SMART PARKING MANAGEMENT SYSTEM

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- SOLUTION IMPLEMENTATION.
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- REFERENCES.

WHAT IS COMPUTING ?

SET INPUT CONDITIONS

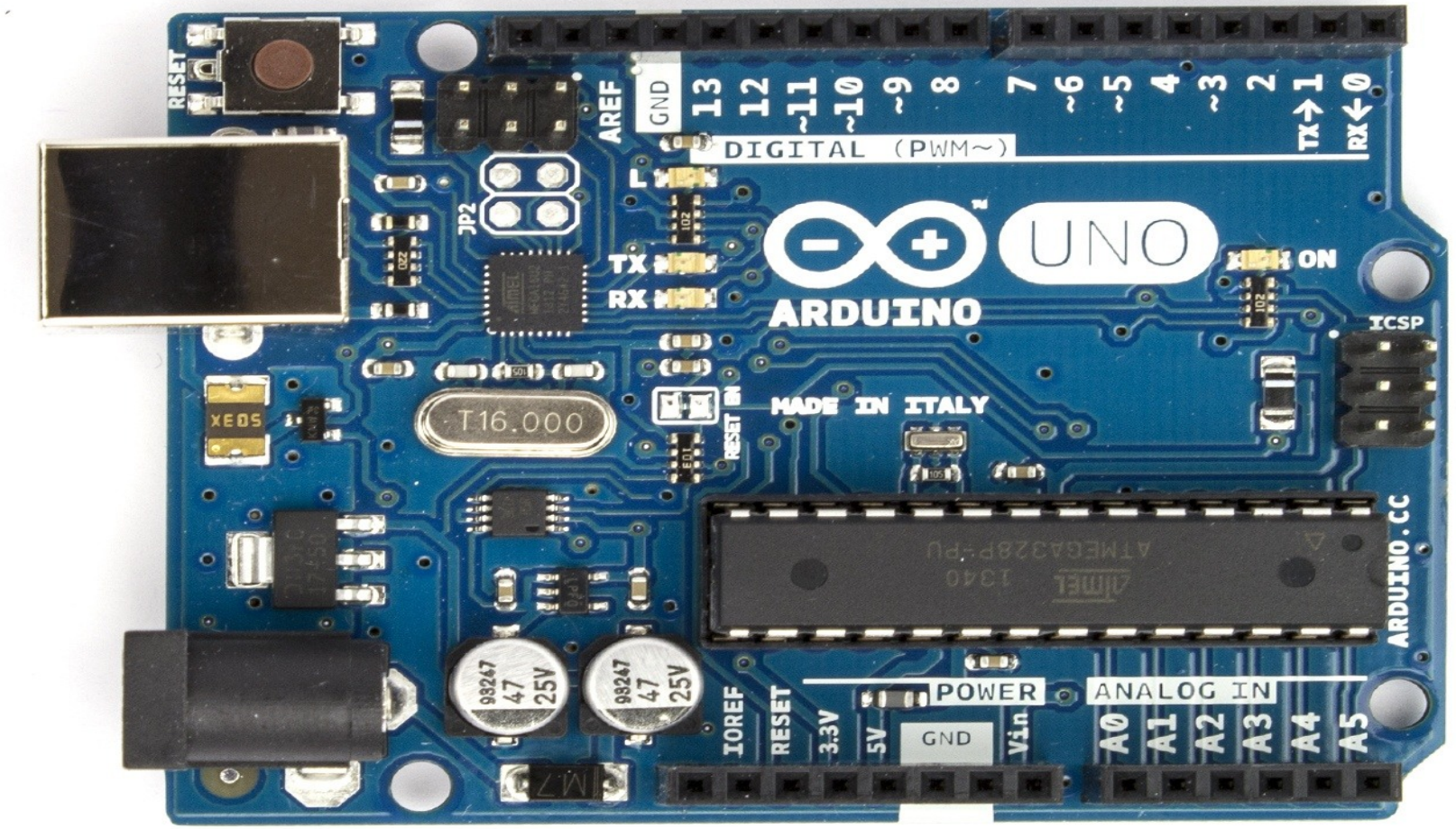
EXECUTE CALCULATIONS

OUTPUT THE RESULTS ...

THEN MAYBE REPEAT ...

