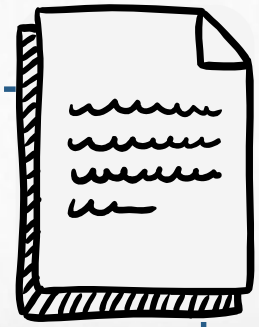
Deliverable 1:
Project Proposal

Introduction



Good afternoon Ladies and Gents, our “lit” team will be presenting 2 ideas, the first being a way of allowing governments and building contractors the ability to cut down on the use of constant electricity with a small yet ingenious speed bump, the second idea being inspired by the amount of glass skyscrapers found in our current time and is to be directed towards the companies that maintain the outer cleanliness of them, this presented project involves the use of a machine that sticks to the all glass exterior of the building.

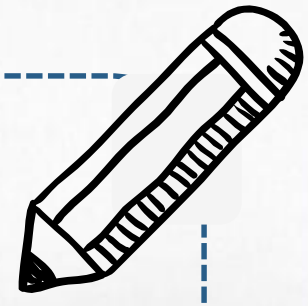
Solar Window Cleaner

A window cleaner is a great way to provide a clean glass window without the hassle of ladders. This robotic cleaner packed with powerful and convenient features will keep a track of areas it has cleaned and stopping when the job is done. This robotic cleaner will run on solar energy in order to obtain a sustainable environment. This robotic cleaner will provide a strong suction and will clean through tough parts.

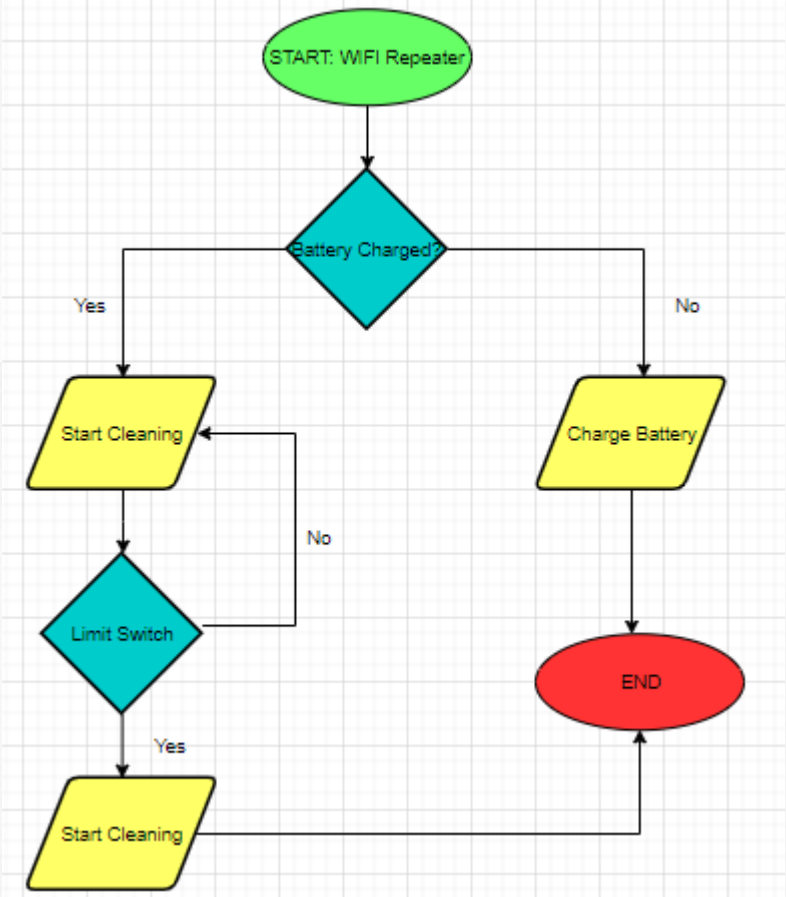
Piezoelectric Rumble Strips

It is New Energy Technology that can be installed in a busy road which will be an energy recovery device. This device will capture the kinetic energy from the tires and convert it to electricity. Cars that will pass on this device will generate enough energy to power an electronic sign. This device will provide a sustainable environment to our society.

