FINAL YEAR PROJECT 2 REPORT

(DJJ50193)

DIPLOMA IN MECHANICAL ENGINEERING

TITLE	SMART PIPING SYSTEM
SUPERVISOR	PN ANI BINTI YAAKUB

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This report is submitted to the Department of Mechanical Engineering in partial fulfilment of the requirements for Diploma in Mechanical Engineering.

MECHANICAL ENGINEERING DEPARTMENT

APPRECIATION

In the name of Allah , the Most Merciful and Gracious . All glory and thanks to Allah and His blessing, we were able to complete this final year project 2 report . With the blessings, hard work, and cooperation of all our team members, the "**Smart Piping System**" project was successfully completed.

We would like to express our sincere appreciation to our project supervisor, **Puan Ani Binti Yaakub ,** who has given us a lot of guidance, advice, encouragement, and constructive criticism until we successfully completed this final year project 2 report .

Not forgetting to also thank our colleagues who gave us a lot of support and opinions in completing this project. In addition, not to forget all the lecturers who are directly and indirectly involved in the production of this project in providing advice to further strengthen the report of this project.

ABSTRACT

People can be assisted in their daily activities by a smart piping system that is designed to completely replace or at least substantially reduce their effort, which makes their work easier. An adequate water supply is important for plant growth because it will be easier to provide water to plants when they need it, and this system provides comfort, increases efficiency, and saves users time. Additionally, this system makes it easier for people to enjoy having their plants by providing them free from problems like forgetfulness and other similar issues. A relay module, an Arduino UNO, a soil moisture sensor, and other technology are used in this system to imitate the behaviour of an automatic system, minimising the use of manual work and completely replacing it. Arduino Uno is programmed to sense the soil's moisture level, dryness, and wetness at a specific time and determine when and how much is used to water the plants. This is achieved by automatically turning the water pump ON or OFF based on the soil's moisture content, which is continuously sensed by the soil moisture sensor. Arduino UNO is used to control the entire procedure, and the necessary components are connected to verify whether or not the system will function as intended.

Keywords : Adruino UNO , relay module , soil moisture sensor , water pump .

DECLARATION OF ORIGINAL WORK AND INTELLEGUAL AND PROPERTIES

TITLE : SMART PIPING SYSTEM

SESSION : 1 2022/2023

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CHAPTER 1 : INTRODUCTION

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1.1 INTRODUCTION

With this system we solved the problem of people that were caused by watering the plant when they don't have a particular time and other problems that they face when pouring water on the plants . Any implausible situation can be created in the absence of a person at home . The lack and wastage of water will affect the plant growth . No matter what the weather, it is either too dry or too wet, and it is very difficult to control the amount of water usage. That means for perfect growth ,water is needed at the proper time along with the proper quantity. To solve these problems , a smart piping system has been created to make sure that the plant are getting the correct amount of water because it's cost-efficient. Then it will be effective to use this smart piping system.

Prepared by: AYU SOFEA BINTI ZAKARIA F1014

1.2 BACKGROUND

To irrigate is to water plants by bringing in water from pipes, canals, sprinklers, or other man-made means. Places that have sparse or seasonal rainfall could not sustain agriculture without irrigation. In areas that have irregular precipitation, irrigation improves the plant growth and quality. By allowing farmers to grow plants on a consistent schedule, irrigation also creates more reliable food supplies.

The earliest form of irrigation probably involved people carrying buckets of water from wells or rivers to pour on their plants . As better techniques developed, societies in Egypt and China built irrigation canals, dams, dikes, and water storage facilities.

Ancient Rome built structures called aqueducts to carry water from snowmelt in the Alps to cities and towns in the valleys below. This water was used for drinking, washing, and irrigation.

Modern irrigation systems use reservoirs, tanks, and wells to supply water for the plant . Canals or pipelines carry the water from reservoirs to fields. Canals and pipelines, just like the ancient Roman aqueducts, often rely on the force of gravity.

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1.3 PROBLEM STATEMENT

- The current piping system is inefficiency in using water.
- Busyness of the households with working and their life schedule.
- Need a high cost to hire a worker.

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1.4 OBJECTIVE

- Design an economic smart piping system.
- Consumers can save more energy and their time.

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1.5 PROJECT QUESTION

This study will answer the following research questions :

a) Is the main purpose of implementing this project, which is to provide comfort to users while watering the plant, achievable?
b) Has this project been successful in helping users overcome the problem they face?
c) Who are the main targets that inspired the implementation of this project?
d) Does this project meet the needs of users ?
e) Is the use of Arduino in implementing this project effective and functional?

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1.6 SCOPE OF THE PROJECT.

- Designed for anyone who has a garden or likes to plant but has difficulty keeping the plants in good condition due to working and having a tight daily schedule.
- The aim of this project is to develop an automatic watering plant system using Arduino and a soil moisture sensor that enables the user to control their plant while they are not around.

1.7 IMPORTANCE OF THE PROJECT

A smart piping system is a system in which a controlled amount of water can be supplied through pipes, pumps, etc., which is a method for helping plants to grow. This system is designed to solve different problems related to the watering process. The importance of this system is very high, and it does help you save money, time, and energy you may spend when watering your plants. As the system is optimized for the perfect timing of watering, it may help the plants to remain healthy and grow perfectly. Thus, the system would not only keep the plants alive but also healthily facilitate their growth. It means this system is a great long-term investment and will save you money over time.

1.8 DEFINITION OF TERMS / OPERATIONS

We design a system that is ideal for every plant in our yard because it's hard for people to take care of their plants. This system can alert the user from time to time. The system should be able to measure and control the soil moisture. When the soil moisture is dry, Adruino will command the water to run.

1.9 SUMMARY

The purpose of this system is to If the soil is dry and the soil moisture sensor detects a low moisture level in the soil, the water pump will start automatically to deliver water to the plant, according to the stored code in the Arduino Uno. When the soil is wet, the soil moisture sensor detects a sufficient level of moisture in the soil, and the water pump is immediately turned off. The main advantage of the system is that it only turns the water pump on when it's needed and instantly turns off when the water is sufficient. In this way, it prevents the wastage of water and ensures the optimal use of water.

CHAPTER 2 : LITERATURE REVIEW

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2.1 INTRODUCTION

This chapter contains research studies conducted related to the automatic watering of plant systems. The aim of this study is to several aspects such as the equipment and tools that will be used while doing this project. Research data in this paper is taken from two main sources namely journals and technical reports. It also contains descriptions of concepts, theories, and also comparisons related to our selected projects. The results of this project have contributed a lot to today's society, especially in the field of agriculture.

2.2 PREVIOUS RESEARCH

Arduino UNO

According to Wikipedia, Arduino. cc developed the Arduino Uno, an open-source microcontroller board based on the Microchip ATmega328P microcontroller. A variety of expansion boards (shields) and other circuits can be interfaced with the board's sets of digital and analog input/output (I/O) pins.

The ATmega328 comes preburned with a boot loader that allow you upload new code to it without the use of an external hardware programmer . It communicates using the original SKT500 protocol. It can also bypass the boot loader and programs the microcontroller through the In-Circuit Serial Progamming header.

The board is prepared with a set of advanced and analog input/output (I/O) pins that can be associated to different development sheets ('shields') or breadboards (for models) and other circuits. The board highlights a serial communication interface, counting a All inclusive Serial Transport (USB) on a few models, which is additionally utilized to stack programs. The microcontroller can be modified utilizing the C and C ++ programming dialects, employing a standard API moreover known as the Arduino dialect, propelled by the Preparing dialect and utilized with a altered form of the Handling IDE. In expansion to utilizing the conventional compiler instrument chain, the Arduino extend gives an coordinates advancement environment (IDE) and command line devices created in Go.