A4

2985 YEN


RESET
AREF
GND
13 12 ~11 ~10 ~9 8 7 ~6 ~5 4 ~3 2 TX→1 RX←0
DIGITAL (PWM~)
JP2
TX
RX
UNO
ARDUINO
ON
ICSP
T16.000
MADE IN ITALY
ATMEGA328P-PU
ARDUINO.CC
POWER
ANALOG IN
IOREF
RESET
3.3V
5V
GND
Vin
A0 A1 A2 A3 A4 A5

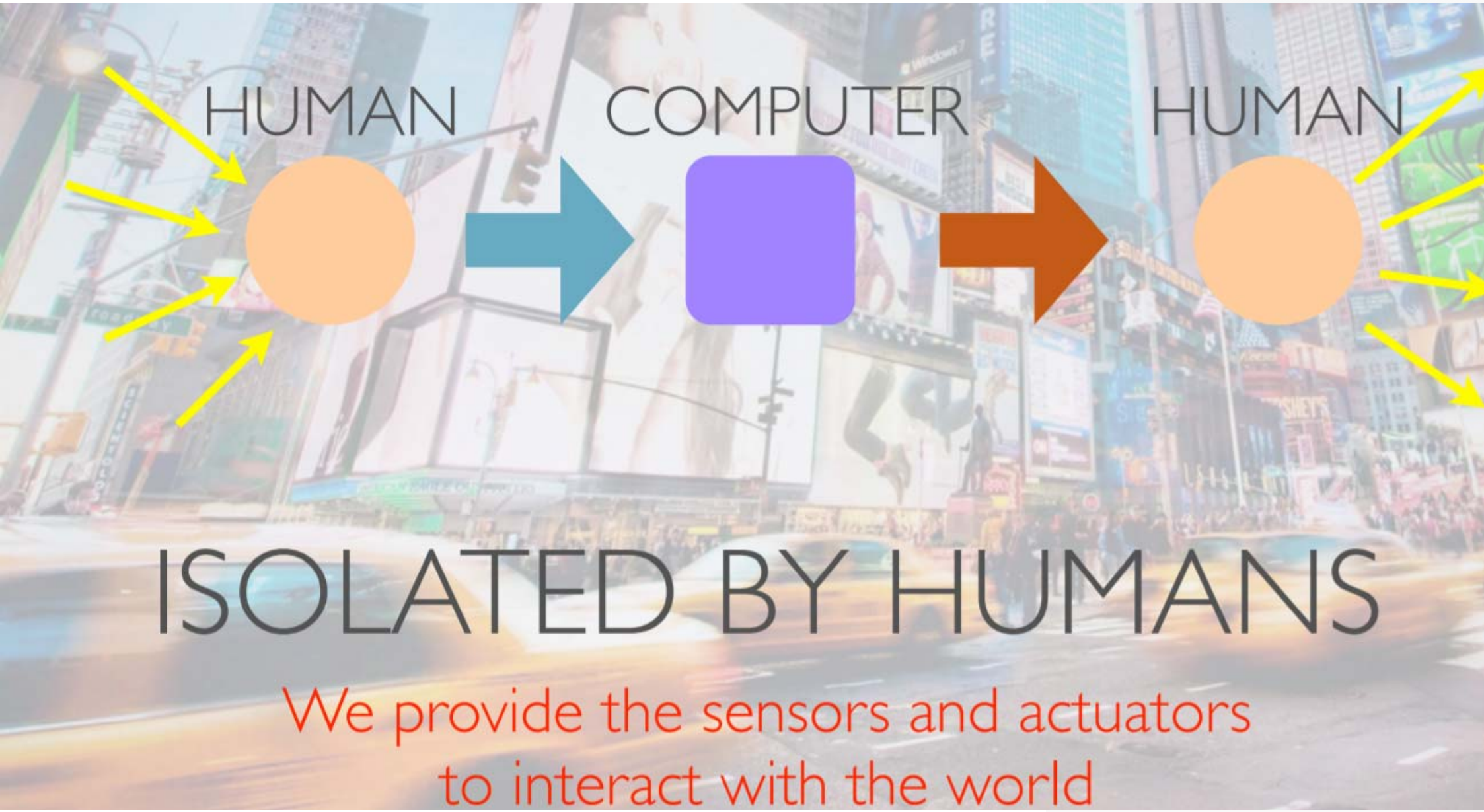
スライド 4

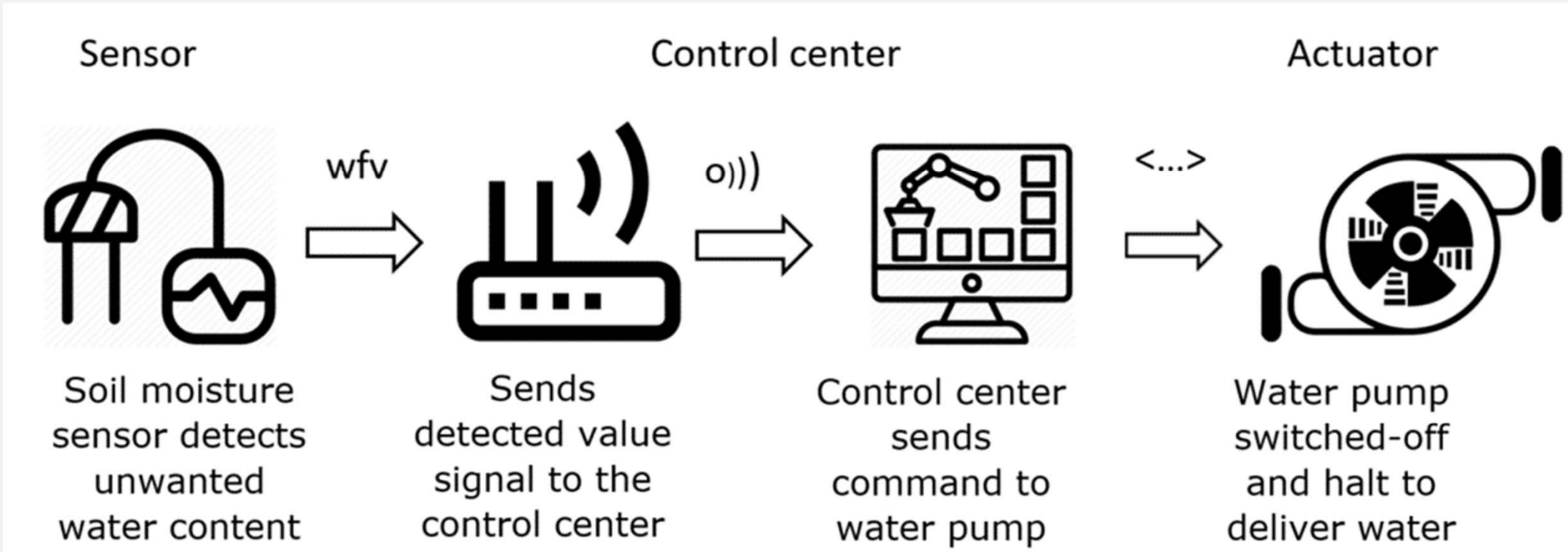
A4 Arduino is one of those Embedded System Devices (called as an Embedded Development Board), which got very famous in the maker's community due to its free and open source nature

Auteur, 2021/10/30

There's a whole selection of projects that use an Arduino and cheap hardware to build home-brew versions of machines that are very expensive on the commercial market. So they become, for example, very useful in developing countries. If you want to set up your own little biology lab, in a developing country the equipment costs $70,000, so you can see that's not going to happen. But if you put together a few Arduinos and some parts with an old computer, then for $70 you can do a number of these sorts of tests and you can solve some problems in the real world.

MASSIMO BANZI: COFOUNDER OF ARDUINO


HUMAN
COMPUTER
HUMAN
ISOLATED BY HUMANS
We provide the sensors and actuators
