APPRECIATION

Many thanks and a heartfelt thank you to our project supervisor, Mrs. Normalini Binti Mansor for giving me so much guidance and advice and guidance to complete this project with great patience.

Not to mention our family members who have provided so much support and encouragement throughout the course of this study, to all our partners directly or indirectly in providing ideas, guidance, advice and guidance we will never miss. Forget it. May this study be blessed by God.

That's all

Supervisory sign

……..

(Mrs. Normalini binti Mansor)

Group Member,

…….. …….

(Nurul Athira Bt Salim I @ Salim) (Mohamad Hakim Bin Mohd Ginen)

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(Nur Aqilah Syarafana binti Roestam A. Sani) (Nur Syaza Syakira Binti Md Marisa)

A DECLARATION OF AUTHENTICITY AND TITLE

Title : Auto Tissue Dispenser

Session : Jun 2019

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1. We are the final year students of Diploma in Building Services, Polytechnic Sultan Slahuddin Abdul Aziz Shah, Shah Alam Selangor

2. We acknowledge that the above project and its intellectual property are the product of our original work / design without taking or imitating any intellectual property from the other parties.

3. We agree to hand over the intellectual property ownership of our innovation project to Polytechnic Sultan Salahuddin Abdul Aziz Shah to meet the requirements for the award of Diploma in Engineering Services to us.

(1) Nur Syaza Syakira Bt Md Marisa Tandatangan:
Tarikh :

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ABSTRACT

Auto Tissue Dispenser is an innovation of tissue dispenser that can remove the toilet paper automatically by touching the infrared sensor to roll out the toilet paper and for the next toilet paper, consumer have to wait for five seconds for the sensor to the detect the touch again. It provide a buzzer to send a warning to the cleaning workers to indicate the toilet paper that already exhausted. It is only suitable to use it in the toilet. The buzzer works by ringing when the toilet paper is already exhausted. Besides, this innovation will creates something new and provide convenience to the cleaning workers. Features design creation have the power tool design consumer satisfaction and user-friendly. The goal for this group's mission is to achieve the saving on the toilet paper usage. By exist this innovation, it will decrease the deforestation for the toilet paper production because this dispenser will save the amount of toilet paper use. This product will developed to simplify the work process for the cleaning workers by having the buzzer to give the caution the cleaning workers when the toilet paper is already exhausted. The dimensions of the product are 33.6 cm (length) x 31 cm (width) x 31 cm (height).

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Topic 5 Discussion & Conclusion

Job Delegation

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	• *3.5.4 Software requirement* • *3.5.5 Testing Troubleshooting*	*Syaza*

	• *3.5.6 Electrical Circuit* • *3.5.7 Metal Frame*	
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	• *4.2.4 Does waste of tissue cause of environmental pollution* • *4.2.5 Does the have time limit at our product able* *to reduce wastage tissue* • *4.2.6 Does the 'Auto Tissue Dispenser' suitable for* *change the existing product*	*Athira*

	4.3 Respond From Cleaner Work • *4.3.1 Simple way of using it*	
	• *4.3.2 The save on the use of tissue* • *4.3.3 Increase the hygiene level of the toilet* • *4.3.4 Stainless* • *4.3.5 Easy to find a spare parts*	*Aqilah*
	• *4.3.6 The buzzer works when it runs out of tissue* • *4.3.7 A lot of tissue wasting* • *4.3.8 Often change tissues* *4.4 Summary*	*Hakim*
TOPIC 5	*5.1 Introduction* *5.2 Discussion* *5.3 Suggestion* *5.4 Summary*	*Group*

CHAPTER 1: PROPOSAL

1.1 INTRODUCTION

The purpose of this project's innovation is to limit the production of toilet paper and provide a buzzer as the warning when the toilet paper is already exhausted. This automatic tissue project selection is intended to limit the total number of toilet paper utilization used by a person and the buzzer will inform the cleaning workers to show that the toilet paper is already exhausted. The company is forced to spend a large amount of money to buy these tissues. If no action is taken, of course, more tissue will be thrown away and wasted away. This is because of some irresponsible individual that using the toilet paper over limit that causing it quickly run out. Therefore, we have been innovating on existing toilet paper by locating sensor to limit the production of toilet paper so that the amount of toilet paper taken by a person can be saved. Besides, we also creating something new by providing a buzzer to inform the cleaning workers that the toilet paper already exhausted and need to refill as soon as possible.

1.2 BACKGROUND RESEARCH

In this era, the awareness of our society in our country is getting worse. This is because people do not care about the wastage of tissue on the toilet that they have done. The use of these tissues can also destroy the lives of wild trees because the trees will be cut down for increasing the production of this tissue. Therefore, this condition needs to be controlled before it becomes worse. Furthermore, a handful of societies also seem to have no consciousness with the use of tissue that has exceeded the limit until the cleaning worker is forced to replace the tissue that has been exhausted with the new tissue regularly.

Based from the data that have been taking, the average consumption of toilet paper across the global stands at about 20000 sheets or 100 rolls every year that had used. The toilet paper production per day stands at about 84 million roles.

Hence, this study aims to discuss how consumer can conserve tissue.

1.3 PROBLEM STATEMENT

- Toilet paper are pulled out without limits.
- Toilet paper is not replenished when exhausted.

1.4 OBJECTIVE OF RESEARCH

The objective of this research is to:-

i. Limiting production of toilet paper.

ii. Using a buzzer as a warning when the toilet paper is depleted from replenishment.

1.5 SCOPE OF RESEARCH

Politeknik Sultan Salahuddin Abdul Aziz Shah, Shah Alam

The project also focuses on services across the area in our country as in the Politeknik Sultan Salahuddin Abdul Aziz Shah which is a great visit. The purpose of this project is to introduce a more proactive innovation in terms of toilet paper saving in the toilet. Although the use of toilet paper often used on the toilet continuously from time to time, but the use of this toilet paper can be saved and also provide a buzzer as warning to inform the cleaning workers that the toilet paper already exhausted with the result of innovation known as ‘Auto Tissue Dispenser’.

1.6 THE IMPORTANCE OF RESEARCH

As a result of the lack of awareness of a handful of Malaysians using toilet paper over the limit has given rise to an idea to create an innovation known as 'Auto Tissue Dispenser'. The importance of this innovation is to increase the saving of the toilet paper use in the toilet and convenient for the cleaning workers to know the toilet paper already exhausted by the warning buzzer. This is because, this innovation is created using the infrared sensor component that will come out when there is a hand at the sensor. The buzzer will detect the toilet paper when it already exhausted, it will detect height between the toilet paper and buzzer for 20cm. In addition, it can save the production of toilet paper and giving convenient to the cleaning workers.

1.7 MATERIAL, APPARATUS AND COSTING

No	Components	Code	Quantity	Price
1	Jumper cable (Male-Female)	A4	1	RM 39.00
2	Jumper cable (Male-Male)	A5	1	RM 29.00
3	Jumper cable (Female-Female)	A6	1	RM 19.90
4	Adaptor	A7	1	RM 39.90
5	Arduino Uno	A3	1	RM 130.00
6	Extender Board	A8	1	RM 40.00
7	Infrared Module	B4	1	RM 7.80
8	Relay 1 CH 12v	G21	1	RM 48.00
9	Casing	-	1	RM 160.00
TOTAL PRICE				RM 1002.60

1.9 SUMMARY

As the conclusions, the public toilets throughout Malaysia are very popular with the available tissue services. However, some of these toilet users are not aware of the widespread issue of waste tissue toilet in this era. This is because, toilet users inculcate irresponsibility and are not concerned about the use of tissue by using tissue that invites wastage. Furthermore, it will increased the cost to purchase the toilet paper to a company.