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SOIL MOISTURE SENSOR

The soil moisture sensor is a sensor connected to an irrigation system controller that measures soil moisture content in the active root zone before each scheduled irrigation event and bypasses the cycle if soil moisture is above a user-defined set point. The soil moisture sensor is usually used to detect the humidity of the soil .So,it is perfet to build automatic watering system or to monitor the soil moisture of your plants .The sensor is sensor is set up by two pieces : the electronic board(at the right) and the probe with two pads, that detects the water content (at the left) .According to Redmond R. Shamshir's articles, the soil moisture sensor is a considerably mature technology, which has increasingly attracted the attention of scientists in the fields of soil science, agronomy, and engineering. Presently, in the development of soil moisture sensor, their application, calibration formula, and accuracy vary, and the difference among different soil types is not considered.

RELAY MODULE

A relay is an electrically operated switch which will be turned on or off, belongings the present bear or not, and may be controlled with low voltages, just like the 5V provided by the Arduino pins. As specified over, the relay is an electrically worked switch where the relay opens when the two contacts are detached, whereas the relay is closed when the two contacts touch. When set to tall, the relay will near permitting current to flow . Each contact connects to an input or output terminal. The input terminal is called Pole, and the output terminal is called Throw

WATER PUMP

A water pump is an electromechanical machine used to increase the pressure of water to move it from one point to another. According to the Anglian pumping's article, a few years ago, the folks used a large form of wise ways to extract water from wells and boreholes. The oldest method involved drawing water up using a bucket that could be lowered into a well or raised out of it using a pulley system. However, simple, hand-operated pumps were also commonly used.

PIPE (HOSE TUBE)

Pipe are commonly used to transport water for gardening, lawn care, and other landscaping purposes. They are also used for outdoor cleaning of items such as vehicles, equipment, building exteriors, and animals.

2.3 SUMMARY

For our project that called Smart Piping System, we used the ATMEGA microcontroller -based plant irrigation system. it will be connected along with the soil moisture sensor in the system with a relay. We called the project as smart irrigation to show considerable water savings as compared to using the previous piping system. It can also be selected to either use it automatically or manually. Humidity sensors can handle all the criteria on a plant.

CHAPTER 3 : METHODOLOGY

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3.1 INTRODUCTION

Issues relating to the design project, methodology, the component that we will use in our final project—a Smart Piping System with Arduino—will be highlighted in this chapter**.**

A flow chart showing the development of the project is presented in Figure 3.1.2 . We highlighted issue related to the detailed of the design project , followed by selection of materials and components . They are the relay module, water pump, soil moisture sensor, and Arduino UNO. As a result, connection cables and a breadboard are used to connect the soil moisture to the Arduino uno board. Soil moisture sensor has the job of detecting the amount of moisture in the soil. Adruino will receive all the information gathered by the soil moisture sensor, and the water pump will provide water to the plants.After that , the project was identified and resolved and the project outline is installed . The project needs to be improved after assemble and its was tested at our client home.

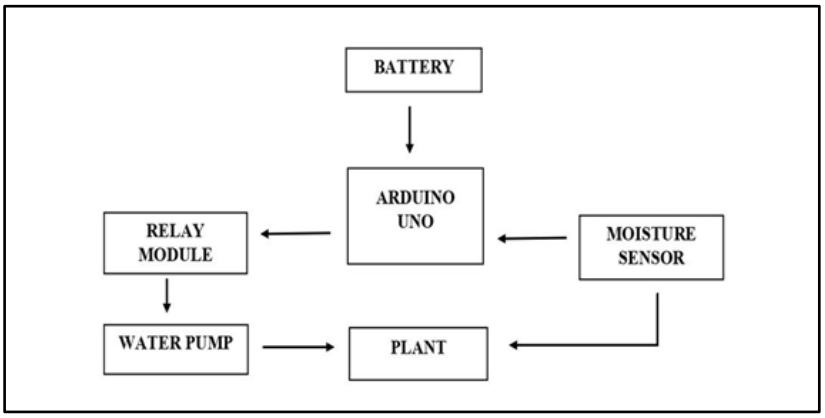


Figure 3.1.1 Adruino UNO Block Diagram.

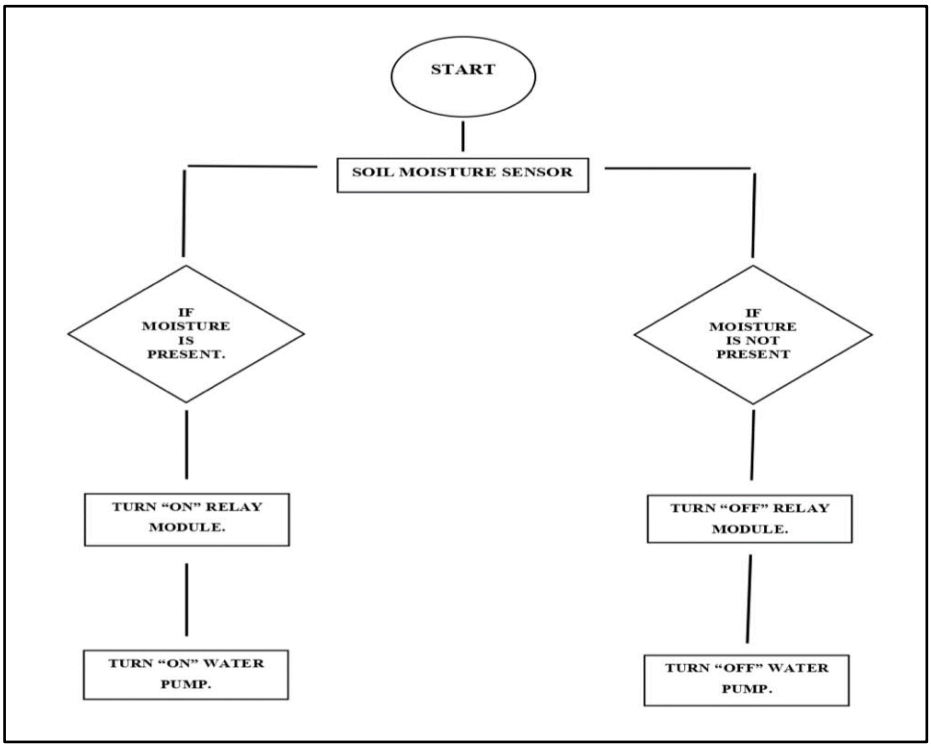
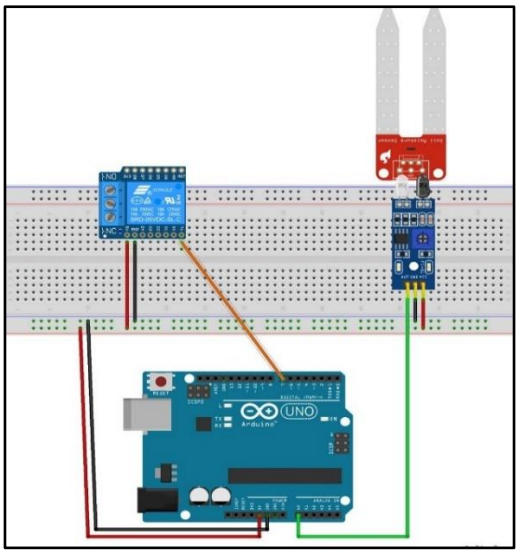


Figure 3.1.2 Soil Moisture Sensor Flow Chart.