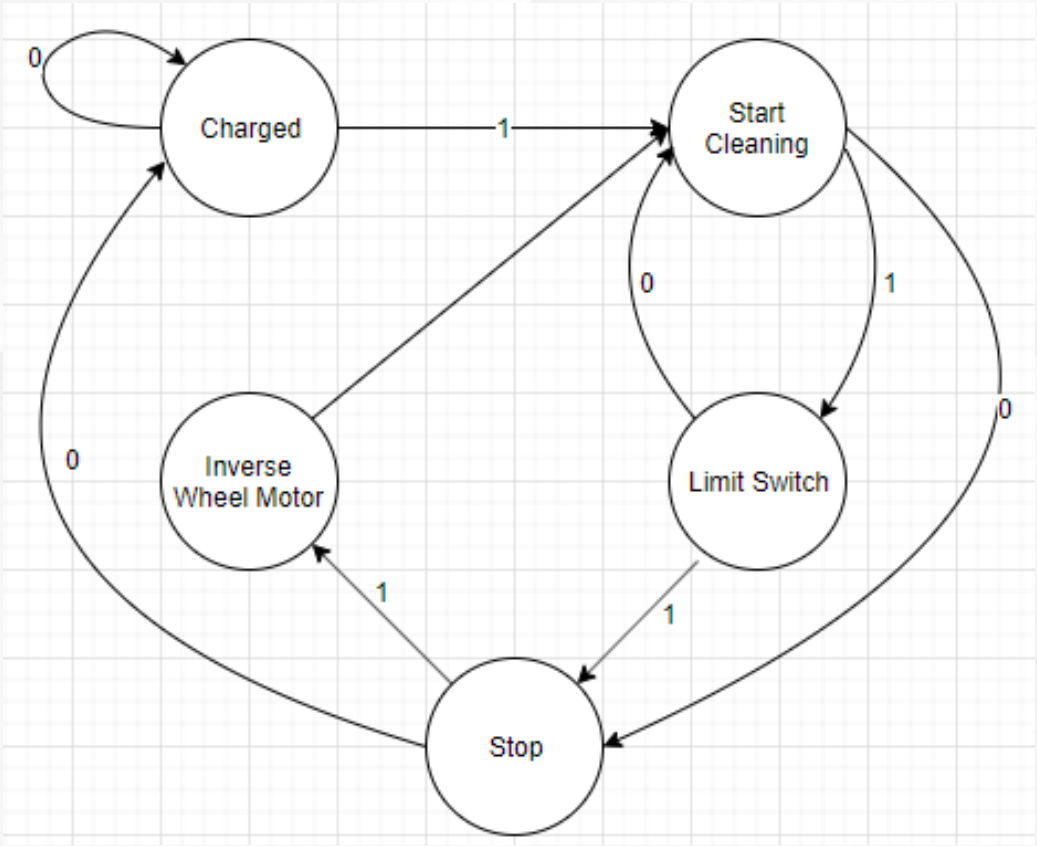
Preliminary Design



Flow Diagram: Solar Window



State Diagram: Solar Window Cleaner



$Q_2Q_1Q_0$	A=0	A=1	Y
000	000	001	0
001	100	010	1
010	001	100	0
011	xxx	001	1
100	000	011	0
101	xxx	xxx	x
110	xxx	xxx	x
111	xxx	xxx	x

Input: A
1→ Agree
0→Disagree
Output: Y
1→ Desired Output

Transition Equation:

$Q_2^* = A'Q_0 + AQ_1Q_0'$

$Q_1^* = AQ_2 + AQ_1'Q_0$

$Q_0^* = Q_1Q_0 + AQ_1'Q_0' + A'Q_1$

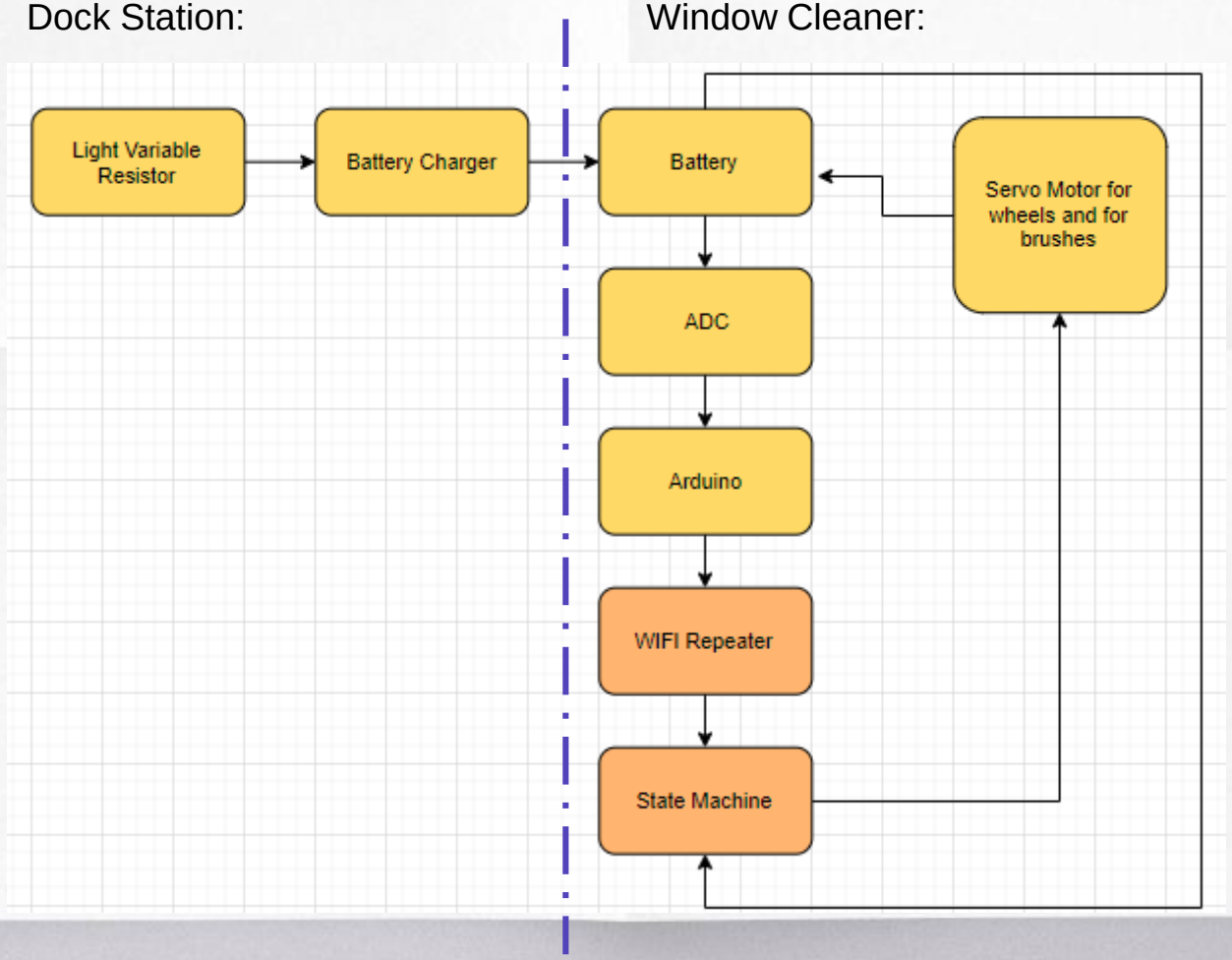
Output Equation:

$Y = Q_0$

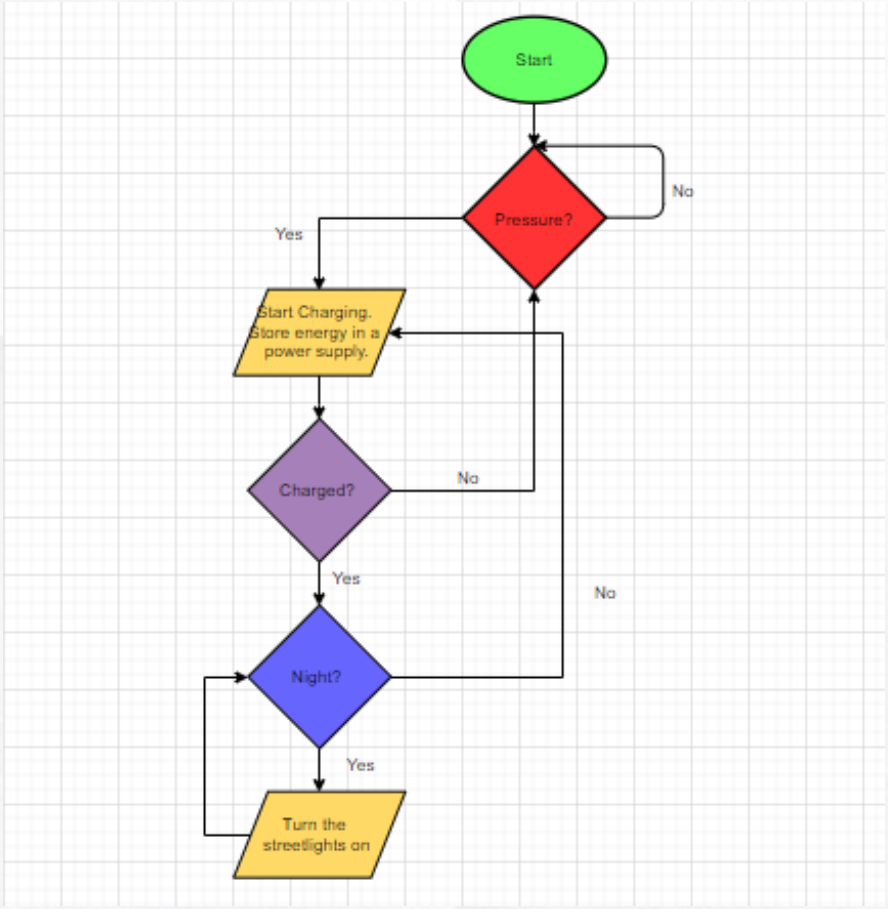
Block Diagram: Solar Window Cleaner

Dock Station:

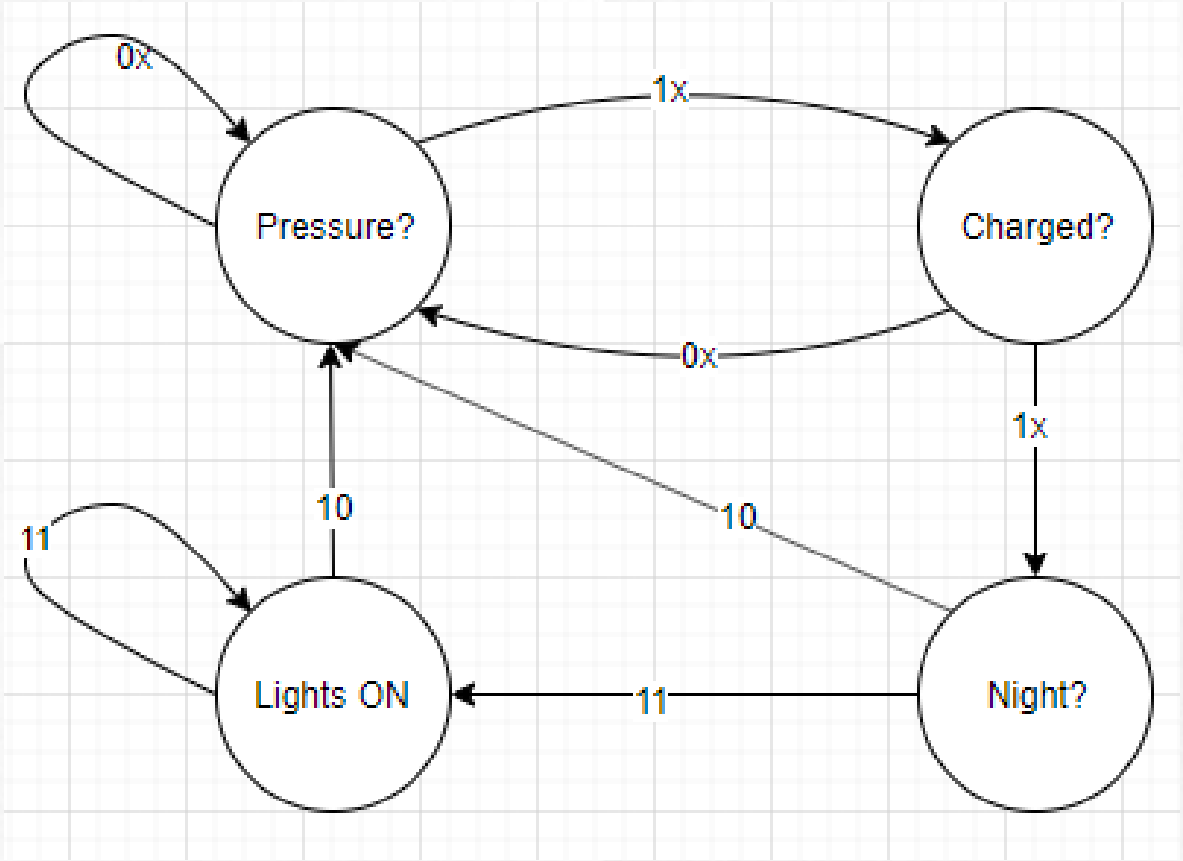
Window Cleaner:



Flow Diagram: Piezoelectric Rumble Strips



State Diagram: Piezoelectric Rumble Strips

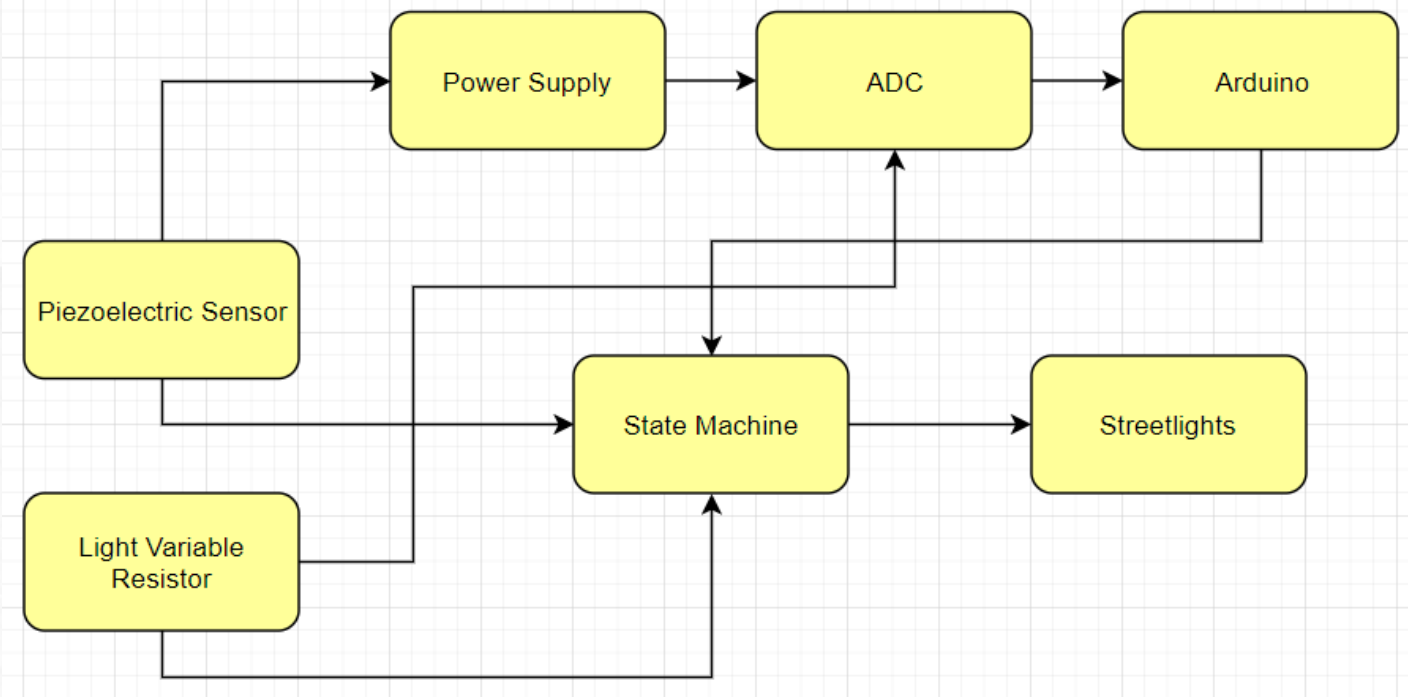


Q_1Q_0	AB				
	00	01	10	11	Y
00	00	00	01	01	0
01	00	00	10	10	0
10	xx	xx	00	11	0
11	xx	xx	00	11	1

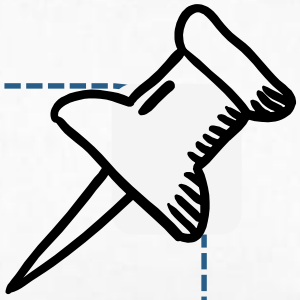
Input: A (Pressure Sensor)
1→ Pressure is detected
0→Pressure is not detected
B (Light Sensor)
1→ Dark/Night
0→Bright/Day