Besides, this issue have to deal with it to decrease the amount of wasting the toilet tissue and provide buzzer to give a warning to cleaning workers to inform that the toilet paper already exhausted. If we do not take any action on waste of this tissue, it will become worse and much of the cost of purchasing the toilet paper in the future. So, from our research we are suggesting to create new innovation that called ‘Auto Tissue Dispenser’ that will provided a sensor from the toilet paper box to detect the hand by touch and the toilet paper will come out a piece once the sensor detect the hand.

From this innovation we know that our solution is better than alternatives idea because we just create the new automatic appliance using a sensor for taking toilet paper in the toilet that can saving a lot of toilet paper from wasting without using and provide a buzzer to give a warning to the cleaning workers that the toilet paper already exhausted.

Lastly, our innovation idea will increase the technology using in future and also will can reach the position as an advanced toilet.

2.0 REFERENCES

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	• Michael J. McGrathCliodhna Ní Scanaill, Sensor Technologies Healthcare, Wellness, and Environmental Applications, Apress, Berkeley, CA, 2013, 600p
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CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Through this chapter, we conduct a detail study of our product, automatic tissue dispenser. Through this product is a toilet roll holder that use sensor – activated to fold the toilet paper automatically, so the users do not have to touch the machine.

2.2 CONCEPT/ THEORY

There the materials:

2.2.1 Tissue paper

2.2.2 Sensor

2.2.3 Tissue casing

2.2.4 Adaptor

2.2.5 Jumper Cable

2.2.6 Extender Board

2.2.7 Relay 1 CH 12v

2.2.8 Buzzer

2.2.1 Tissue paper

Today it’s difficult to imagine life without toilet paper. The evolution of toilet paper is an interesting story and the toilet paper has an amazing past. The first “official” toilet paper was introduced in China in 1391, but the first mention of toilet paper (paper for personal hygiene) dates back to the year 589 AD in Korea. Between 875 and 1317 AD, paper was produced in large sheets (2-foot x 3-foot sheets and even perfumed) for Chinese emperor’s family hygiene. Joseph C. Gayetty invented the first packaged toilet paper in the United States in 1857. Joseph C. Gayetty is credited as the inventor of modern commercially available toilet paper. "Gayetty’s Medicated Paper" was sold in packages of flat sheets, medicated with aloe and watermarked with his name. Gayety’s toilet paper was available as late as the 1920's.In 1871, Seth Wheeler (to some sources Zeth Wheeler) of Albany became the official “inventor” of toilet paper. Seth Wheeler patents rolled and perforated wrapping paper. His Albany Perforated Wrapping Paper Company began selling the first toilet paper on a roll. Rolled and perforated toilet paper was invented around 1880. In 1879, Thomas Seymour, Edward Irvin and Clarence Wood Scott founded the Scott Paper Company in Philadelphia. Scott brothers came up with the idea of customizing rolls for every merchant-customer they had. They began selling packages of small rolls and stacked sheets. Scott Paper Company began producing toilet paper under its own brand name in 1896. By 1925 Scott Company became the leading toilet paper company in the world. The first documented use of a roll of toilet paper was in 1882 in New York State. Before tissue paper is use at the toilet, around 1391, during the Song Dynasty, a Chinese emperor decreed that large 2-foot-by-3-foot paper sheets must be made for his toilet time. Until then, people in China just used random paper products. By the era of Colonial America, things weren’t much more advanced. After the rebels had left Great Britain for the colonies, the best things they could find were corncobs. Ouch. It wasn’t until later that they realized they could use old newspapers and catalogues. The whole reason there was a hole through the corner of the Old Farmer’s Almanac was so people would be able to hang it on a hook in their outhouses.

2.2.1.1 Type of toilet paper

(a) Toilet paper

Toilet Tissue is the most purchased tissue product by consumers. The majority of us can't think living lack of toilet paper. The quality of this tissue paper can be determined by the number of plies, durability, coarseness and fiber quality. Typically it is the lowest grade of paper. It may be rippled, perfumes, colored or patterned, medicated or treated with aloe or other perfumes. These papers not only for bathroom, it is also useful for nose care, removing makeup.

Diagram 2.2.1.1 (a) Toilet paper

According to consuming, paper towels are the second largest tissue product. It is durable among the tissue paper. The Strength of paper towels depends on fiber quality, wet end chemicals and other reasons. Although it is from one up to four plies but generally it is two-ply. The basis weight of this kind of tissue paper is about 20 to 24 g/m^2.

Diagram 2.2.1.2 (a) Toilet paper

Sparkle Paper Towels, 24 Giant Rolls, Pick-A-Size, White

(b) Facial tissue

Facial tissues are sort of thin, soft, absorbent, smooth and disposable paper which is used for clean the face. It is also known as paper handkerchiefs or wipes and generally sold in boxes. One of importance uses of facial tissue is reducing the spread of an infection or diseases as like swine flu.

Diagram 2.2.1.1 (b) Facial Tissue

Kleenex Facial Tissues Family Size, 210 Count (Pack of 18), packaging may vary

(c) Table napkins

Table napkins are other kinds of tissue paper that are used in dining tables. These are offered from one up to four plies and in different colours, patterns, folds and sizes.

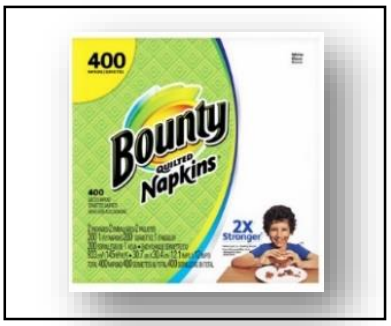


Diagram 2.2.1.1 (c) Table Napkins

Bounty Paper Napkins, White, 400 Count

2.2.1.2 Standard tissue dimension

The rolls of today usually are 234 sheets of Bath room tissue per roll each sheet 9.9 x 10.01 CM (appox 4 inches x 4 inches). Slight variation may be there between rolls of different brands, in the length and not width.

“Why is the color always white?”

Popular colors at the time were pink, blue, yellow, green, peach, and black. Unfortunately there were some unfortunate implications that caused the demise of colored toilet paper.

- It turns out the dye in colored toilet paper had several negative consequences for both the users and producers.
- It made colored toilet paper too expensive to produce than its white counterpart. Demand for colored rolls was shrinking as well.
- Many doctors at the time began to associate it with increased health risks. Such risks included skin irritation, cervical cancer, urinary tract infections, rectal issues and others
- Dye didn’t allow colored toilet paper to decompose as quickly. This means it was more likely to clog up septic tanks it was flushed down.

The tissue that I choose is toilet paper is an environmentally sustainable and very suitable with my product automatic tissue dispenser.

2.2.2 Sensor

Sensor as an input device which provides an output (signal) with respect to a specific physical quantity (input).

Type of sensor :

2.2.2.1 Temperature Sensor

One of the most common and most popular sensor is the Temperature Sensor. A Temperature Sensor, as the name suggests, senses the temperature i.e. it measures the changes in the temperature.

In a Temperature Sensor, the changes in the Temperature correspond to change in its physical property like resistance or voltage.

There are different types of Temperature Sensors like Temperature Sensor ICs (like LM35), Thermistors, Thermocouples, RTD (Resistive Temperature Devices), etc.

Temperature Sensors are used everywhere like computers, mobile phones, automobiles, air conditioning systems, industries etc.

Diagram 2.2.2.1 Temperature Sensor

Advantages of temperature sensor :

- Thermocouple measures temperature in -200oC to +2500oC range, RTD measures in -200oC to +850oC range, thermistor measures in -100oC to +260oC range and IC sensors measures in -45oC to 150oC range.
- (Advantages of thermocouple are): No external power required, simple and rugged in construction, cheaper, support for wider temperature range etc.
- (Advantages of RTD are): More stable, higher accuracy, more linearity compare to thermocouple
- (Advantages of thermistor are): Higher output, faster in operation
- (Advantages of IC sensor are): Highest output, cheaper, most linear than all types.