The water level in the related section has been determined using this section. The detector detects a lack of water in the plant and sends a signal to the microcontroller. In order to turn on the pump, the microcontroller sends signals to the appropriate devices.Additionally, based on the output of the sensors, the microcontroller sends a signal to the input devices to turn off the pump when the soil moisture reaches the specified level.



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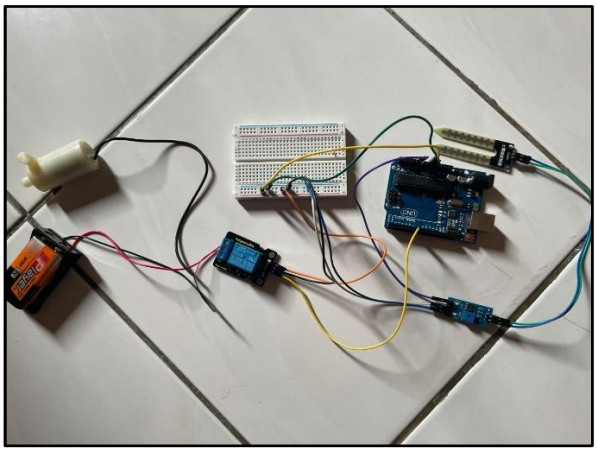

Figure 3.1.3 Circuit Diagrams

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The microcontroller's programme is created with instructions for conditioning a particular environment. The desired humidity and temperature are maintained by turning on the heater or cooler. By turning the water valve on and off, you may also control the moisture in the soil. Due to the programme scan cycle, the system's response time to the recovery of variations in microclimatic parameters is delayed by a few seconds.

PROJECT DESIGN

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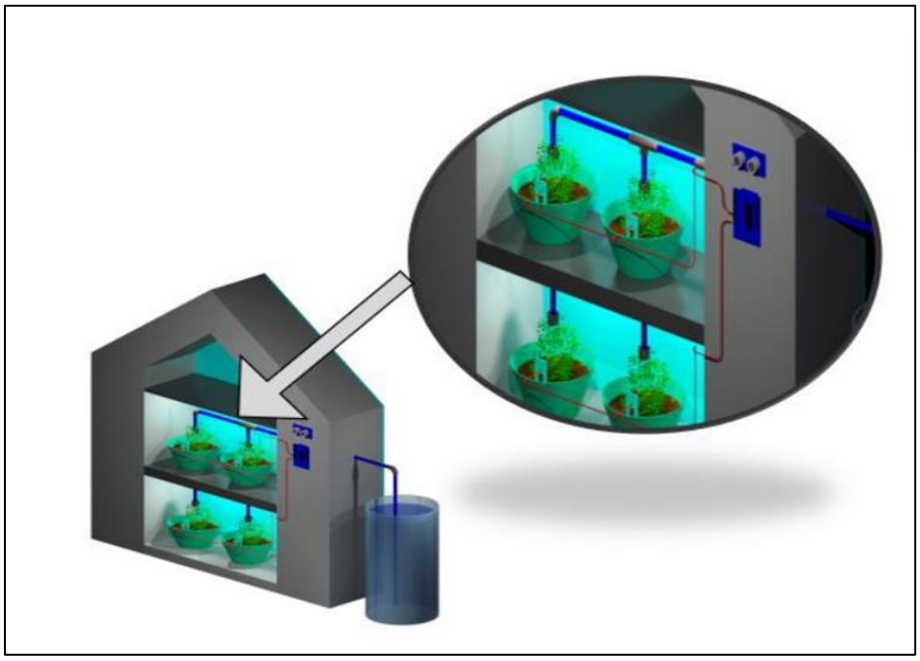