to interact with the world


Sensor
Control center
Actuator
wfv
o)))
<...>
Soil moisture sensor detects unwanted water content
Sends detected value signal to the control center
Control center sends command to water pump
Water pump switched-off and halt to deliver water

- 1. Let us make things ourselves!
- 2. Sometimes a cheap solution is enough
- 3. Sensing can be cheap
- 4. Computing can be cheap
- 5. Actuation can be cheap

ASSIGNING ROLES

ROLES ASSIGNMENT WAS AS BELLOW:

EL KODSI ZAINAB	AHMAD AL SHAAR	ASEM MKL
• TESTER	• LEADER	• DESIGNER & ARCHITECT
• DOCUMENTER	• ARCHITECT & DESIGNER	• CODER
• MANAGER		

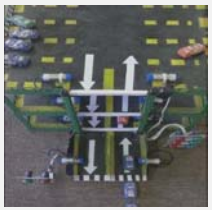
PROBLEM ANALYSIS

Mobility Problems and traffic jam

finding a parking space in some cities in working hours is an almost impossible mission. This search for parking space results in waste of time, fuels, and traffic jams. The driver can spend more time inside the parking area to find a free space.

Automatic authentication

Some companies have their own parking areas dedicated for the office staff, and the employees must use a special card to authenticate. In traditional parking spaces, the gate is oppened manually not automatically.

