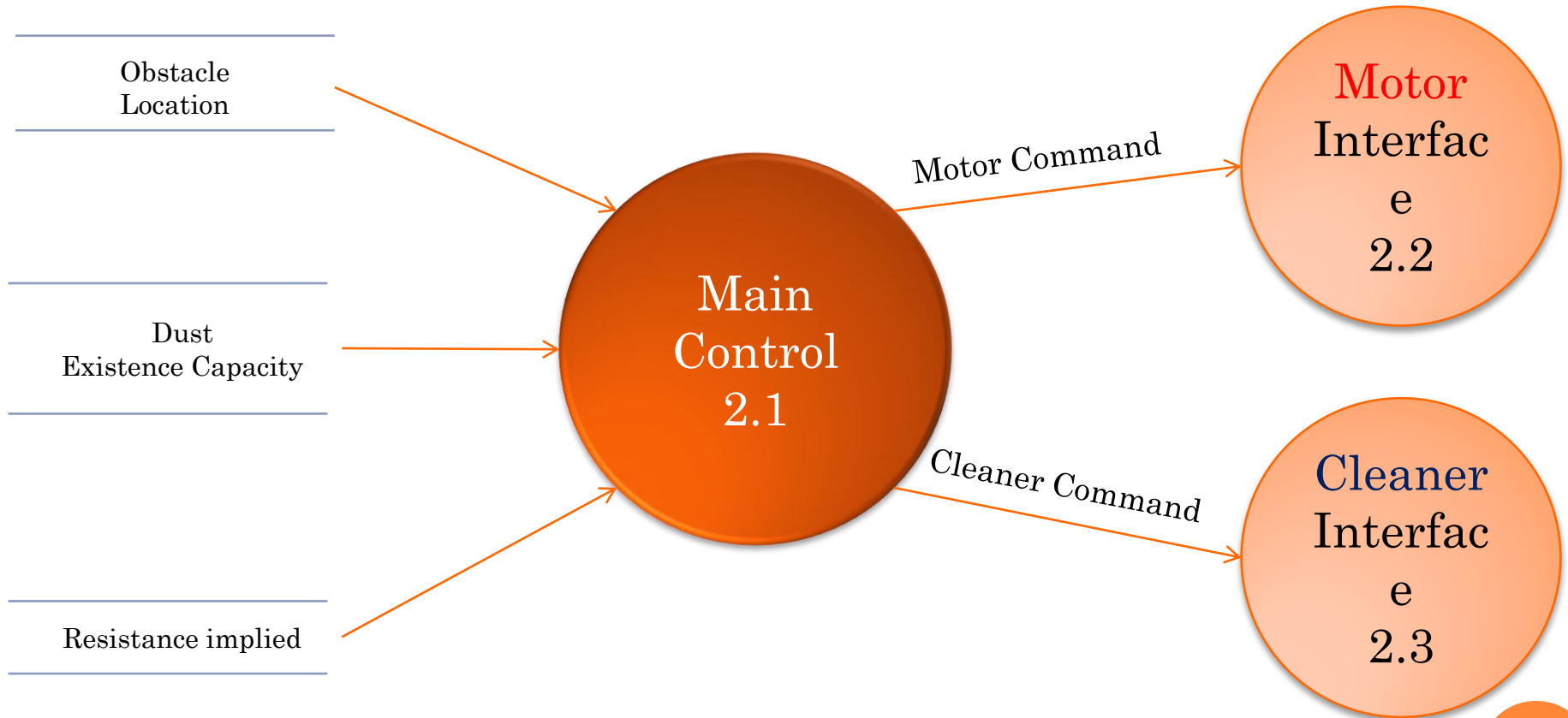
Data Flow Diagram – Level 1.