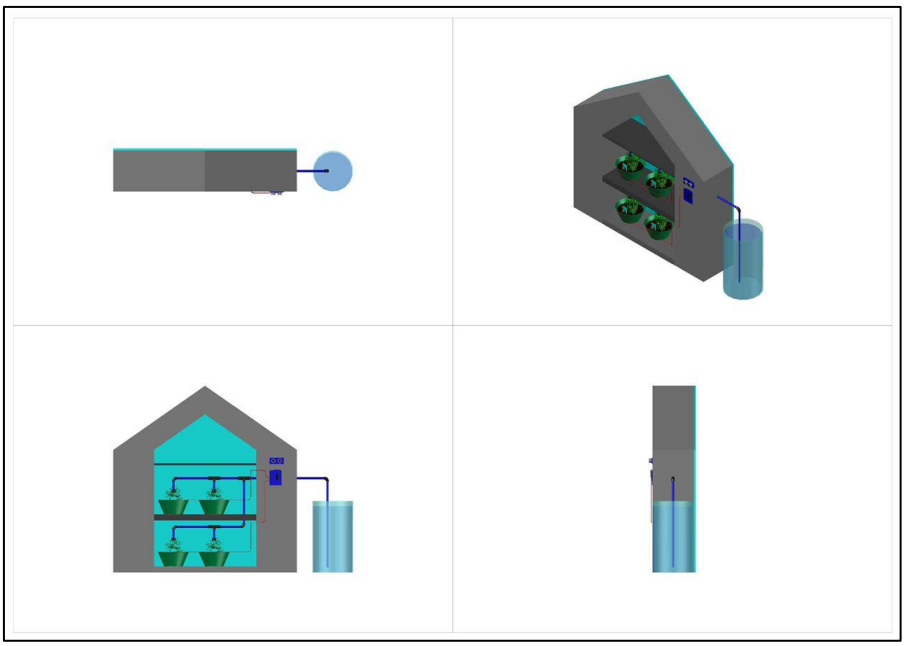

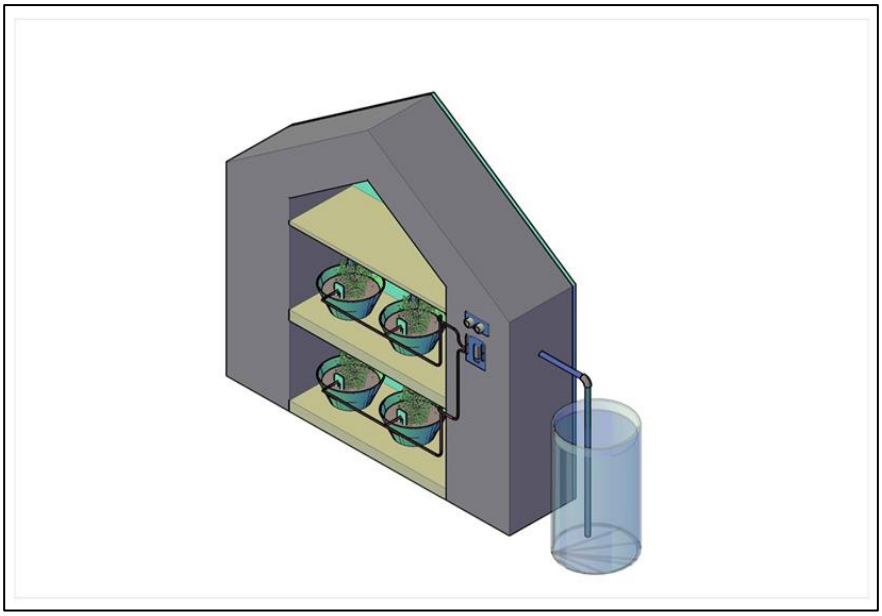

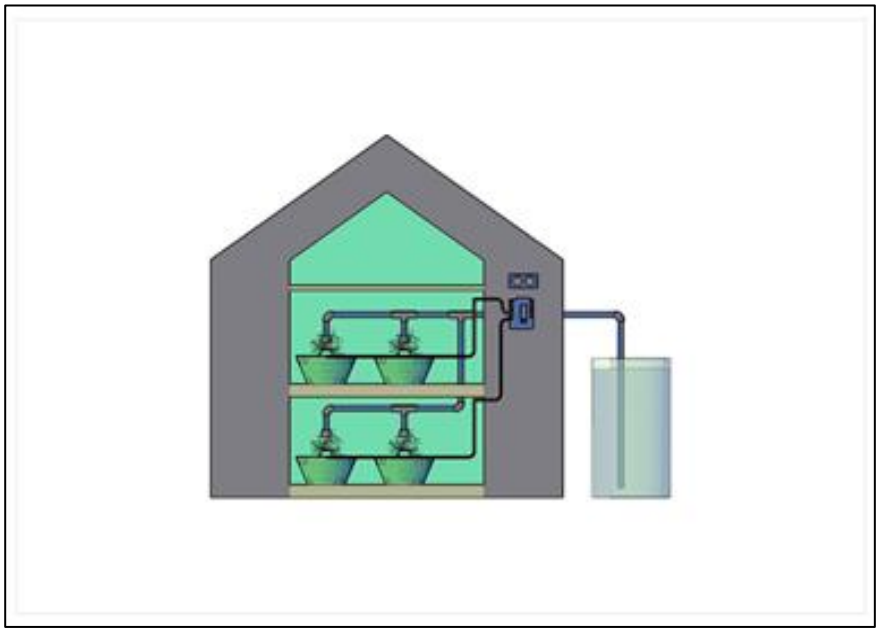

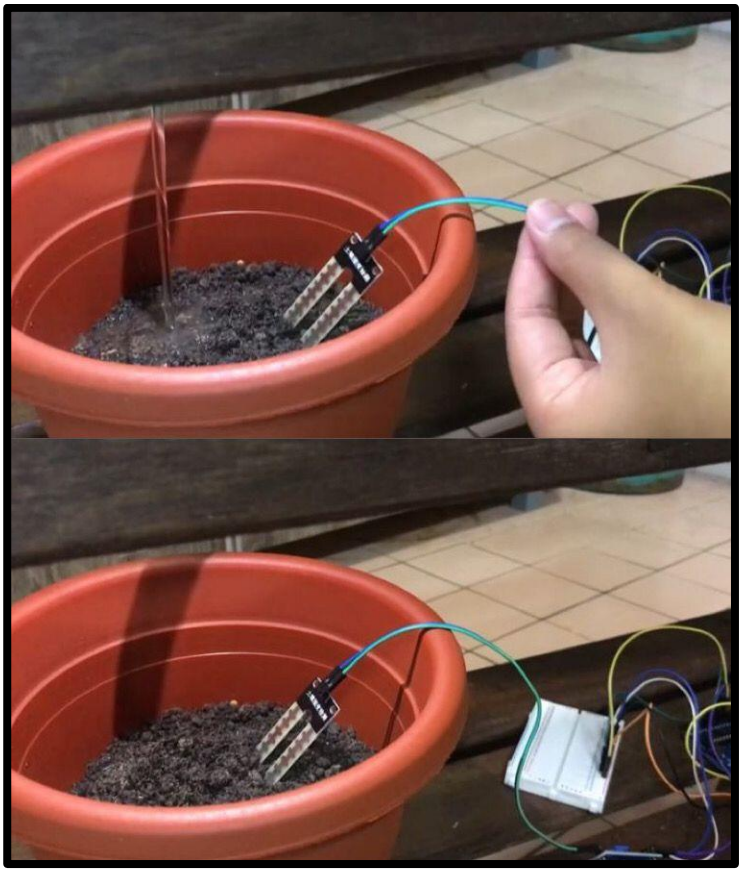

PROJECT DESCRIPTION

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This project can be installed into an existing garden and be used for both indoor and outdoor plant applications. Your plants will require water if you frequently go out of town for a long period of time. You shouldn't depend on your friends or neighbours to water your plants. You can relax knowing that your plants will get enough water while you're away thanks to this method. The Arduino Uno is used in the designs of this system, which is a simple project. The kit includes a display for measuring the moisture level of your plants as well as an inbuilt relay module to power the motors. Relays control the individual motor pumps that drive the flow of water from a reservoir to the plant in need of water.

MATERIALS AND EQUIPMENTS

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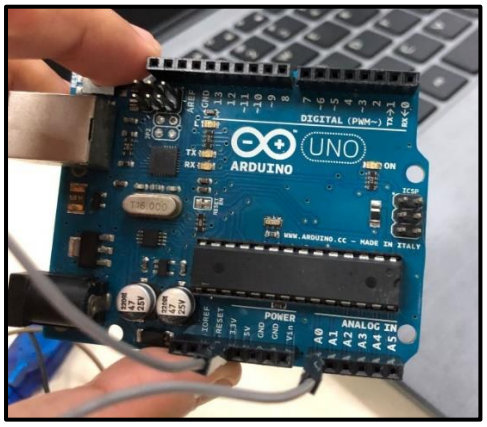
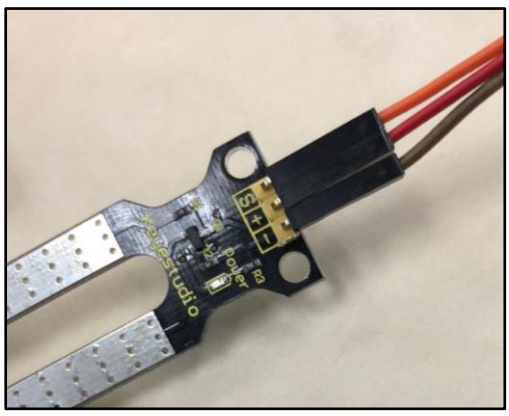
Adruino UNO



Power, analogue, ATmegs328, ICSP header, Reset button, power LED, digital, test led 13, TX/RX, USB interface, and an external power supply can all be added to the Arduino Uno board and power the Arduino Uno with the help of a USB cable or an external power supply. The majority of external power supplies are batteries or AC-to-DC adapters. By plugging the adapter into the Arduino Uno's power jack, the Arduino board can be connected. Both the Vin and GND pins of the POWER connector can be connected to the battery leads in the same way.

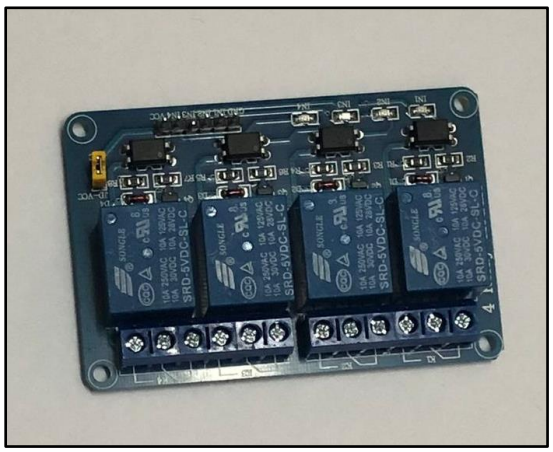


Soil Moisture Sensor

Capacitance is mainly used by this sensor to measure the soil's moisture content (dielectric permittivity). This sensor can function by being inserted into the ground, and the status of the water content in the soil can be provided as a percentage. This module also includes a potentiometer to set the threshold value, and the comparator LM393 can evaluate the value. Based on the threshold value, the LED would either turn on or off.