Disadvantages of temperature sensor:

- (Disadvantages of thermocouple are): Non linearity, least stability, Low voltage, Reference is needed, least sensitivity etc.
- (Disadvantages of RTD are): Lower absolute resistance, expensive, current source needed, less rugged compare to thermocouples etc.
- (Disadvantages of thermistor are): Nonlinearity, limited support for temperature range, current source needed, fragile, self heating etc.

2.2.2.2 Proximity Sensors

A Proximity Sensor is a non-contact type sensor that detects the presence of an object. Proximity Sensors can be implemented using different techniques like Optical (like Infrared or Laser), Ultrasonic, Hall Effect, Capacitive, etc.

Diagram 2.2.2.2 Proximity Sensors

Some of the applications of Proximity Sensors are Mobile Phones, Cars (Parking Sensors), industries (object alignment), Ground Proximity in Aircrafts, etc.

Advantages:

- Accurate compared to other technologies.
- Have high switching rate
- Can work in harsh environment condition

Disadvantages:

- Detect only metallic target
- Operating range may be limited

2.2.2.3 Infrared Sensor (IR Sensor)

IR Sensors or Infrared Sensor are light based sensor that are used in various applications like Proximity and Object Detection. IR Sensors are used as proximity sensors in almost all mobile phones.

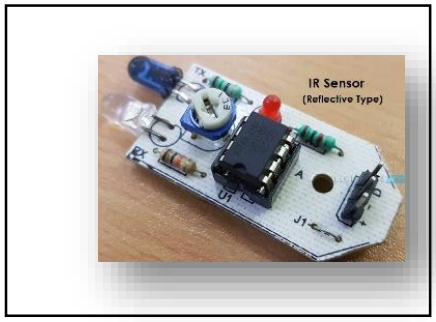


Diagram 2.2.2.3 Infrared Sensor

There are two types of Infrared or IR Sensors: Transmissive Type and Reflective Type. In Transmissive Type IR Sensor, the IR Transmitter (usually an IR LED) and the IR Detector (usually a Photo Diode) are positioned facing each other so that when an object passes between them, the sensor detects the object.

The other type of IR Sensor is a Reflective Type IR Sensor. In this, the transmitter and the detector are positioned adjacent to each other facing the object. When an object comes in front of the sensor, the sensor detects the object.

Different applications where IR Sensor is implemented are Mobile Phones, Robots, Industrial assembly, automobiles etc.

Advantages

- They can receive infrared light that is irradiated from both living and non-living objects. This is essential for many of the applications that infrared detectors are used for.
- Infrared detectors can detect infrared light from far distances over a large area, much like the human eye is capable of detecting visible light.
- Infrared detectors operate in real-time and detect movement, making them ideal for security purposes.
- Infrared detectors help humans see what other devices do not allow them to see, such as leaks in underground pipes.

Disadvantages

- They are incapable of distinguishing between objects that irradiate similar thermal energy levels.
- Infrared detectors are also rather expensive, so they are not as widely used as they could be.

2.2.2.4 Light Sensor

These Light Detectors or Sensors can detect different types of light like visible light, ultraviolet light, infrared light etc.

Diagram 2.2.2.4 (a) Light Detector

Diagram 2.2.2.4 (b) Infrared Light

Advantages

- It is easy to integrate with lighting system such as automatic lighting system.
- It is used for energy consumption or energy management by automatic control of brightness level in mobile phones and auto ON/OFF of street lights based on ambient light intensity.
- LDR (i.e. photoresistor) based light sensors are available in different shapes and sizes.
- Light sensors need small voltage and power for its operation.
- Photoresistors are lower in cost, bi-directional and offer moderate response time.
- Photodiodes offer quick response time, lower in cost and provide digital output.
- Phototransistors are very fast and provide immediate output compare to photoresistors.
- Phototransistors generate high current compare to photodiodes.

Disadvantages

- LDRs are highly inaccurate with high response time (about 10s or 100s of milliseconds).
- Resistance varies continuosly (analog) in photoresistor and are rugged in nature.
- Photodiodes are temperature sensitive and are uni-directional unlike photoresistors.
- Phototransistors cannot withstand voltages above 1000 volts.
- Phototransistors are vulnerable to surges, spikes and EM energy.

2.2.2.5 Smoke Sensor

Smoke detector with photoelectric which can detect the smoke in fire ground and timely send out the alarm signal. Suit for home, hotel, office, etc.

Diagram 2.2.2.5 Smoke Sensor

Advantages

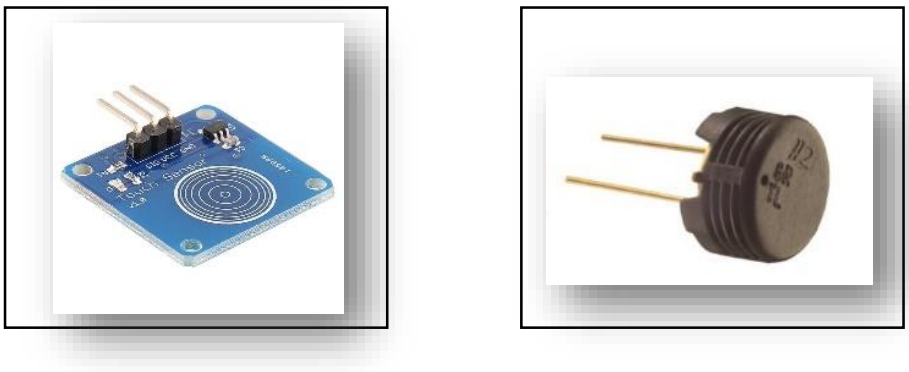
- Detect invisible product of combustion. It can detect fires that are in the incipent stage or detect other aerosol,
- Quick acting, provides for earlier detection than types of smoke detectors or thermal detectors.

Disadvantages

- May provide false detection if used where volatile solvents, conductive material dusts, or high humidity are present.
- Detects the presence of smoke only, not toxicity.
- Has a potential for high false alarm rate.

2.2.2.6 Touch Sensor

A touch sensor detects touch or near proximity without relying on physical contact. Touch sensors are making their way into many applications like mobile phones, remote controls, control panels, etc. Present day touch sensors can replace mechanical buttons and switches.



(a) (b)

Diagram 2.2.5.1 Touch Sensor (a) and (b)

2.2.2.7 Colour Sensor

Colour sensors detect the colour of a surface. The sensors cast light (red, green, and blue LEDs) on the objects to be tested, calculate the chromaticity coordinates from the reflected radiation and compare them with previously stored reference colours. If the colour values are within the set tolerance range, a switching output is activated.

Diagram 2.2.2.7 Colour Sensor

2.2.2.8 Humidity Sensor

Controlling or monitoring humidity is of paramount importance in many industrial & domestic applications. In semiconductor industry, humidity or moisture levels needs to be properly controlled & monitored during wafer processing. In medical applications, humidity control is required for respiratory equipments, sterilizers, incubators, pharmaceutical processing, and biological products. Humidity control is also necessary in chemical gas purification, dryers, ovens, film desiccation, paper and textile production, and food processing. In agriculture, measurement of humidity is important for plantation protection (dew prevention), soil moisture monitoring, etc. For domestic applications, humidity control is required for living environment in buildings, cooking control for microwave ovens, etc. In all such applications and many others, humidity sensors are employed to provide an indication of the moisture levels in the environment.

2.2.2.9 Tilt Sensor

A Tilt Sensor or a Tilt Switch is a component that detects orientation of an object. One of the best example for the application of a tilt sensor is its use in aircrafts. The horizontal and vertical orientation or inclination of the airplane will be provided by the tilt sensor to on board computers.