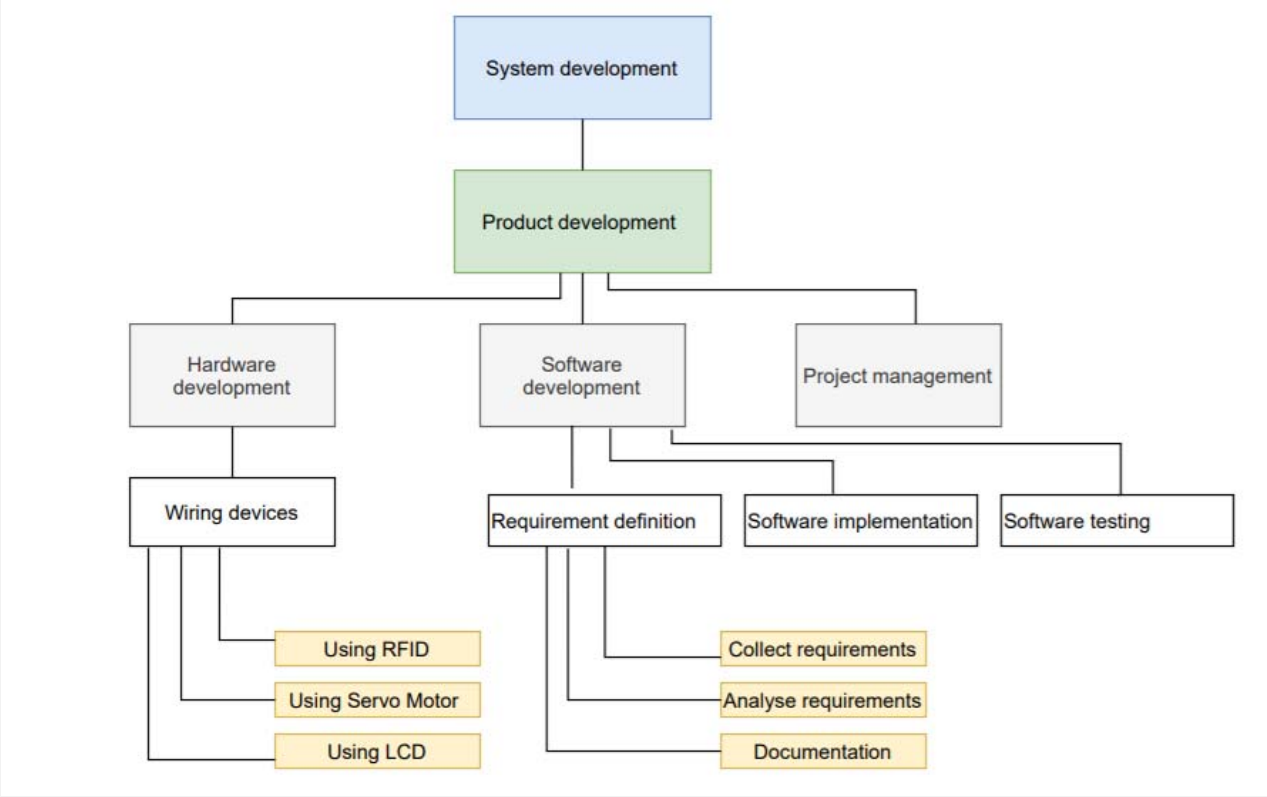


SMART PARKING MANAGEMENT SYSTEM

- Automatic authentication.
- The gate opened only in case of existing free parking space.

WORK BREAKDOWN STRUCTURE (PMP)

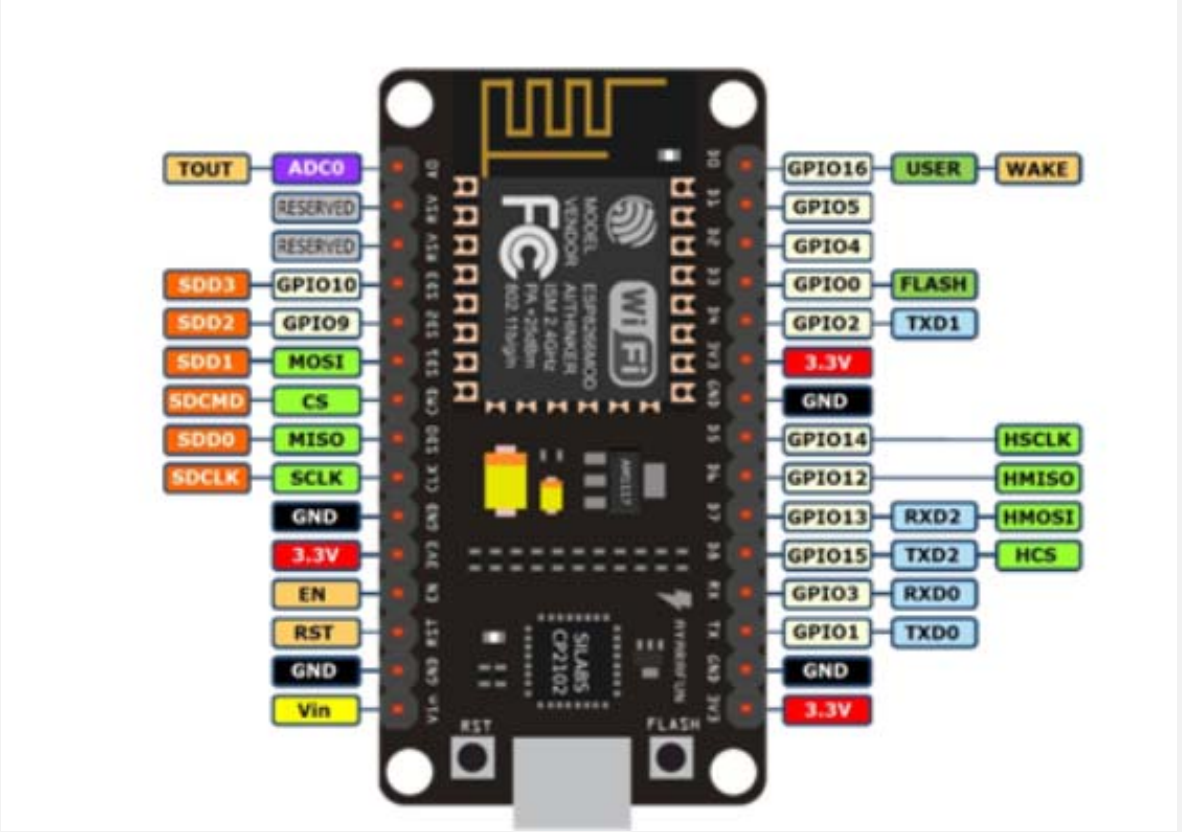
a comprehensive, hierarchical model of the deliverables constituting the scope of a project.