Battery

This project used battery that provides a nominal voltage of 9 volts is known as a "nine-volt battery" or "9-volt battery. Depending on the battery chemistry, the actual voltage ranges from 7.2 to 9.6 volts. Batteries of all shapes and sizes are produced; one popular size is PP3, which was first used in early transistor radios.

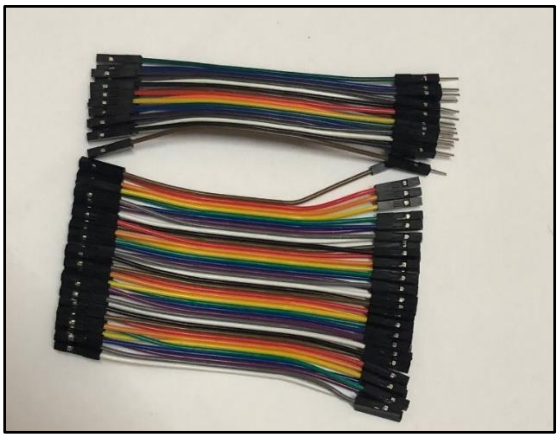


Relay Module

An electrical switch controlled by an electromagnet is known as a power relay module. A separate low-power signal from a microcontroller activated the electromagnet. When it is energized, the electromagnet pulls to either open or close an electrical circuit.

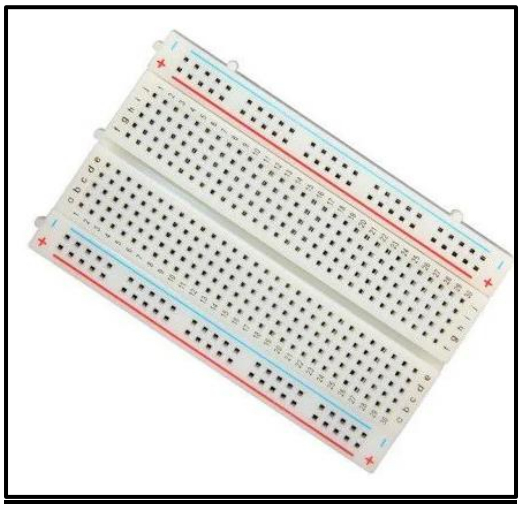
Water Pump.

An electromechanical device called a water pump raises water pressure so that it can be moved from one location to another. Modern water pumps are used all over the world to supply water for purposes in municipal, industrial, agricultural, and domestic settings.



Jumper.

A jumper wire is an electric wire used to connect distant printed circuit boards. It is possible to short-circuit and jump onto the electrical circuit by connecting a jumper wire to the circuit. For solderless breadboarding, jumpers (also known as jumper wires) can be obtained in ready-to-use jumper wire sets or created manually. For bigger circuits, the latter can become laborious work. Jumper wires that are ready to use come in a variety of qualities, some of which even have teeny plugs attached to the wire ends.



Breadboard

An electronic circuit's semi-permanent prototype is built on a breadboard, which can be used again and again because it doesn't involve soldering or destroying the tracks. A perforated block of plastic with several tin-plated phosphor bronze or nickel silver alloy spring clips hidden beneath the perforations makes up a modern solderless breadboard socket. The clips are frequently referred to as contact points or tie points. The breadboard specification frequently includes the number of tie points.

Battery Holder

A battery holder is a chamber or compartment that can hold one or more batteries. The holder also must create an electrical connection with the battery terminals when using dry cells. Cables are often attached to the battery terminals for wet cells, as is the case with disaster lighting equipment or autos.

Clear Pipe

Water is supplied through a clear pipe. Typically, they are white. Use either hot or cold water supply lines with this type of water supply tube. It is among the most widely used plastics in the world thanks to its low cost and simple installation.

MATERIALS	FEATURES
Arduino	• Microcontroller AT mega328 • Voltage of 5V-12V • Input voltage 7-12V • Rage of input voltage 6-20V • Pins of digital I/O Pin DC Current 40mA • Pin Current DC for 3.3V 50mA • Memory of Flash 32KB(Atmega328)
Soil Moisture Sensor	• Voltage of working 5V • Current of working <20mA • Working temperature 10-35celcius • High sensitivity • Power consumption low • Signal output of voltage 0-5V
Relay Module	• There are four pins on the module: **AO:** Analog Output **DO:** Digital Output **VCC:** Connect the VCC pin to 5V on the Arduino **GND:** 0V reference point
Water Pump	• **Power**—including the flow rate and horsepower • **Material**—weather-resistant materials required for exposed applications • Motor type/fuel type: electric, gas, diesel, hydraulic, or manual • **Head**—total head discharge, or maximum pump power, suitable for the intended application.
Jumper wires	**Three versions:** • Male-to-male, • Male-to-female • Female-to-female.
Battery	• Temperature 0-60 Celcius. • Length 17.5 mm. • Height 48.5 mm. • Width 26.5 mm.
Battery Holder	• Have higher strength. • High resistance to the vibrations. • Lighter weight. • Made from plastic materials .
Breadboard	• Distribution Strips are two. • Wire Size is 21 to 26 AWG wire. • Tie Points are two hundred. • Withstanding Voltage is 1,000V AC. • Tie points within IC are 630. • Insulation Resistance is DC500V or 500MΩ. • Dimension is 6.5*4.4*0.3 inch.

	• Rating is 5Amps. • ABS plastic through color legend. • ABS heat Distortion Temperature is 183° F (84° C)Hole or Pitch Style is 2.54mm.
Clear Pipe	• Rigid and don't easily deform. • Great for long trench situations. • Highly resistant to oxidative reactions. • Meets all set international standards of health and safety. • Good Pressure-bearing Capabilities.

THE ADRUINO CODE

Prepared by: SAIDATUL NAZIEHA BINTI AZMAN F1015

```
int Relay = 13;
int sensor = 8;
int val;
void setup() {
  pinMode(13,OUTPUT); //Set pin 13 as OUTPUT pin, to send signal to relay
  pinMode(8,INPUT); //Set pin 8 as input pin, to receive data from Soil moisture sensor.
}

void loop() {
  val = digitalRead(8);
  if(val == LOW)
  {
  digitalWrite(13,LOW); //if soil moisture sensor provides LOW value send LOW value to relay
  }
  else
  {
  digitalWrite(13,HIGH); //if soil moisture sensor provides HIGH value send HIGH value to relay
  }
  delay(400);
}
```

METHODS/ PROCESSES

1. Connect VCC on the relay to 5V pin Arduino .
2. Connect GND on the relay to negative power rail of breadboard.
3. Connect IN on relay to PIN 3 on Arduino.
4. Insert battery into battery holder,connect the '-' the black wire from battery pack to the negative power rail on the breadboard.
5. Next connect the black wire of pump to negative power rail.
6. Connect soil moisture sensor to module and connect AO and A0.
7. Connect GND (on module) to GND.
8. Connect VVC (on module) to probably .
9. Connect red wire of pump to NC.
10. Connect the red wire (battery holder) to COM.
11. Connect negative power rail to GND.
12. Use the C code and code to calibrate the soil moisture sensor.
13. Do the stand alone circuit.
14. Calibrate the soil moisture .
15. Complete the build.