Output: Y
1→ Streetlights are on and Power supply is charged
Transition Equation:
$Q_1^* = BQ_1 + AQ_1'Q_0$
$Q_0^* = BQ_{1+} AQ_1'Q_0'$
Output Equation:
$Y = Q_1Q_0$

Block Diagram: Piezoelectric Rumble Strips

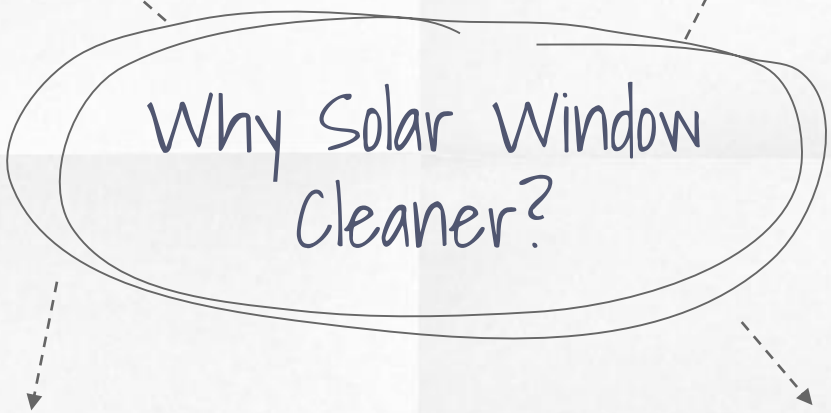


Justification



Technology in the solar power industry is constantly advancing and improvements will intensify in the future, so it will increase the effectiveness of solar panels.

Reduces electricity bills.



Solar energy has the least negative impact on the environment.

Low maintenance costs: Solar panels generally don't require a lot of maintenance; you only need to clean them a couple of times per year.

Why Piezoelectric Rumble Strips?

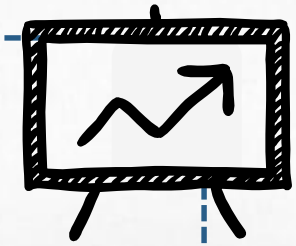
Potential solution in powering up establishments without creating adverse effects on the environment.

Introduce an alternative way of harnessing electrical energy.

This innovative road bumps will be able enhance infrastructure and road designs and contribute to traffic regulations by preventing possible accidents.

Utilize other alternative sources of electrical energy, which are completely independent from the environment.

Prospective Market



Target Audience

- Our 2 projects are targeting the “big boys” or in other words, big companies that have multiple compounds and buildings that must be well lit and cleaned, therefore we have concluded that these are the following areas that would be interested in our projects:

1. Governments
2. Building contractors such as Emaar
3. Global innovative companies
4. Environmentally friendly companies and movements
5. Tesla?

Benefits

Solar Window Cleaner

- Safer alternative than workers cleaning skyscrapers.
- Much more environmental option than the use of water.
- Systematic approach to cleaning massive areas of glass.

Piezoelectric Rumble Strips

- Without the rumble strips, that energy would've been wasted as brake heat.
- Powering the traffic lights or lighting up temporary signs at special events.
- This is sustainable to the environment.

Cost

Labor Cost Estimation

Deliverable	Hours	Cost
1	5	1600 AED
2	11	3400 AED
3	4	1500 AED
4	7	2150 AED
5	19	5550 AED
6	28	8700 AED
7	3	1000 AED
8	2	800 AED
Total:	80	24,700 AED

