Product requirements

Home Farm

G R E E N G O B L I N - Group 12

Overview

There is a need for a product that gives normal people the opportunity to take back control over their food.

GreenGoblin's Smart farm makes it possible for everybody to grow their own vegetables and herbs. The Smart Farm is designed to require minimal effort from the user without compromising the quality of the output. With the self-adjusting water and light system the plants will have the perfect and most optimal conditions.

Even the busiest businessperson or the least green fingered person can use the Smart Farm. Just insert seeds in the Farm, choose a program and the Farm will do the rest. In a few weeks there will be perfectly grown vegetables ready to harvest. The Smart Farm even lets you follow the process on your phone through an app.

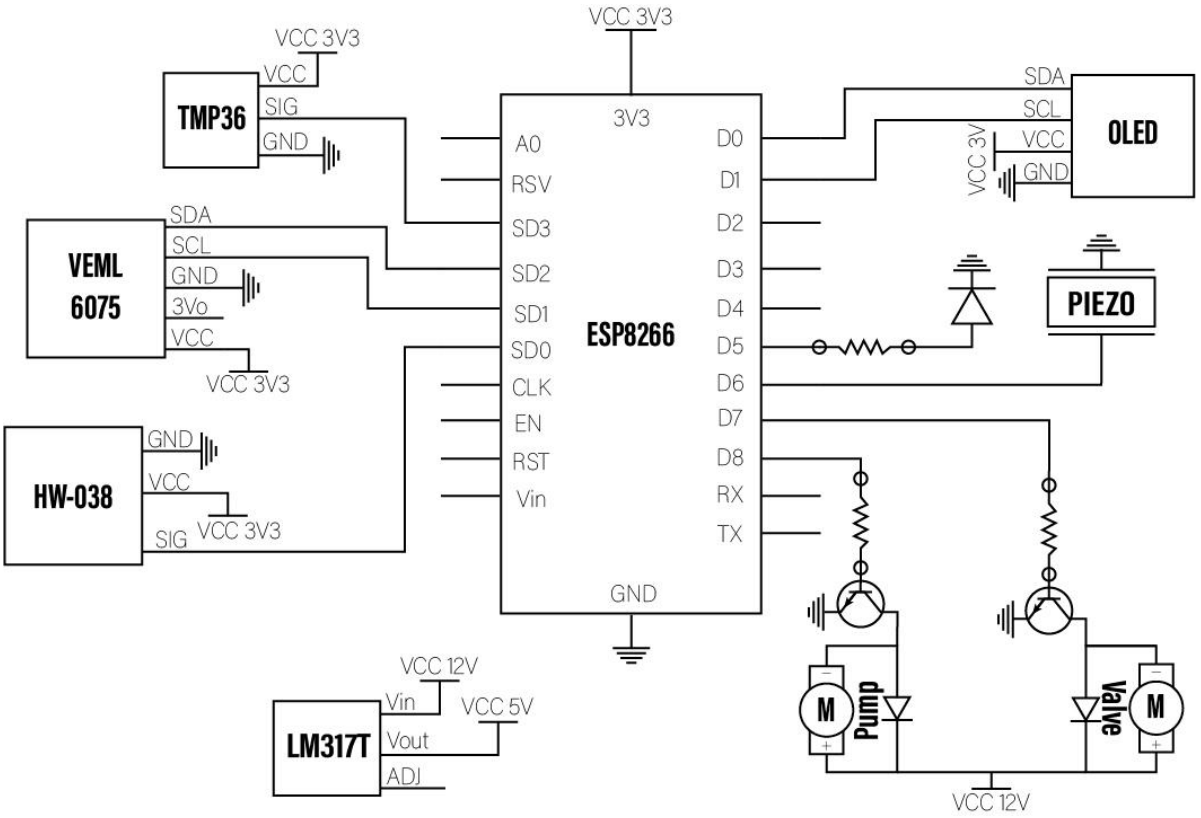
Grow better and more sustainable vegetables and herbs easily and all year around with GeenGoblin's Smart Farm.

No.	Requirement	Criteria	Comments
	Functionality		
	The product must be able to hydroponically grow herbs and vegetables.		
	Must have a water dispensing system to ensure the plants always get the water they need.		
	Must have LED light that ensures the optimal light conditions for the plants.		Optimal time of light, optimal wavelengths
	Must be able to add fertilizer to the water.		
		Planting area: 10-50 cm2	Should be able to fit in normal peoples homes but still have room for a meaningful amount of plants.
	Must be modular and stackable.		Connecting multiple modules.
	Water transfer between modules.		
	Electricity transfer between modules.		
	The only input from the user should be to insert seeds,		