RESULT AND ANALYSIS

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

Adruino is a flexible hardware platform that can be programmed, and it was created to logically control the circuit. The Arduino continuously collects data from the water level sensor and, as necessary, alerts the user when the water drops below a specific level. A computer is used to analyse every piece of information from the Adruino. Adruino is excellent at gathering data and delivering it to another tool so it may be processed. It works effectively, both in terms of the time required and the quantity of electricity used. The moisture content of the soil is continuously sensed by a smart pipe system. This system reacts correctly by providing the plants with the precise amount of water they need, and when the amount is reached, it turns off the water supply.

After all procedures and component gathering have been completed, the goal has been met. Knowing the research's findings will allow you to determine whether the system is successful or not. Following that, the system was put to the test, and the outcome was as expected. This system attempts to perform data gathering, transmission, and automatic management functions. It aims to make significant advances in terms of timing, efficiency, accuracy, and low operating costs.

Prepared by: AYU SOFEA BINTI ZAKARIA F1014

Test	Soil moisture sensor
Test purpose	To test the sensor values and its functionality
Irrigation	This can be controlled depending on type of soil.
Water flow	Soil moisture sensor helps in controlling flow of water.

3.3 SUMMARY

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

In this project, we use microcontroller i.e. arduino, soil moisture sensor and relay module which is connected to Arduino UNO board via connector wire and breadboard.

Adruino UNO is a microcontroller board based on ATmega328. adruino serves as a microcontroller that controls all systems, the system controls the automatic watering of plants. The system consists of a module relay that acts as a switch by using a relay we can turn on or off the motor/pump. The system also consists of a humidity sensor and It can sense the dryness and moisture of the soil.

Often, we cannot set a time to water the plants because the plant soil becomes dry. So, for proper care, we need to water the plants when the soil becomes dry.In this system, soil moisture sensor (soil moisture sensor) will sense the soil moisture level. Soil moisture is the amount of water contained in the soil after experiencing an uncontrolled excess of water. The nature of low frequency water is very good for measuring soil moisture .If the soil is dry then the sensor will sense the low soil moisture level and will automatically switch to a water pump to supply to the plants. The measurement of soil moisture is done by a sensor that sends information and parameters about soil moisture to the arduino, which controls the pump.When the plant gets enough water and the soil becomes wet then the sensor senses sufficient moisture in the soil. After that the water pump will stop automatically.

A water pump can be defined as a pump that applies principles such as mechanical as well as hydraulic throughout the piping system and to produce sufficient force for future use. It is used in this project to pump the air which needed to water the plants and it can

be controlled electronically by delivering it into a microcontroller. Pumping water is a basic and practical technique, far more practical than scooping it by hand or lifting it in a handheld bucket. This is true whether the water is taken from a fresh source, moved to a required location or so on.

CHAPTER 4: PRELIMINARY FINDINGS OF THE RESEARCH

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

4.1 INTRODUCTION

This chapter will discuss the advantages and standards used, the next project proposal, and conclusions about the smart piping system. This chapter will also discuss in more detail the results of the project that has been done. And this chapter also combines data and analysis of the piping system. This data and analysis are especially important for this project because they contain the discussion necessary to achieve the objectives and scope of this project.

Prepared by : SAIDATUL NAZIEHA BINTI AZMAN F1015

4.2 PRELIMINARY INVESTIGATION OF THE PROJECT

The results of interviews and spontaneous questions from the surrounding residents and the public who have used the Smart Piping System stated that they strongly agree if this project is carried out and expanded. And this equipment is very easy to operate and saves manpower. It can also please consumers who use it because the fertility rate or mortality of their plants or flowers will no longer increase by using our piping system. On the whole, after the Smart Piping System trolley was completed and used, it was found that all the objectives of the study stated at the beginning of the project study had been met.

4.3 PROPOSAL

This research has been able to provide a detailed picture of the Smart Piping System. And after doing a lot on this project, students were found to be satisfied with it. Therefore, the researcher has agreed and expanded it so that this project continues to be accepted among the community, especially its users. And maybe, if accepted by users, there will be improvements to the systems in the Arduino over time.

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

4.4 SUMMARY

This chapter has explained about the agreement and understanding among the community in particular, not to mention the safety during the production of this project in the workshop. Safety in the workshop is one of the most important aspects of the job.

Each project developed has its own importance and objectives, as does our smart piping system. Although initially there were shortcomings, we managed to achieve its objectives. Based on the conclusions that have been made, we can see that this project can be well received by students, the community, and users who want to use it, especially our project lecturers. This is because we have met their needs and even eased their burden. Therefore, we hope that this project can be continued so that it can be accepted by all students and the community, as well as get widespread commercial traction. With this, let us help to develop the Malaysian economy through the production of greater innovation.

CHAPTER 5 CONCLUSION

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

5.1 INTRODUCTION

The results of this report include creating automatic plant watering systems for small gardens based on the explanation that was provided. We took advantage of the chance by designing a small watering system. This system's design makes use of an Arduino Uno. This system can help with plant care because of advances in technology and IoT.

Prepared by : SAIDATUL NAZIEHA BINTI AZMAN F1015

5.2 CONCLUSION

The system successfully monitors and controls work that includes detecting soil moisture and accurate water content levels based on the needs for the plant watering process. The system works best for plants that are mostly planted in pots and can be used for indoor or outdoor gardening. With this system, the watering process begins, pauses, and operates automatically at the appropriate times. In order to minimize water use the system is designed and implemented in such way,that it is much easy and cost effective.

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

5.3 PROPOSAL

There are a variety of proposals for improving the smart piping system, one of which is to improve the development of software for Arduino that will control the sensor and circuit that will direct the plant's moisture. After testing the water pump to supply the necessary water, the moisture sensor is set to the requisite sensitivity. The use of this technique as a long-term answer to a plant's everyday needs should prove to be very beneficial.

Prepared by: AYU SOFEA BINTI ZAKARIA F1014

5.4 PROJECT LIMITATION

People do not need to manually water plants because the system is made to be helpful. The system's testing has shown that plants can be watered. If the system didn't work, it was tested by examining the plant's condition and the amount of moisture in the pot.

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

5.5 SUMMARY

This smart piping system has been designed and tested successfully function of the system has been automatic.The soil moisture sensor measure the moisture level of the soil, its sends the signal to the Adruino the water pump turn on and supply the water to that plant, and when the system has stopped it means the water pump is turned off when the moisture content of the soil is maintained as required