A5

NodeMCU (Node MicroController Unit)

- software and hardware development environment.
- contains all crucial elements of the modern computer: CPU, RAM, networking (wifi), and even a modern operating system and SDK.

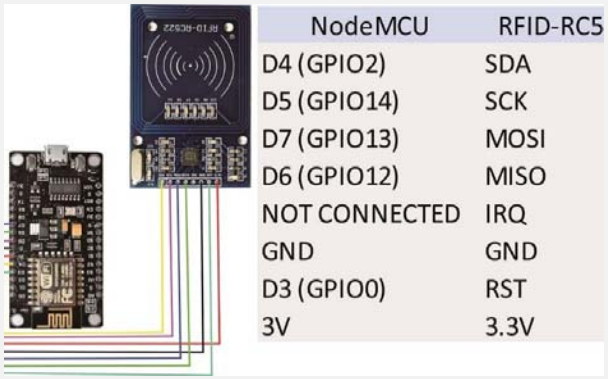


A5

Through its pins we can read inputs – light on a sensor, a finger on a button, or a Twitter message –and turn them into an output – activating a motor, turning on an LED, publishing something online. It has also WiFi capabilities, so we can control it wirelessly and make it work on a remote installation easily! We can tell our board what to do by sending a set of instructions to the microcontroller on the board. To do so we can use the the Arduino Software (IDE).

Auteur, 2021/10/30

WBS DICTIONARY



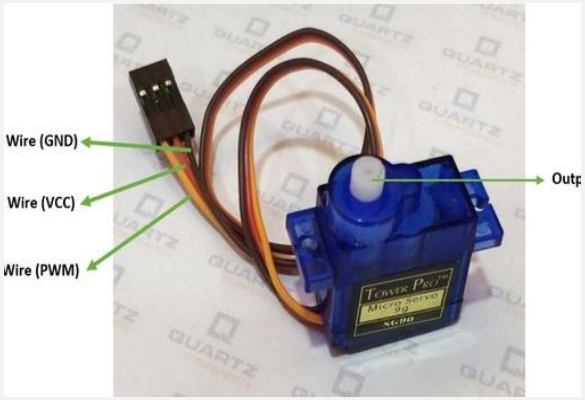
NodeMCU	RFID-RC5
D4 (GPIO2)	SDA
D5 (GPIO14)	SCK
D7 (GPIO13)	MOSI
D6 (GPIO12)	MISO
NOT CONNECTED	IRQ
GND	GND
D3 (GPIO0)	RST
3V	3.3V

RFID

- RFID reader board.
- RFID card.
- RFID tag.
- eight-pin headers.

LCD

- Display free parking slots available.