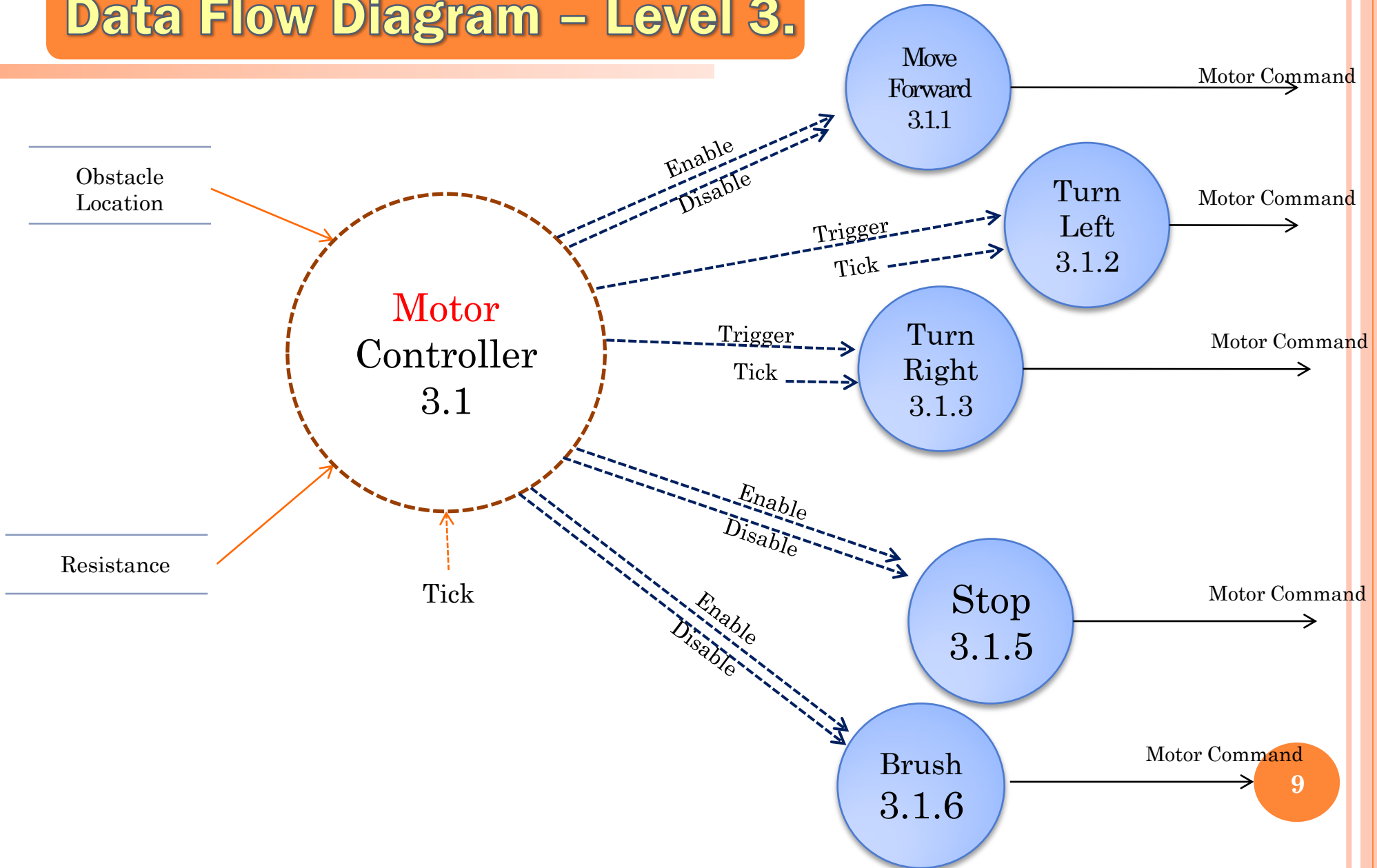
Data Flow Diagram – Level 2.