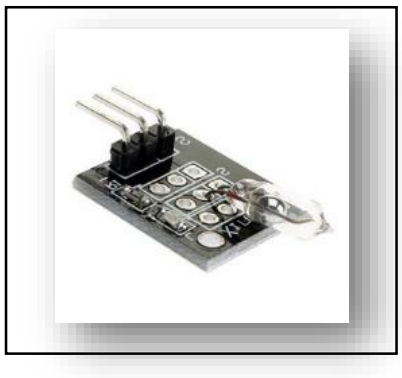


Diagram 2.2.2.9 Tilt Sensor

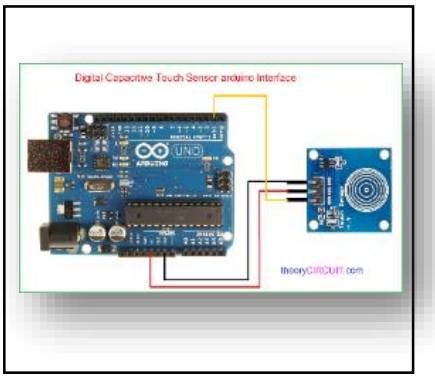
The sensor that I choose

- Arduino Uno

Microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of board.

The sensor is touch sensor with Arduino uno.



This device uses your body as part of the circuit. When you touch the sensor pad, the capacitance of the circuit is changed and is detected. That detected change in capacitance results in the output changing states. It is suitable to detect capacitive element variations. It consumes very low power and the operating voltage is only between 2.0V~5.5V.

- Light sensor

Conventional security lights with motion detection sense objects and people crossing the path of the motion detector's sensor, triggering the lights to go on. When someone approaches, the sensors turn on the lights. Infrared radiation exists in the electromagnetic spectrum at a

wavelength that is longer than visible light. It cannot be seen but it can be detected. Objects that generate heat also generate infrared radiation and those objects include animals and the human body whose radiation is strongest at a wavelength of 9.4um. Infrared in this range will not pass through many types of material that pass visible light such as ordinary window glass and plastic.

2.2.3 MATERIALS OF CASING

2.2.3.1 Porcelain

a hard but delicate, shiny, white substance made by heating a special type of clay to a high temperature, used to make cups, plates, decorations.

Diagram 2.2.3.1 Porcelain

Advantages

- You won’t have to replace them anytime soon.
- They are resistant, which means you can drop things on them and they won’t scratch, break or crack.
- They are easy to clean, you have to do is mix some vinegar with warm water and your porcelain tile floor will be both cleaned and disinfected
- They are non-porous, which means they don’t facilitate the growth of bacteria. Also they are not prone to mildew growth.
- They’re great for both inside and outside areas, high trafficked or in humid environments.

Disadvantages

- Being durable, porcelain tiles are also hard to cut or to drill. They require special and stronger tools to be cut into any desired shaped.
- They are harder to fix onto mortar, they need extra pressure to be forced into place.

2.2.3.2 Rubber

A tough elastic polymeric substance made from the latex of a tropical plant or synthetically. "heat and sunlight may cause rubber to deteriorate"

Diagram 2.2.3.2 Rubber

(a) Latex

Advantages

- Latex is ready to use right out of the container. Latex is inexpensive, it exhibits good abrasion resistance, and is an elastic mold rubber. Because of its high elasticity, a feature unique to latex is its ability to be removed from a model like a glove. Latex molds are also good for casting wax and gypsum.

Disadvantages

- Low-cost latex products generally shrink. Making molds with latex rubber is slow and time-consuming. Making a brush-on latex mold takes ten days or more. Latex molds are generally not suitable for casting resins.

(b) Polysulfide rubber

Advantages

- Polysulfide molds are very soft, “stretchy” and long lasting, some ven lasting 40 years old.It is good for making molds with severe undercuts and/or very fine detail.

Disadvantage

- Has offensive odour. Polysulfides must be mixed accurately by weight or they will not work. Polysulfide rubber costs higher than latex.

(c) Silicone rubbers:

Advantages

- Silicone rubber has the best release properties of all the mold rubbers. The combination of good release properties, chemical resistance and heat resistance makes silicone the best choice for production casting of resins.

Disadvantages

- Silicones are generally high in cost. They are also sensitive to substances, and do not have a long library life.

(d) Polyurethan rubbers:

Advantages

- Polyurethanes are easy to use, with many having a simple mix ratio by volume. They are less expensive than silicones and polysulfides

Disadvantages

- As silicone rubber has the best release properties, urethane rubber has the worst release properties and will adhere to just about anything. Limited shelf life after opening – remaining product may be affected by ambient moisture in the air.

2.2.3.3 Wood

Diagram 2.3.3.3 Wood

Wood is a tough fibrous tissue found in the stems and roots of trees and other woody plants. Wood has been used for many purposes; it has been used for fuel and construction material for thousands of years. Wood is an organic material and it is composed of cellulose fibers which have a string tension; these cellulose fibers are embedded in a matrix of lignin. Wood is also defined as the only secondary xylem in stem of trees. In a living tree wood provides support, which enable woodsy plants to grow and stand by themselves.

Advantages

- Wood is used as a supporting material in building made of other materials like in roofs, interior doors, etc.
- Wood flooring is a product made from timber that is used as flooring.
- Engineered wood components are often used in construction and industrial applications.
- Wood has always been used for furniture like chairs and cots.
- It is also used in the form of cutlery like wooden spoon, chopsticks.
- Wood is also used as an artistic mode. It includes totem poles, woodcut printmaking, and certain types of musical instruments.
- Many types of equipment used in sports are made of wood. Example - Cricket bats, baseball bats.
- Other types of recreational sports equipment like skis, hockey sticks, archery bows are commonly made from wood.

Disadvantages

- Wood energy produces green house gases.
- Transportation of wood to urban areas can be expensive.
- Wood is hygroscopic and it will absorb surrounding vapours loses moisture below the fiber saturation point.
- Biotic factors can cause decay of wood by mold fungi, bacteria and insects.

2.2.3.4 Steel

Diagram 2.2.3.4 Steel

Steel is an alloy of iron and carbon containing less than 2% carbon and 1% manganese and small amounts of silicon, phosphorus, sulphur and oxygen. Steel is the world's most important engineering and construction material. It is used in every aspect of our lives; in cars and construction products, refrigerators and washing machines, cargo ships and surgical scalpels.

Advantages

- Steel has the highest strength-to-weight ratio of any construction material, so it can provide large spans, more space with smaller size sections compared to concrete.
- Steel provides a better cycle which enhances the schedule compared to concrete.
- Steel material is available with no shortage despite of the huge demand especially in the last few years.

Disadvantages

- Due to the high demand for the steel construction especially in the last few years, the material cost of the steel became higher.
- The resistance of steel against fire is weaker than the concrete, that's why steel structures will require fireproof material which may increase the cost.

The materials that I choose for toilet paper casing is stainless steel because of the unique ability of stainless steel to resist corrosion, heat damage and chemical damage, high strength duplex grades provide added strength, allowing for a reduced thickness in the material, providing a cost advantage over conventional grades of stainless steel.

2.2.4 ADAPTOR

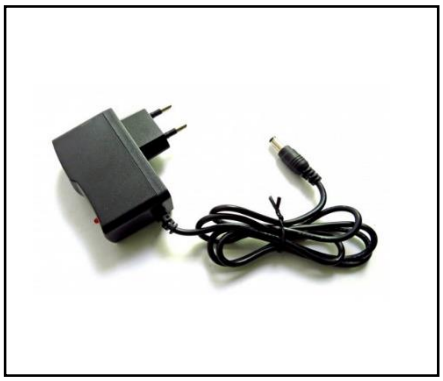


Diagram 2.2.4.1 Adaptor

Also called AC adapter, power adapter .a device with a cord that plugs into an electrical outlet and functions as an external power supply for a small or portable electronic device, usually converting AC current to DC.