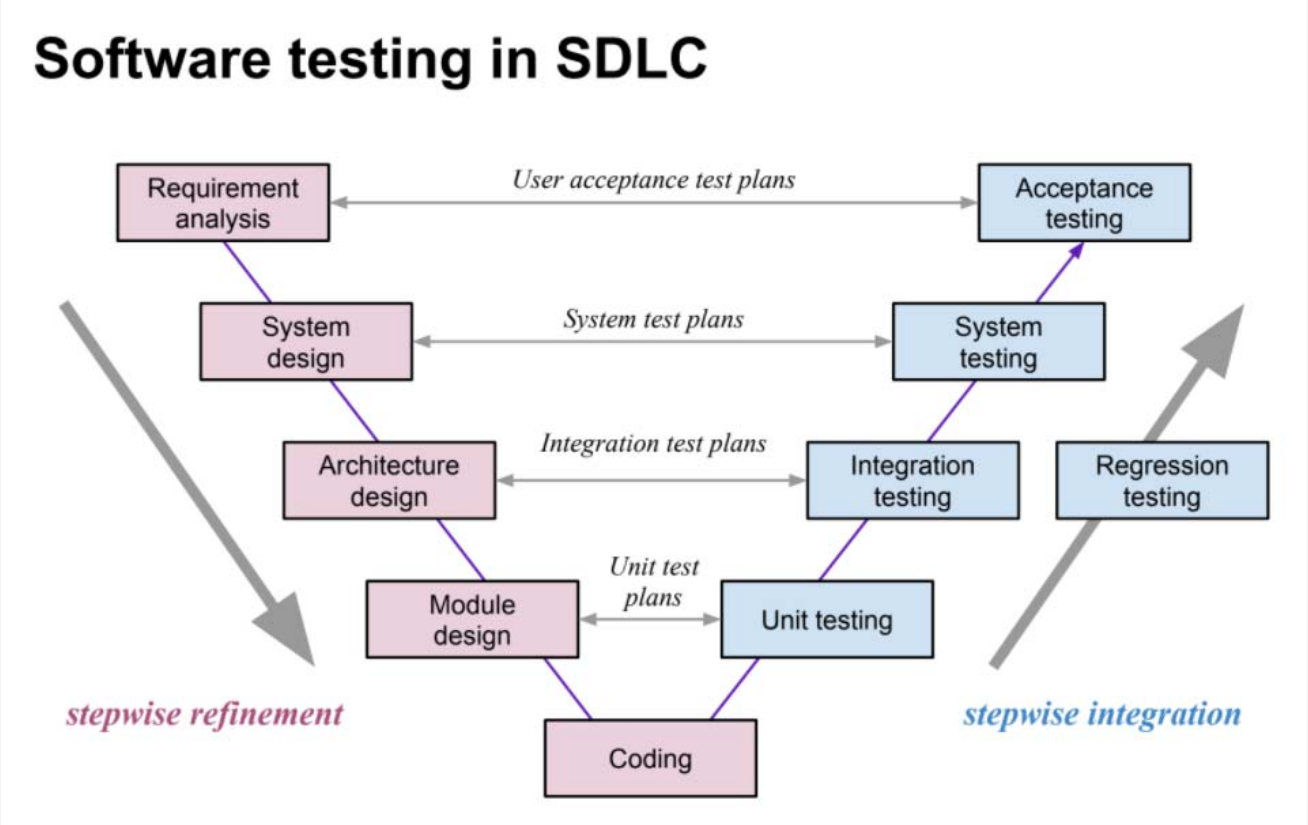


Servo Motor

- Gate simulation.

SOFTWARE TESTING

Tests were executed to ensure the quality of our product:



BUDGET

The budget of the project is estimated as below:

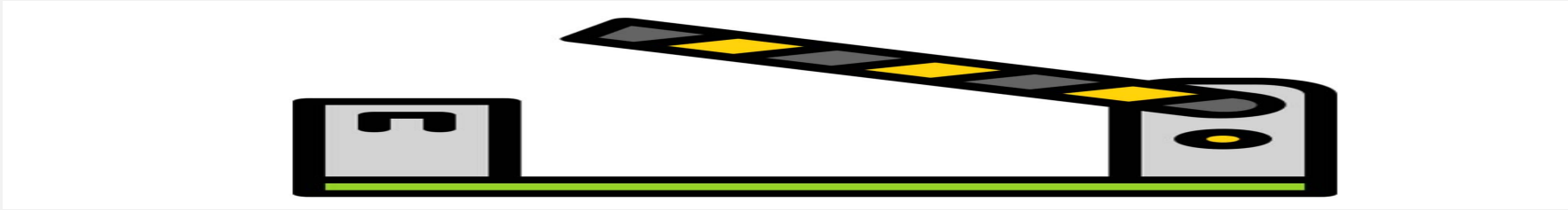
DEVICE	PRICE
NODE MCU	**¥ 700**
RFID	**€ 5,35**
SERVO MOTOR	**¥ 217**
LCD	**¥ 680**

DESCRIPTION OF THE SOLUTION

- RFID reader board.

Going out from the parking

❑ LCD to display the number of available places.