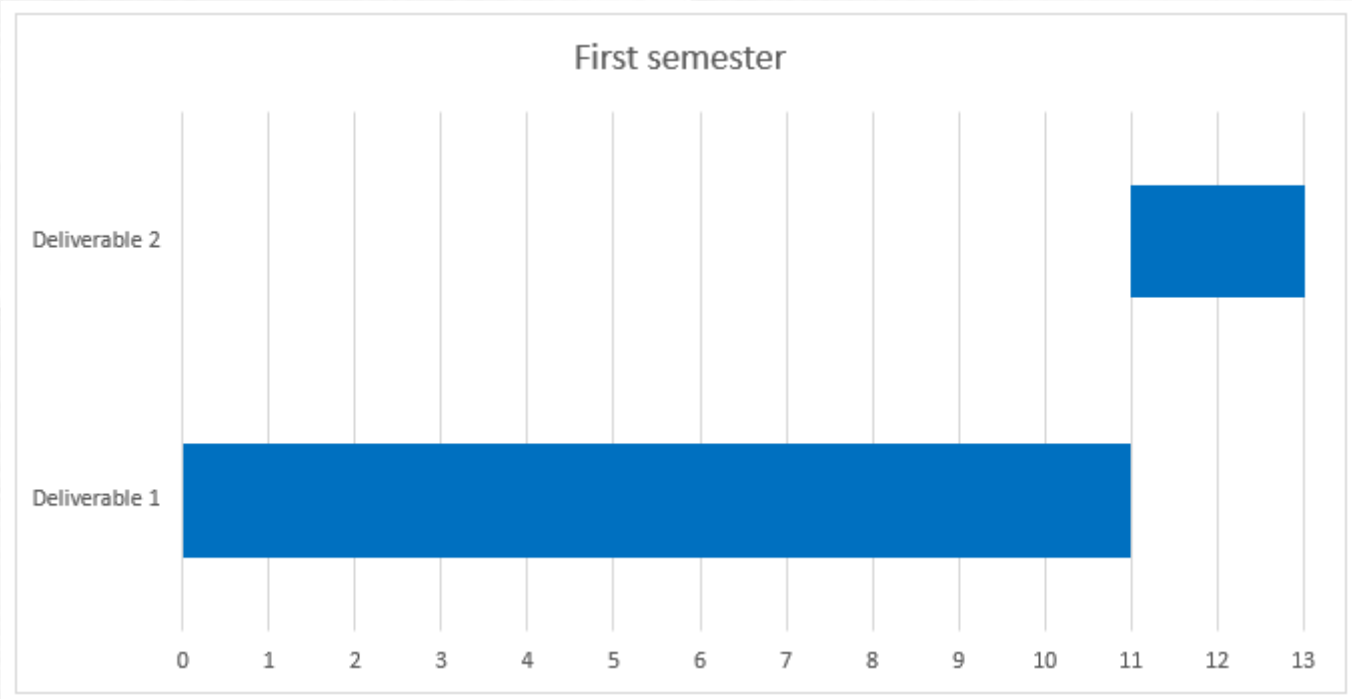
Parts Cost Estimation: Solar Window Cleaner

Component	Quantity	Cost
Servo Motor (Arduino Kit)	2	600 AED
Limit Switch (Arduino Kit)	1	600 AED
Light Variable Resistor	1	10 AED
WIFI and Repeater	1	25 AED
74HC74 (Dual D type flip flops)	1	4 AED
74HC02 (Quad 2-input NOR gate)	1	4 AED
74LS08 (Quad 2-input AND gate)	2	8 AED
74LS04 (HEX inverter gate)	1	4 AED
NE555 timers	1	5 AED
Total:	660 AED	

Parts Cost Estimation: Piezoelectric Rumble Strips

Component	Quantity	Cost
Resistors (Arduino Kit)	-	600 AED
LED Lights (Arduino Kit)	4	600 AED
Servo Motor (Arduino Kit)	1	600 AED
Ceramic Piezo Sensor/Actuator	5	50 AED
Light Variable Resistor	1	10 AED
74HC74 (Dual D type flip flops)	1	4 AED
74HC02 (Quad 2-input NOR gate)	1	4 AED
74LS08 (Quad 2-input AND gate)	2	8 AED
74LS04 (HEX inverter gate)	1	4 AED
Total:	26	680 AED