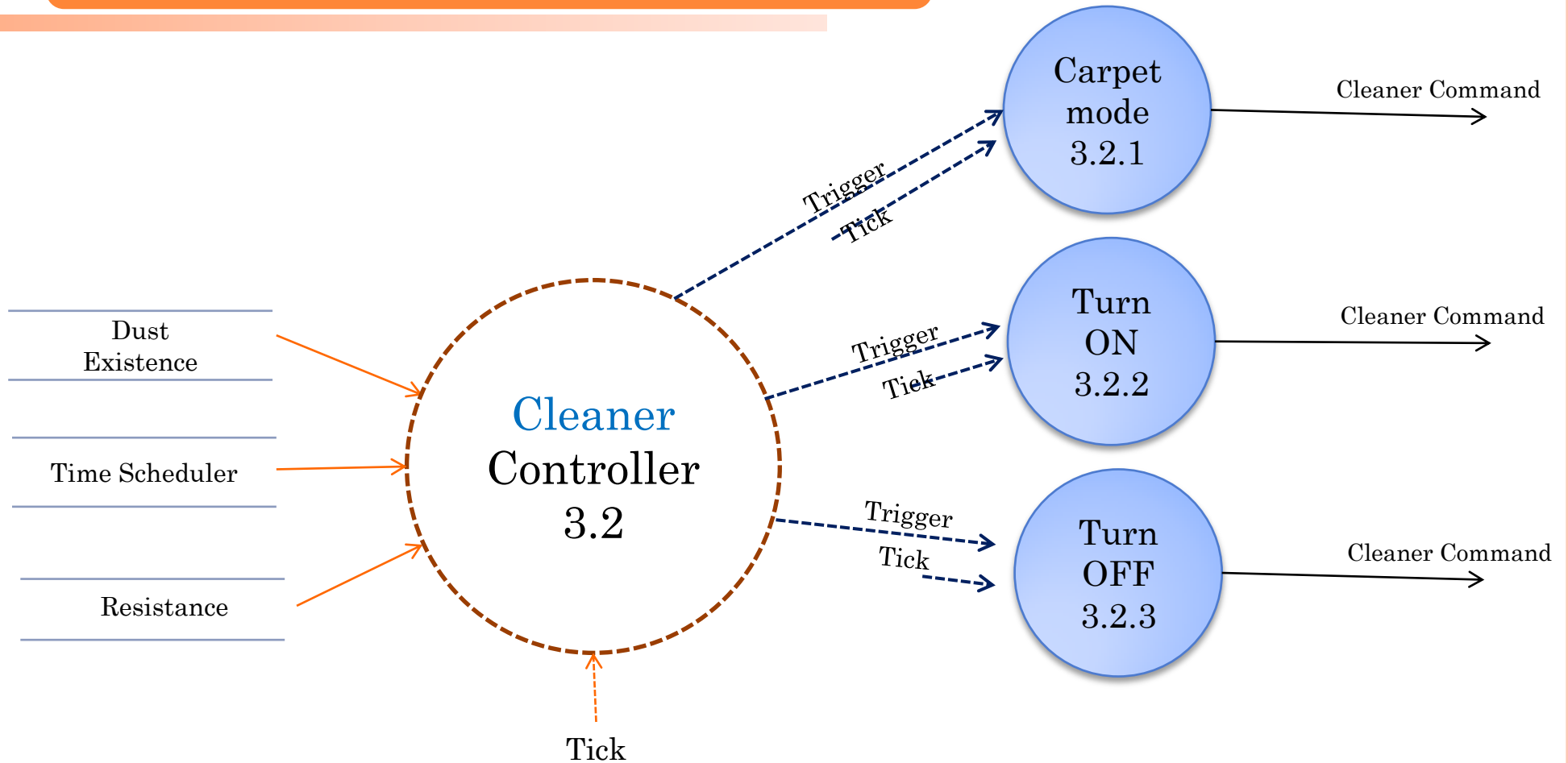
Data Flow Diagram – Level 2.



Data Flow Diagram – Level 3.