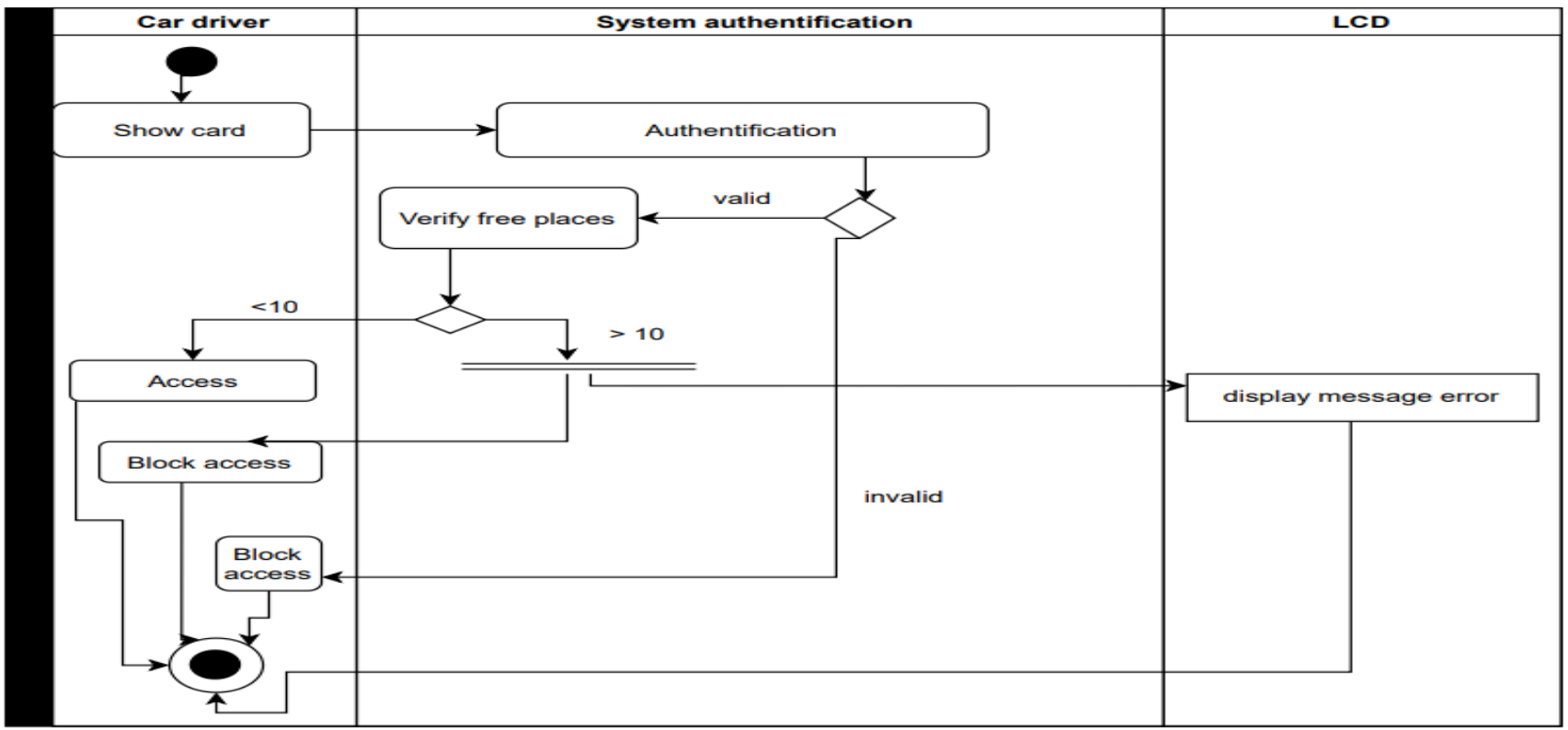
Accessing to the parking after fulfilling the two conditions below:

- **Authentication OK.**
- **Free places in the parking area.**

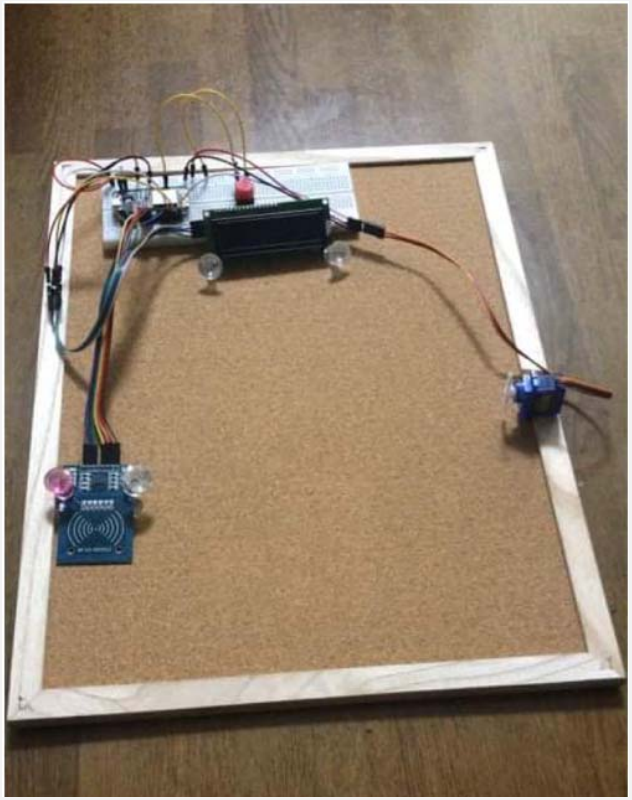
- RFID reader board.