Gantt Chart


First semester
Deliverable 2
Deliverable 1
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1
2
3
4
5
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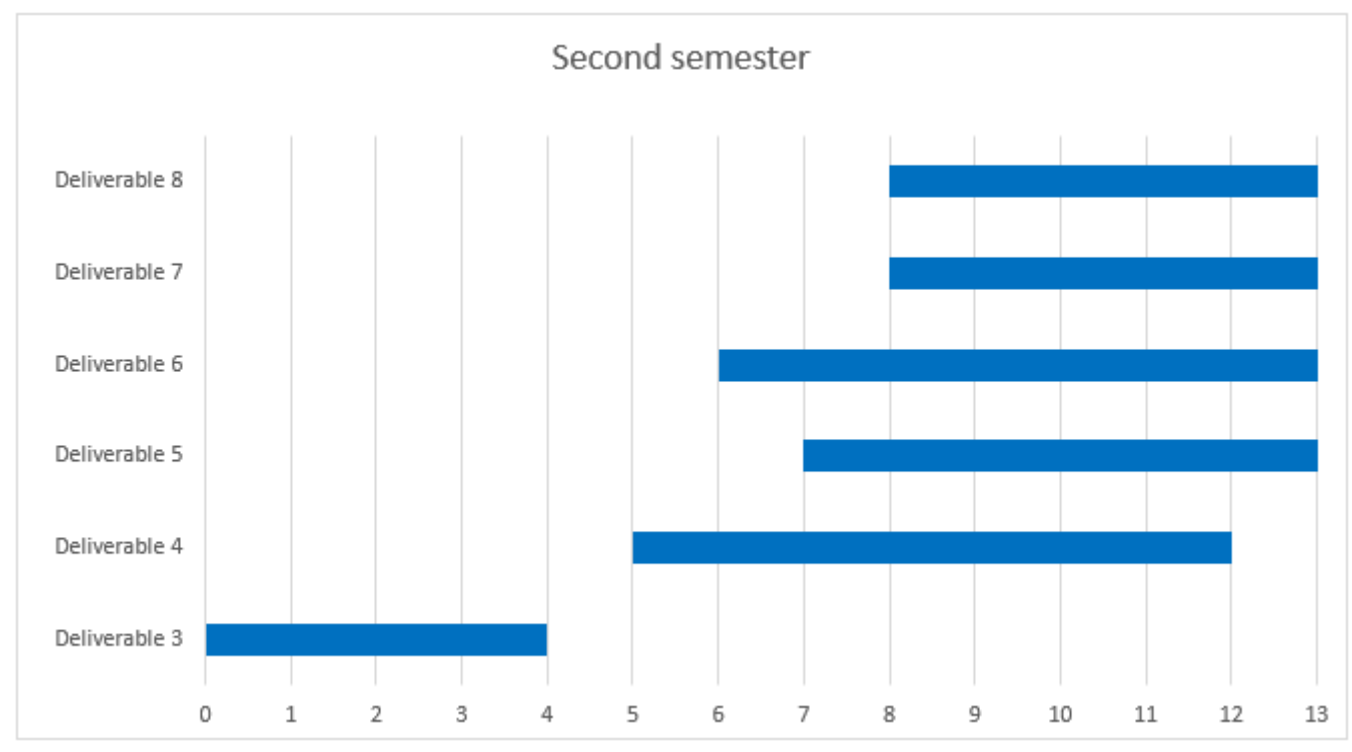
13

Gantt Chart


Second semester
Deliverable 8
Deliverable 7
Deliverable 6
Deliverable 5
Deliverable 4
Deliverable 3
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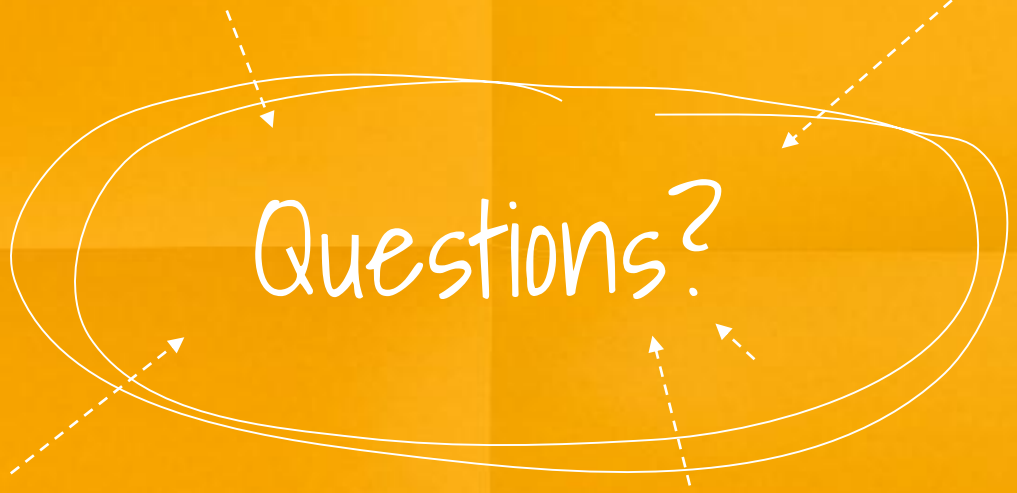
Questions?