2.2.5 JUMPER CABLE

Jumper cable
(Male – Female)

Jumper cable
(Male – Male)

Jumper cable
(Female – Female)

Jumper cables, also known as booster cables or jump leads, are a pair of insulated wires of sufficient capacity with alligator clips at each end to interconnect the disabled equipment/vehicle with an auxiliary source, such as another vehicle or equipment with the same system voltage or to another battery.

2.2.6 Extender Board

Extender boards are designed to bring a circuit card completely out of a card cage or enclosure so that it can be tested or debugged. This provides access to both sides of the test board.

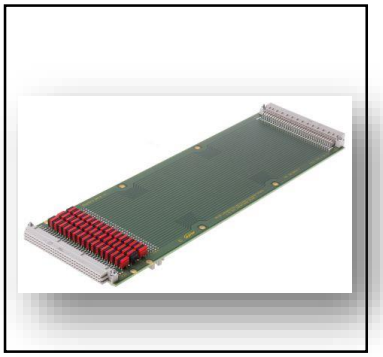


Diagram 2.2.6.1 Extender Board

2.2.7 Relay 1 CH 12v

Diagram 2.2.7.1 Relay 1 CH 12V

Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized.

2.2.8 Buzzer

Diagram 2.2.8.1 Buzzer

An electronic device that makes a buzzing sound, buzzer is mainly used as warning tone alarm tone. As an acoustic component with integrated structure, buzzer supplies supply power with DC voltage and it is widely used in computer, printer, duplicator, alarm, digital toy, car electronic devices, telephone, stop watch and used as alarming component. In general, main function is alarming and reminding.

Uses for the Arduino Sound Detector

Given that this device measures whether or not sound has exceeded a threshold, you're basically left with determining what it is you want to do. What I mean by this is that you can do something when it is quiet and/or you can do something when it is loud. For example:

- You could detect whether or not a motor is running.
- You could set a threshold on pump sound so that you know whether or not there is cavitation.
- In the presence of no sound, you might want to create an ambiance by turning on music.
- In the presence of no sound and no motion, you may go into an energy savings mode and turn off the lights.

2.3 PREVIOUS RESEARCH

- The previous project featured a tissue dispenser with only limited functionality.
- The previous tissue dispenser also only have a roll toilet paper in it and it will take time because the sensor will be able to remove a toilet paper one by one and do not remove once in two toilet paper (two rolls toilet paper on the left and right in the tissue dispenser).
- The previous tissue dispenser does not have any sanitizer at the side as the hygiene use.

2.4 SUMMARY

In this subtopic, we have described the tools used on this product. Even though there are so many products in the market, we believe our products have the privilege. This is because we have discussed and this product meets all the necessary criteria. Therefore, this subtopic can explain a little bit about our products.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

Methodology is the method or procedure used to implement the project in more detail. It also systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. This step is very important in implementing this project to ensure that this project is completed at a predetermined time.

Methodology is very important to help the project run smoothly. In addition, the methodology makes it easier for someone to know about the project being carried out as it covers all the processes in order to get organized, the project definitely takes longer to complete.

In this chapter, I discuss the research design, data collection method, research instrument, project development step, data analysis method, chapter summary.

3.2 RESEARCH DESIGN

The research design is an action plan that shows in detail how a survey is conducted. It also serves as a guide to assisting researchers in the process of collecting, analyzing and making interpretations of the results of research conducted. Research design is also a model for researchers to make an inferens on the variables studied.

This research is a descriptive study that aims to explore and explore the error source in measurement. Survey by using questionnaire insrument to obtain information from respondents.

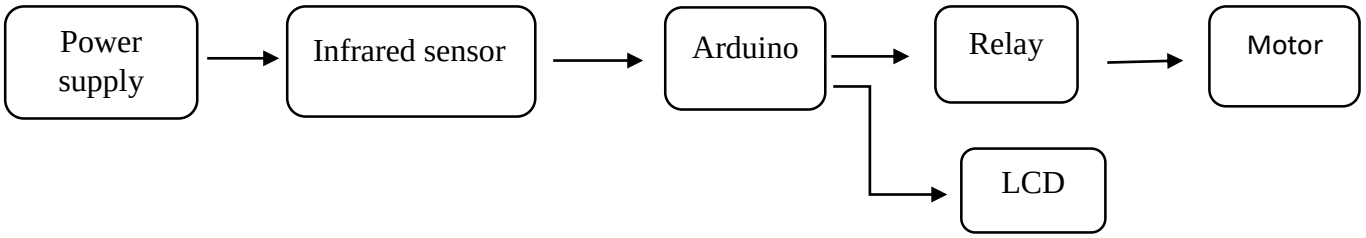


Figure 3.3 Block diagram

From the block diagram above the, the power supply is used to ON the project. The project will be operate when the infrared sensor is detect a hand and the infrared sensor will send a digital input to the Arduino. As a brain for this project, Arduino will send an electrical signal to relay to move the motor. Next, the LCD will show the tissue is roll or have to wait for 5 second.

3.3 DATA COLLECTION METHODS

In this phase the data collection was done by a survey form to identify the needs of consumers. A survey form was made online and distributed to the public. Once completed, an analysis process has been conducted to compile data. Then, these data are classified according to section and have used the graph.

3.4 STUDY INSTRUMENTS

A reference source will be conducted to emulate the research objectives and the collection of data obtained from various sources such as questionnaires, interviews and observations.

3.4.1 INTERVIEWS

Interviews were held against the cleaners with the aim of obtaining information and understanding of this study. Interviews and questionnaires were conducted at AEON Shah Alam. Researchers have been interviewing Puan Nur Linda, Aeon Delight's worker. Through private interviews, researchers have the opportunity to explain the purpose of the ongoing research in detail, explaining the questions that are less understood by the respondents. Additionally, researchers may use this opportunity to seek further clarification on the information they seek and any questions or doubts that may arise during the research period.

Questions raised are provided in advance by researchers to ensure that the information to be obtained later is sufficient and appropriate to the research topic, research objective and the importance of the research.

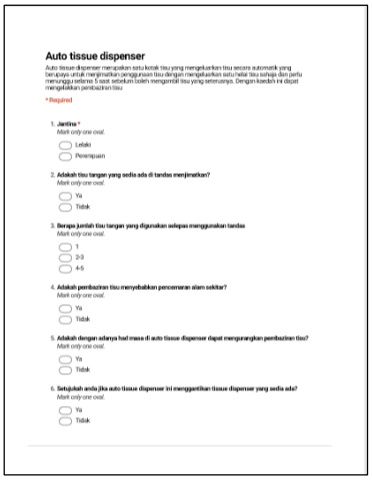
3.4.2 OBSERVATION

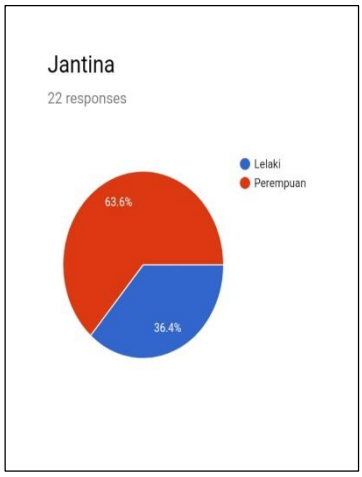
In addition to interviewing, researchers have also sought opportunity to act from time to time by simply listening to and observing the situation of respondents on the scope of the study. The researcher is constantly socializing and adapting to obtain information through close contact with respondents and management as informers.