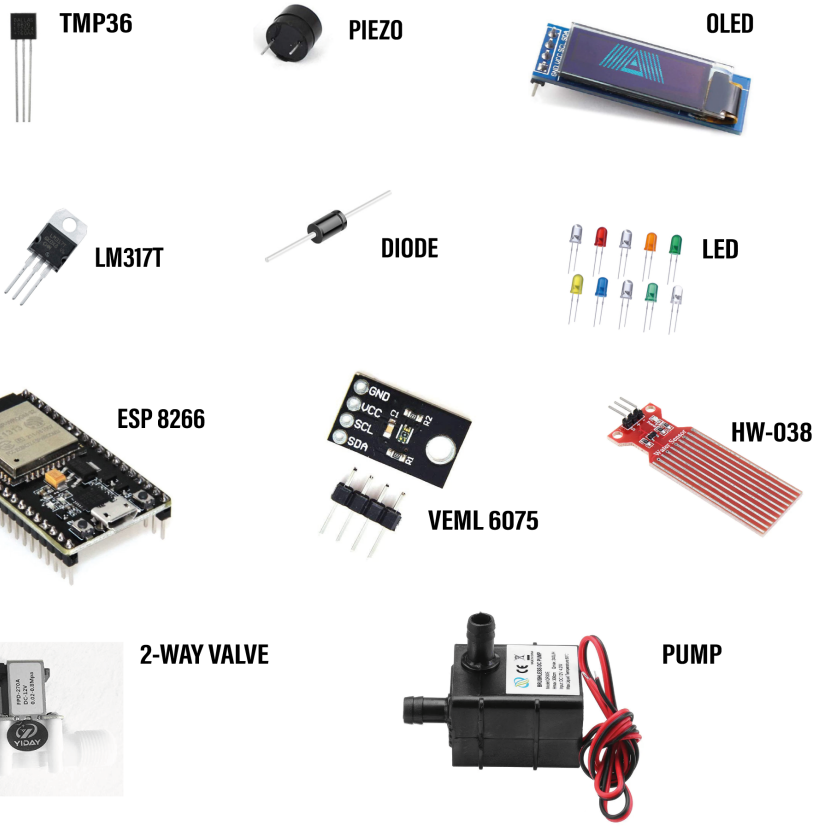
	choose a program and refill water and fertilizer in the tank.		
	Must be able to monitor the status of the plants.		Temperature, water level, concentration of fertilizer, LED strength.
		Should show the user the status of the plants on an app.	
Production			
		Sustainable production should be strived for	
		Made mostly from recycled plastic	
		Use a minimum amount of components	
		Should be easy to assemble	
		Made of mostly recyclable materials	
		Minimize use of critical metals	
Construction			
		Should consist of standard components that are suitable for mass production	
		Size: under 1 m2	For one module
	Must have room for various sensors (see ‘Electrical, hardware and sensors’)		
	Must have room for a microcomputer to receive signals/commands.		Connect to the message broker (MQTT).
		Some kind of screen (ex. OLED).	In order to show the user information.
	Must be able to send water and power between modules.		
	All the parts with water must be able to close tightly/properly.		Both for practical and safety issues.
	Must have a constant source of power.		
	Must have a water tank.		
	Must have a pump.		To pump water to modules.
	Must be stable when connected to other modules.		
	Must have valves to control the water from between modules.		

Electrical, hardware and sensors

Block diagram of electrical hardware:



Components:



	Water level in tank Wavelength in LED Temperature around the plant	The accuracy of water level, wavelength and temperature is TBD	Input/sensor requirements
	The actuators pump water		Output/actuator requirements

	through the system and controls the valves to the different modules		
	Temp sensor (tmp 36) Piezo OLED screen Step down converter (LM317T) Diode LED ESP 8266 UV-sensor (VEML 6075) Water level sensor (HW-038) 2-way valve(s) Water pump (TBD)		Critical BOM components
		It is not critical for the system to receive and send information instantly.	Communication requirements
	12 V step down to 3 V		Power supply (12 V) to esp (3 V)
Design			
		Simple and sleek design in its appearance.	
	TBD		
Use/Userfriendliness			
	App for function control		Use of NodeRED for online control.
	Ability to customize settings		Light, water etc.
		Easy to stack and utilize the modularity.	
		Easy connection of water and power between modules.	
		Affordance and easy to use app, with multiple plant modes.	
	The only input from the user should be to insert seeds, choose a program and refill water in the tank.		
		Easy to harvest	
		Easy to clean	
		Easy to plant seeds	
Finance			
		TBD	Etc. students living in smallapartments in the city
Stakeholders			
	People living in big cities without access to a garden, who want to eat more		

	sustainably.		
		Sustainable NGO’s	Could have an interest in promoting this product.
		Corporations in the food industry	Could see our product as a treat.
Safety and legislations			
	Water and electrics have to be seperated and must not constitute any safety hazard.		
	Must comply with rules about food and health regulations.		