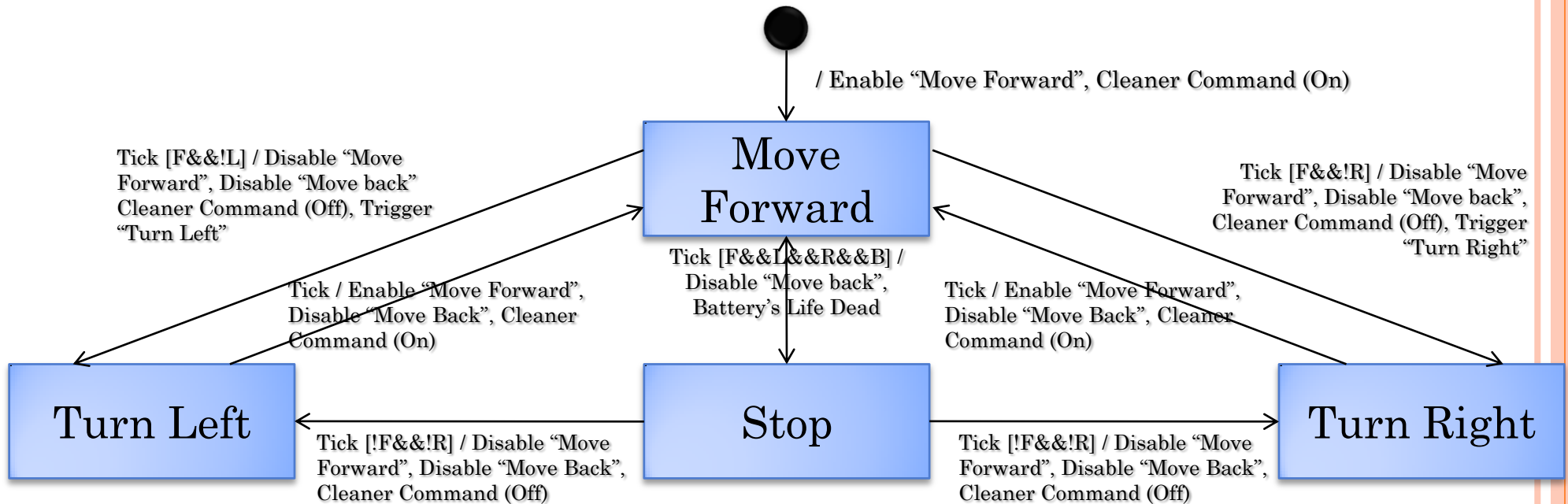


Data Flow Diagram – Level 3.



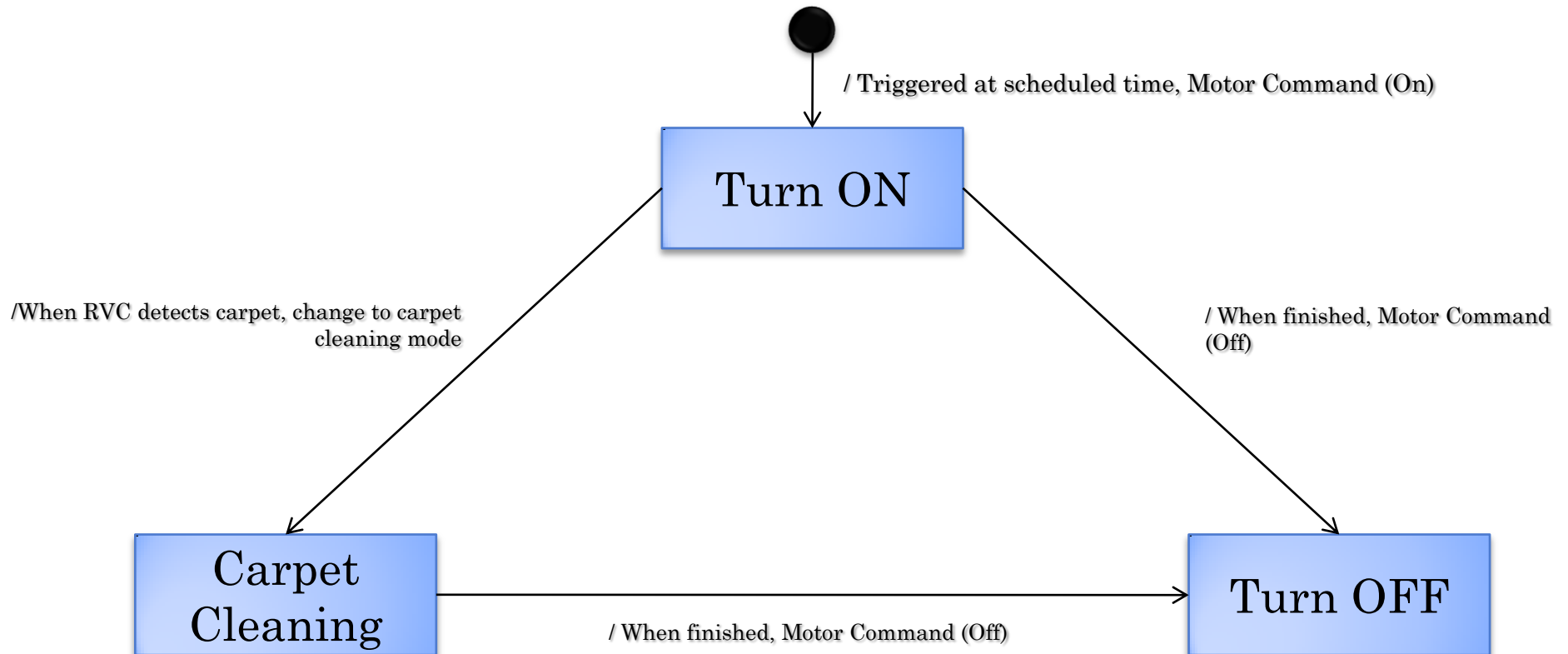
Data Flow Diagram – Level 4.