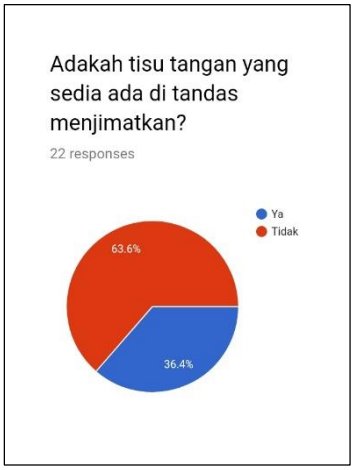
3.4.3 QUESTIONNAIRE

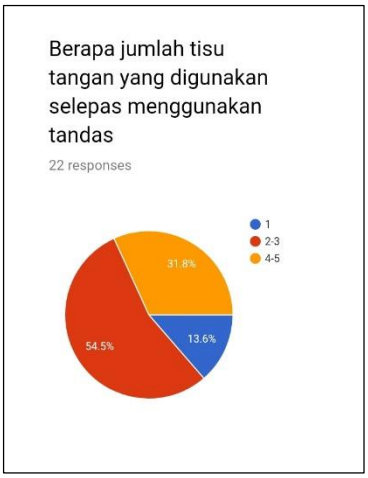
Questionnaires were conducted to obtain the data to be analyzed and used as information to achieve the objectives of the study. This is because the data cannot be obtained from reference materials. The questionnaire provided is a closed ended question which provides the answer. Answers from these respondents are only given two options; agree and disagree.

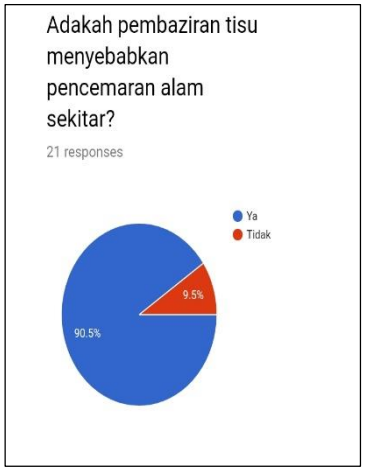
After conducting surveys and studies on this project. Some information is obtained for the success of this project. The study of tissue dispensers tells a lot about tissue savings. There are many tissue dispenser that have been created using a variety of technologies.

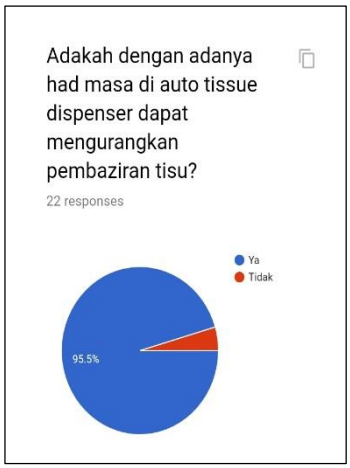












3.5 MANUFACTURING STEPS

Here is the sequence of project development steps

3.5.1 Installation for the cable connection from Arduino Uno to Extender Board

The process start with the jumper cable and connect it to the Arduino Uno and extender board. The installation must be correct by connect it to the positive and negative charge to avoid the electrical circuit from being corrupt.

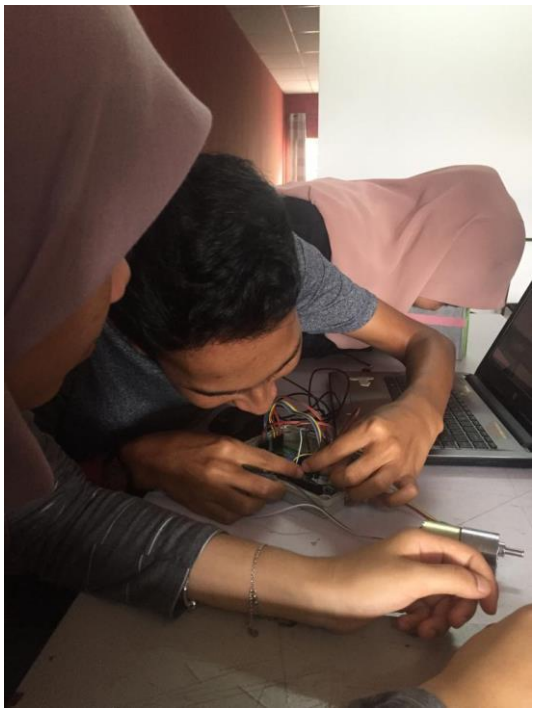


Diagram 3.5.1.1 shows the installation of the jumper cable to the Arduino Uno and extender board

Diagram 3.5.1.2 shows the jumper cables have been installed to the other electrical components

3.5.2 Installation for Infrared Sensor through the jumper cable

Using the infrared sensor to detects the human heat as the function to the detector to remove the toilet paper.

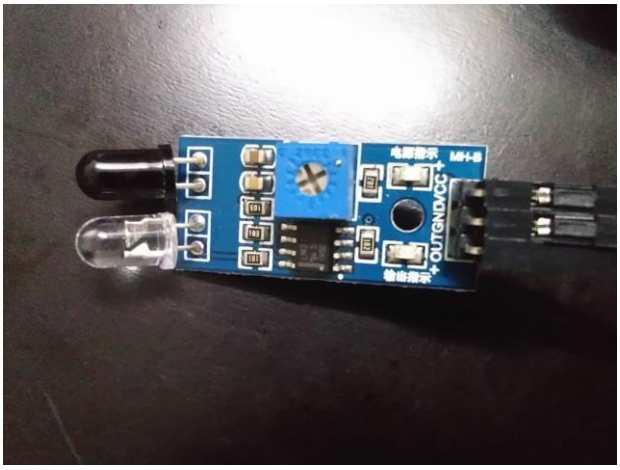


Diagram 3.5.2.1 Infrared Sensor

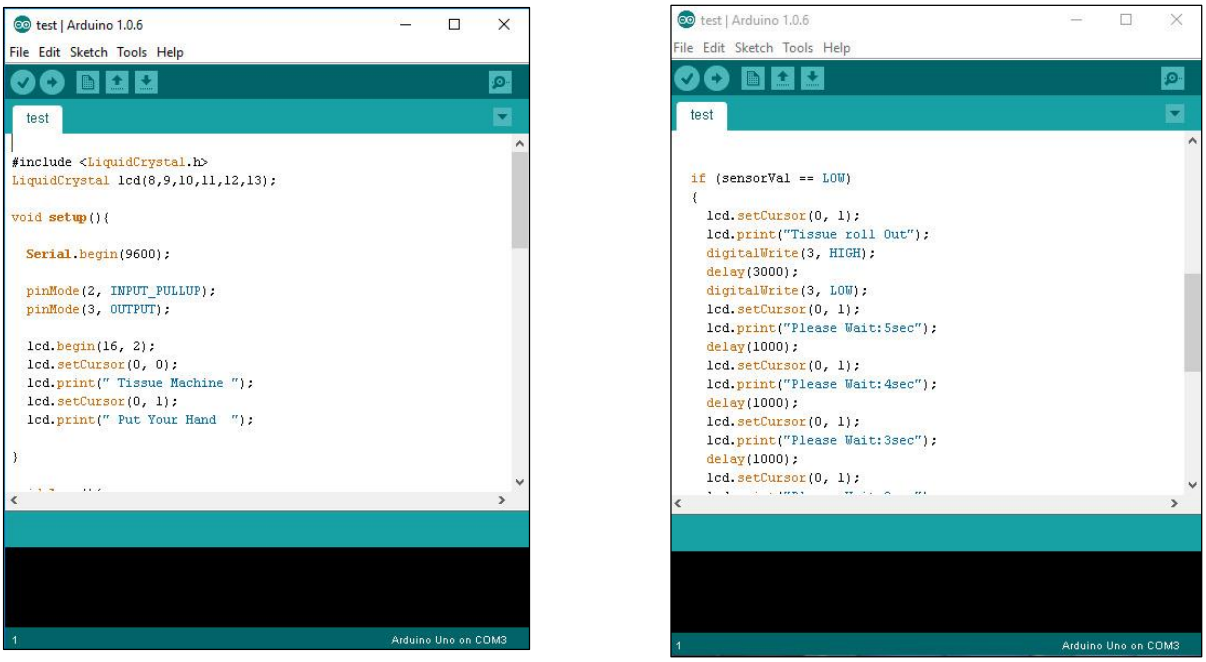
3.5.3 Installation of DC Motor

This DC Motor works when the user place their hand at the sensor and the motor started to release the toilet paper.