REFERENCE ATTACHMENT

Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

i. GANTT CHART

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

GANTT CHART

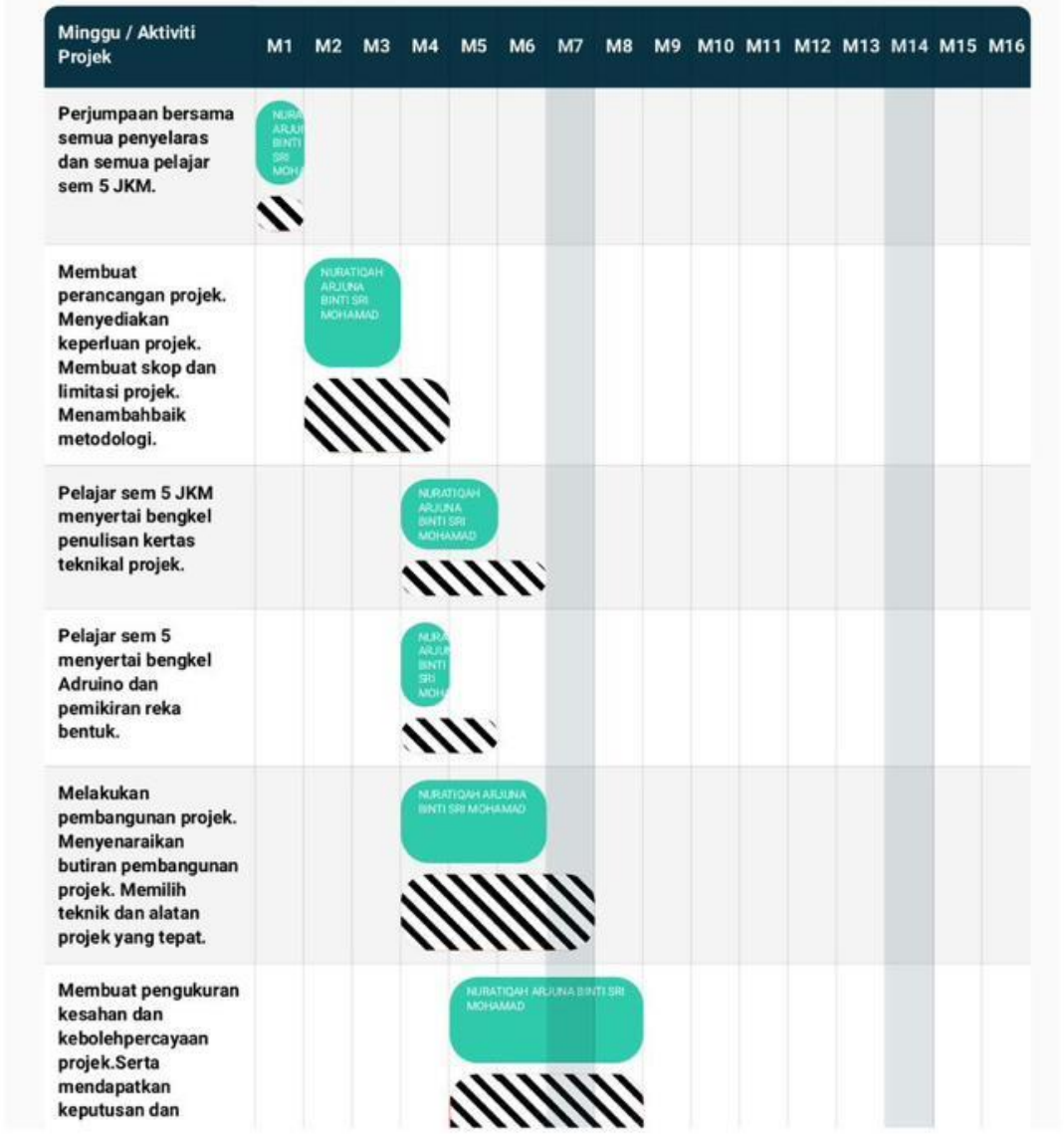
SESION : 1:2022/2023
DEPARTMENT : MECHANICAL ENGINEERING
CODE/COURSE : DJJ50193 PROJECT 2

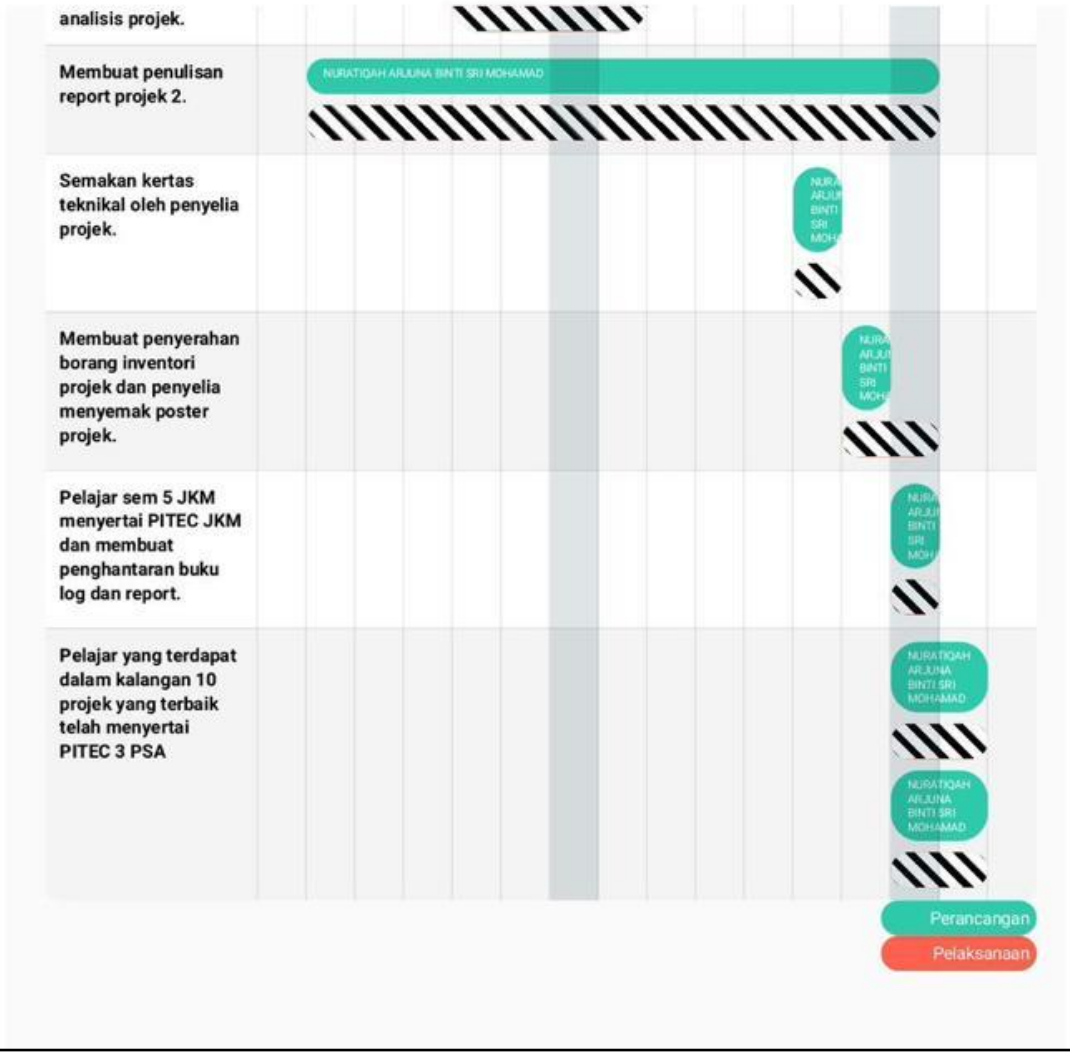
	WEEK/ PROJECT ACTIVITY	STATUS	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
1	Project briefing, iSOLMS briefing	P															
		A															
2	Project Planning	P															
	project requirement																
	project plan																
	project scope and limitation																
	project methodology	A															
3	Technical writing workshop	P															
		A															
4	Design thinking / Arduino workshop	P															
		A															
5	Project Development	P															
	project development details																
	project techniques and tools																
		A															
6	validity and reliability measurement	P															
	project results and analysis																
		A															
7	Project report writing	P															
		A															
8	Technical Paper review by supervisor	P															
		A															
9	Project Inventory Form submission	P															
	Poster review by supervisor																
		A															
10	PITEC JKM (Project Exhibition and Presentation)	P															
	Logbook and report submission																
		A															
11	PITEC 3 PSA (Project Exhibition and Presentation)	P															
		A															