(1) State Transition Diagram for Controller3.1

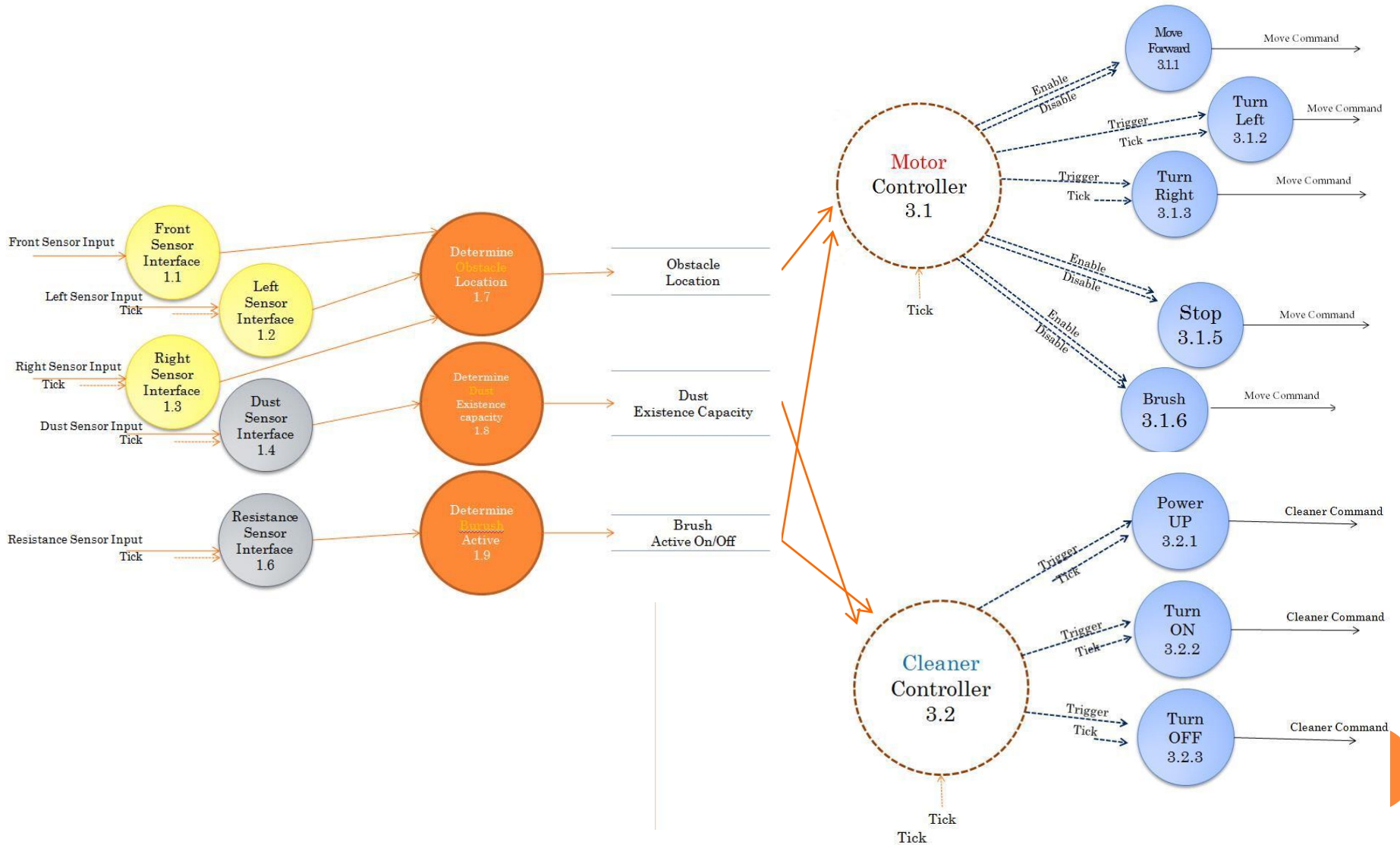


Data Flow Diagram – Level 4.