Diagram 3.5.3.1 DC Motor

3.5.4 Software requirement

For software requirement, I have choose Arduino Software. I had to find a suitable coding to program my Arduino as the brain of the project. So, I decided to use the Arduino software to insert code programming into Arduino. After I had done compiling the coding without an error.



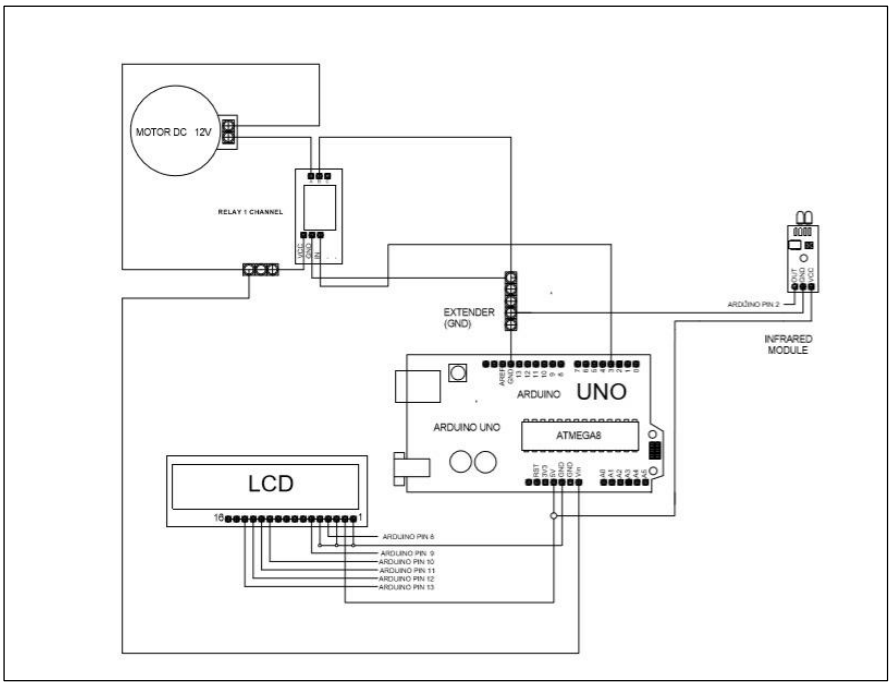
3.5.4.1 Arduino software

3.5.5 Testing and Troubleshooting

The procedure of testing is beginning by assemble all components on breadboard. The circuit is assemble by referring to the schematic diagram below. Transfer the code programming from Arduino software into Arduino Uno R3. After I had done transfer, the Arduino is ready to control all the components. Before switch on the power supply, make sure all components is install at the right place and right pin. Use multimeter to check all the connection to avoid short circuit and components to be destroy. Then, switch on the power supply to test the circuit.

3.5.6 Electrical Circuit for the ‘Auto Tissue Dispenser’ system

Based on this circuit, we can install the components perfectly without getting any errors.



3.5.6.1 Schematic Diagram

3.5.7 Metal frame

The steel frame is made as a base to form a case in order to cover the inside from being damaged. Iron is incorporated using welding method. There are four steel posts vertically and four poles joined together forming a rectangle, iron selection is made because the steel is more durable and can withstand heavy loads.

Diagram 3.5.7.1 measure the length of steel

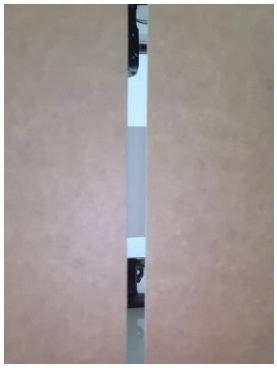
Diagram 3.5.7.2 cut the steel

Diagram 3.5.7.3 resize to fit the steel

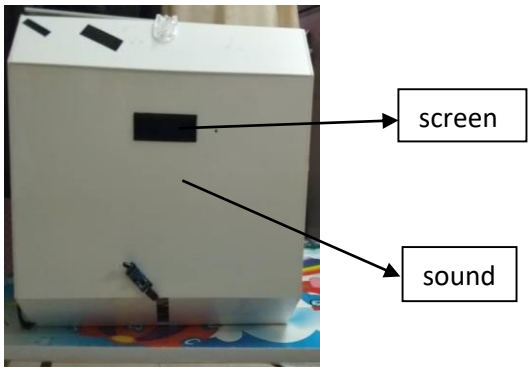
Diagram 3.5.7.4 measure the length

3.5.8 Plastic casing

The plastic selection was chosen as the cover that covered the project as the plastic was rusty, lightweight, easy to clean and waterproof. At the front of the case, it was punctured so that the screen could be placed and the edge of the screen drilled to produce sound. Next, the top is made of doors so that the filling of the tissue when done is easy. Also, the bottom edge is drilled to allow the wire to be removed and can be connected to the plug.



3.5.8.1 hole for the toilet paper to exit



3.5.8.2 screen and sound

3.5.8.3 Place to open refill the dispenser

3.5.8.4 wire for motor

3.6 WORKFLOW CHART

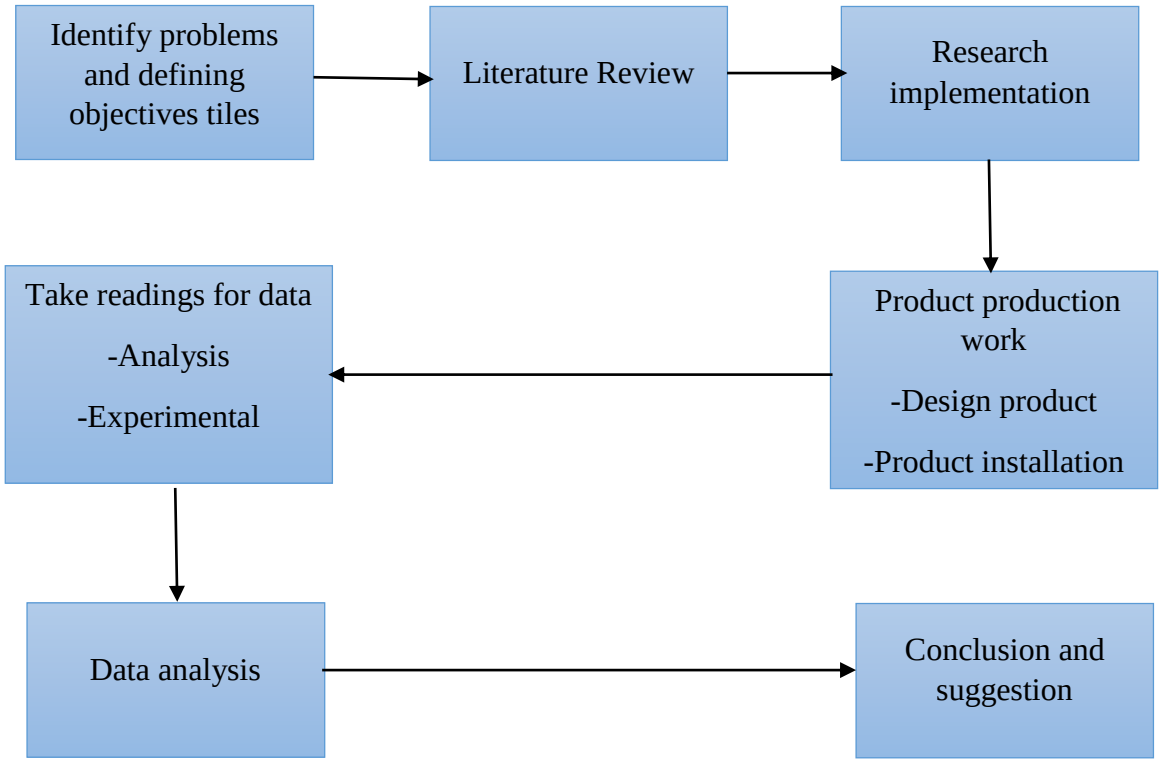


Diagram 3.6.1 Workflow Chart

The flow chart is a diagram representing a process in which it is indicated in different types of boxes and the order is connected with arrow. The diagram can help in solving the problems that take step by step. Process operations are represented in the form of boxes and arrows connecting them also represent the data flow of the data. The data flow is not always represented in the flow chart, as opposed to the flow of data flow instead, they are implied by the operation sequence. The flow chart have been used in analyzing, designing, documenting or managing processes or programs in various fields.