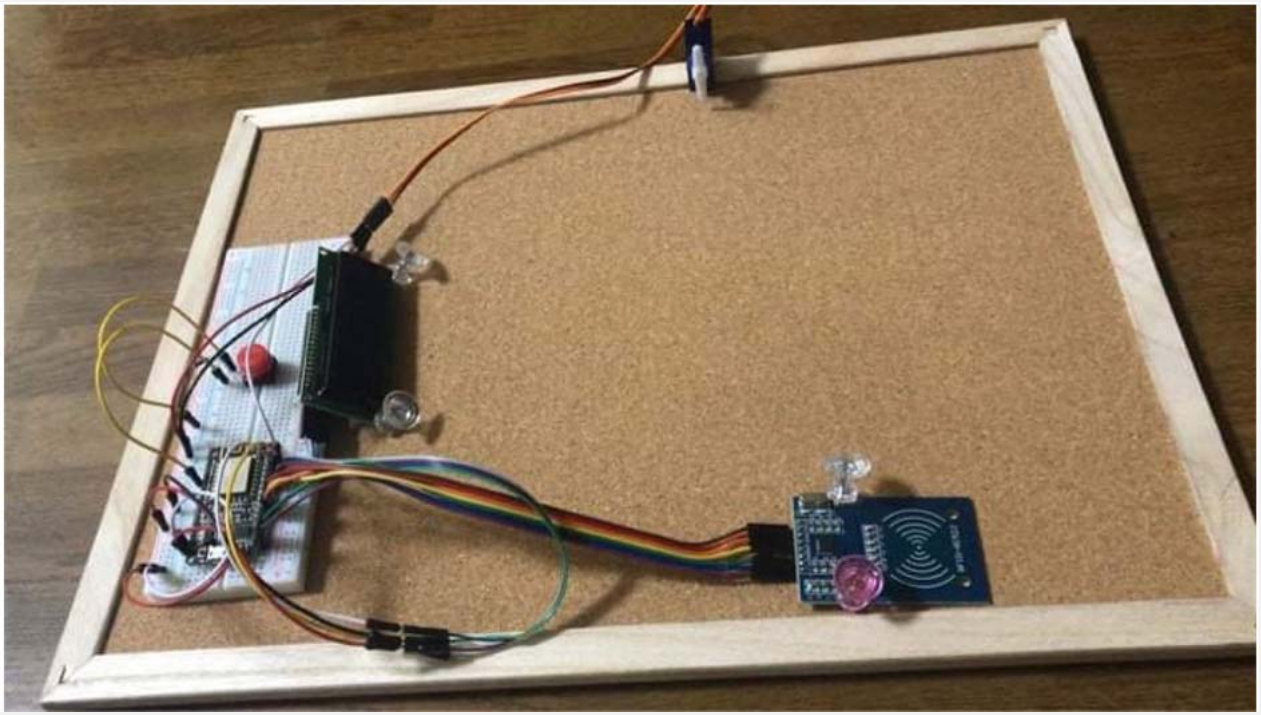
ACTIVITY DIAGRAM

- Describe the flow of activities:



SOLUTION IMPLEMENTATION





UNIT TESTING

Unit testing				
Module	Test case	Description	Result	Bug
LCD test	Display.	Display the number of cars inside the parking.	OK	0
	Increasing.	Increasing the number of cars when a new car entered through the gate.	OK	0
	Decreasing.	decreasing the number of cars when a new car entered through the gate.	OK	0
RFID	Authentication OK	Using the RFID card, display a message authentication OK not in the LCD but in the console.	OK	0
	Authentication invalid	Using the cash card, display a message : authentication invalid not in the LCD but in the console.	OK	0
Servo Motor	Servo motor is moving right and left.	Execute the code to make the servo motor moving right and left.	OK	0

PERSPECTIVES

Our system could be used not only for managing parking spaces but it would be used for many other projects :

Ticket tram validation card:

- The passenger will validate the ticket before entring the tram, to resolve the conflicts of validation between the controller and the passenger and the validation is done automatically.

Avoid crowded places :

- An automatic gate to block access when the number of people reached a threshold already declared in the code.

Develop our project :

- it is possible to develop our project and use other sensors to show to the driver the free spaces by displaying the precise number of the place, and guiding him to not waste his time.

6. Look around: chances are everywhere

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THANK YOU VERY MUCH