(2) State Transition Diagram for Controller3.2



Total DFD



Data Dictionary

Data 명	설명
Obstacle Location	Front, Left, Right Sensor 들을 통해 입력 받은 값을 저장
Floor type	Resistance sensor 를 통해 바닥의 유형을 알아내어 일반모드에서 카페트모드로 혹은 그 반대로 전환
Dust Existence	Dust Sensor 를 통해 입력 받은 값을 먼지의 존재 여부로 판단하여 저장
Dust Box Capacity	Dust Box Sensor 를 통해 입력 받은 값을 통해 dust box 안에 있는 먼지의 양을 판단하여 저장
Motor Controller	Obstacle Location 과 Battery's Life Data 를 입력 받아 각각의 모터에 data 값을 전달
Cleaner Controller	Battery's Life 와 Dust Existence 와 Dust Box Capacity Data 를 입력 받아서 Cleaner 에 data 값을 전달

Process Specification

Name	1.1 Front Sensor Interface
Input	Front Sensor Input(+Data Structure if possible)
Output	Front Obstacle (+Data structure)
Process Description	“Front Sensor Input” process reads an analog value of the sensor, converts it into a digital value such as True/False, and assigns it into output variable “Front Obstacle”.

Name	1.2 Left Sensor Interface
Input	Left Sensor Input(+Data Structure if possible), Tick
Output	Left Obstacle (+Data structure)
Process Description	“Left Sensor Input” process reads an analog value of the sensor periodically, converts it into a digital value such as True/False, and assigns it into output variable “Left Obstacle”.

Process Specification (cont.)

Name	1.3 Right Sensor Interface
Input	Right Sensor Input(+Data Structure if possible), Tick
Output	Right Obstacle (+Data structure)
Process Description	“Right Sensor Input” process reads an analog value of the sensor periodically, converts it into a digital value such as True/False, and assigns it into output variable “Right Obstacle”.

Name	1.4 Dust Sensor Interface
Input	Dust Sensor Input(+Data Structure if possible), Tick
Output	Dust Existence (+Data structure)
Process Description	“Dust Sensor Input” process reads an analog value of the sensor periodically, converts it into a digital value such as True/False, and assigns it into output variable “Dust Existence”.

Process Specification (cont.)

Name	1.6 Floor Type Sensor Interface
Input	Floor Type Sensor Input
Output	Floor Type
Process Description	“Floor Type Sensor Interface” is triggered when the sensor detects RVC on the carpet and returns it into output variable floor type

Name	1.7 Determine Obstacle Location
Input	Front Obstacle, Left Obstacle, Right Obstacle
Output	Obstacle Location
Process Description	“Determine Obstacle Location” process reads an analog value of the obstacles, converts them into a digital value and then assigns them into output variable “Obstacle Location”.

Process Specification (cont.)

Name	1.8 Determine Dust Existence
Input	Dust Existence
Output	Dust Existence
Process Description	“Determine Dust Existence” process reads an analog value of the existence of the dust, converts it into a digital value and then assigns it in to output variable “Dust Existence”.

Name	3.1 Motor Controller
Input	Obstacle Location, Battery’s Life, Tick
Output	Motor Command which controls moving forward or back, turning to left or right and stop.
Process Description	“Motor Controller” process reads an analog values of obstacle location and the life of the battery, then makes a command to move forward or back, turn left or right. And also when battery dies make the RVC to stop.

Process Specification (cont.)

Name	3.2 Cleaner Controller
Input	Dust Existence, Tick
Output	Cleaner Command which controls the RVC to be turned off or on.
Process Description	“Cleaner Controller” process reads an analog values of dust existence, then makes a cleaner command to turn off or on