Planning
Actual

CARTA GANTT : PERANCANGAN DAN PELAKSANAAN PROJEK PELAJAR

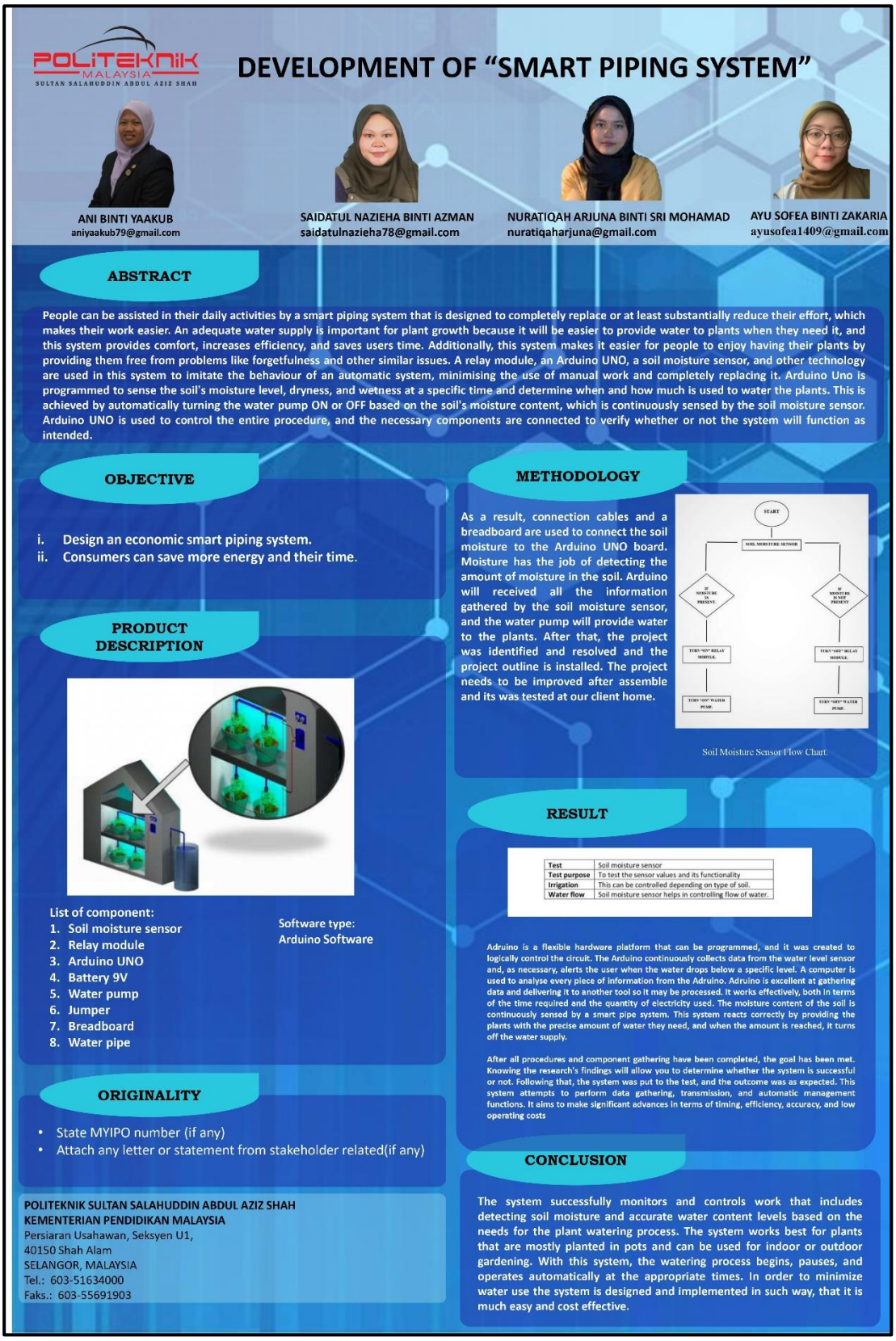
SESI : 1 : 2022/2023
JABATAN: JKM
KODKURSUS: DJJ50193
TAJUK PROJEK : SMART PIPING SYSTEM (SISTEM PAIP PINTAR)




analisis projek.
Membuat penulisan report projek 2.
NURATIQAH ARJUNA BINTI SRI MOHAMAD
Semakan kertas teknikal oleh penyelia projek.
Membuat penyerahan borang inventori projek dan penyelia menyemak poster projek.
Pelajar sem 5 JKM menyertai PITEC JKM dan membuat penghantaran buku log dan report.
Pelajar yang terdapat dalam kalangan 10 projek yang terbaik telah menyertai PITEC 3 PSA
NURATIQAH ARJUNA BINTI SRI MOHAMAD
NURATIQAH ARJUNA BINTI SRI MOHAMAD
Perancangan
Pelaksanaan

Prepared by: AYU SOFEA BINTI ZAKARIA F1014

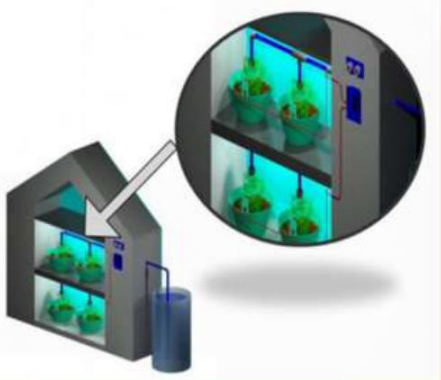
ii. POSTER



Prepared by: NURATIQAH ARJUNA BINTI SRI MOHAMAD F1001

SENARAI PROJEK AKHIR SESI 1 2022/2023

TITLE	SMART PIPING SYSTEM
SUPERVISOR	PUAN ANI BINTI YAAKUB
GROUP MEMBER	NURATIQAH ARJUNA BINTI SRI MOHAMAD, SAIDATUL NAZIEHA BINTI AZMAN, AYU SOFEA BINTI ZAKARIA.
ABSTRACT	People can be assisted in their daily activities by a smart piping system that is designed to completely replace or at least substantially reduce their effort, which makes their work easier. An adequate water supply is important for plant growth because it will be easier to provide water to plants when they need it, and this system provides comfort, increases efficiency, and saves users time. Additionally, this system makes it easier for people to enjoy having their plants by providing them free from problems like forgetfulness and other similar issues. A relay module, an Arduino UNO, a soil moisture sensor, and other technology are used in this system to imitate the behaviour of an automatic system, minimising the use of manual work and completely replacing it. Arduino Uno is programmed to sense the soil's moisture level, dryness, and wetness at a specific time and determine when and how much is used to water the plants. This is achieved by automatically turning the water pump ON or OFF based on the soil's moisture content, which is continuously sensed by the soil moisture sensor. Arduino UNO is used to control the entire procedure, and the necessary components are connected to verify whether or not the system will function as intended. **Keywords:** Adruino UNO , relay module , soil moisture sensor , water pump



Gambar /Poster

iii. BILL OF MATERIAL/EQUIPMENT AND COSTING

BIL	DETAILS	QUANTITY	AMOUNT (RM)
1	Adruino IOT	1	11.20
2	Soil Moisture Sensor	4	20.80
3	Female to Female Jumper Wires ((FF)	1	3.70
4	Female to Male Jumper Wires ((FF)	1	3.70
5	Battery Holder	1	2.00
6	DC 3V-6V Pump Water	1	5.50
7	Wood Frame.	1	20.00
8	Vase.	2	5.40
9	Packet Soil.	1	6.00
10	Pipe Hose.	1	7.00
11	Clear Plastic	1	5.40
12	Nails	1	2.00
13	Board	2	28.00
		AMOUNT	**120.70**

Prepared by : SAIDATUL NAZIEHA BINTI AZMAN F1015

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