3.7 DATA ANALYSIS METHOD

Data and information obtained were analyzed and processed to obtain conclusions and problem solving on the research. These data and information have been analyzed to obtain the correlation between the data and the comparison between the data obtained.

The results from the data have been analyzed further illustrated in the form of pie charts to facilitate the understanding of readers to make conclusions on the study

3.8 SUMMARY

As the conclusion, this chapter is focusing on the steps of the project produce. By this methodology, we can know about the detail process for our innovation product. Besides, the methodology also explain how the rules and procedures of making the project.

CHAPTER 4: ANALYSIS & DATA

4.1 INTRODUCTION

The analysis and data was obtained to see how the effectiveness of the ‘Auto Tissue Dispenser’ application and how the buzzer ringing when the tissue is depleted that has been used by the cleaner worker and the student of Polytechnic Sultan Salahuddin Abdul Aziz Shah.

The results that obtained on this chapter is from questionnaire and testing in the study area. The result of the questionnaire with the users is drawn by the pie chart and with the cleaner is in the bar chart. The more detail of analysis and data is in the graph and it was taken based on the objectives.

The questionnaire was conducted with the cleaner PSA. There are some questionnaire that we asked to the cleaner:

- Satisfaction with the Auto Tissue Dispenser
- Problem with the existing tissue roll

The questionnaire was conducted with the users of PSA. There are some questionnaire that we asked to the users:

- Gender of respondents
- The existing hand tissue saves
- The total hand tissue using after used the toilet
- Does waste of tissue cause of environmental pollution
- Does the have time limit at our product able to reduce wastage tissue
- Does the ‘Auto Tissue Dispenser’ suitable for change the existing product

4.2 RESPOND FROM THE USERS

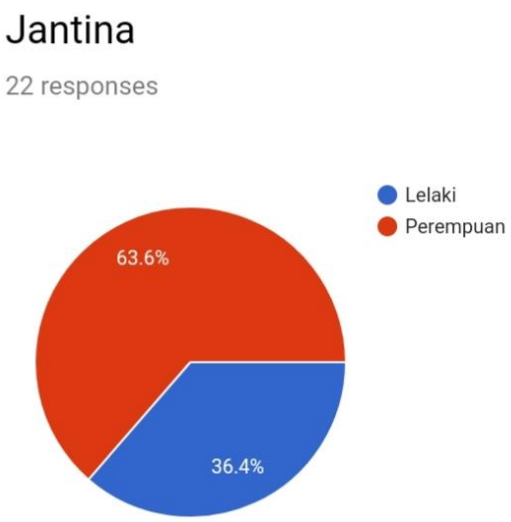
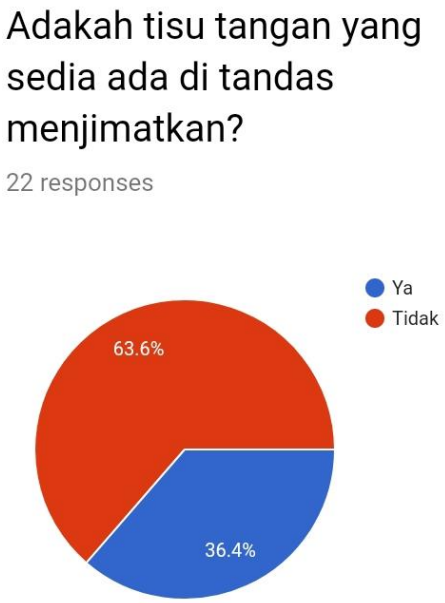


Figure 4.2.1 Gender of respondents

The figure 4.1.1 shows the total number of students Polytechnic Sultan Salahuddin Abdul Aziz Shah and the respondent from the public who responded to the survey. The survey has been filled by 22 person randomly. Based on the pie chart, there are 63.6% of respondent were female and the remaining is 26.4% respondent were male. The most of of the respondent were female. Therefore, this is means a female more likely to answer the questionnaire that has given.

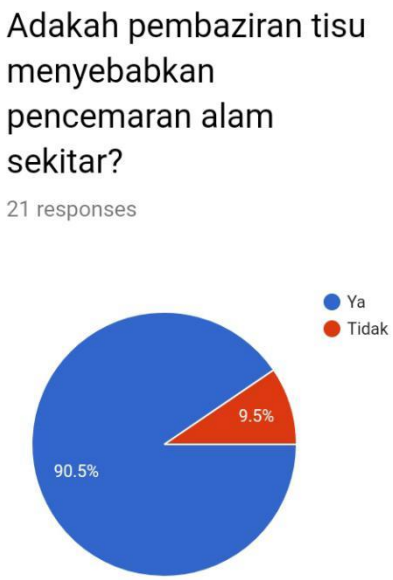


4.2.2 The existing hand tissue saves

Based on the figure 4.1.2 above showed the percentage of the existing hand tissue is saves or not. This is because, the percentage is really important because to know about the use of tissue while in the toilet. There were 63.6% of the respondent vote yes. It is means, hey really agree that the existing hand tissue was really saving to them. Instead of, the 36.4 of the respondent respond no. It is means, they really not agree that the existing hand tissue in toilet really not saving and it would need to change with our product.

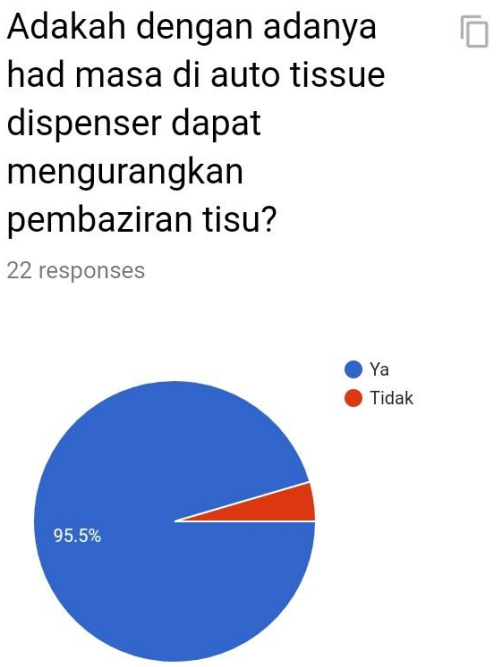
4.2.3 The total hand tissue using after used the toilet

Based on the figure 4.1.3 above showed the total hand tissue using after used the toilet. This is because, it need to know how much hand tissue that using by users. There were just 13.6% of them using 1 piece of hand tissue. Meanwhile, there were 54.5% of them using 2 to 3 piece of hand tissue and the balance is 31.8% that they using 4 to 5 piece of hand tissue after using the toilet. On the whole, the data showed that the average users using 2 to 5 piece of hand tissue and it really coincide with our objective where to save the tissue with 1 piece of tissue with once use.



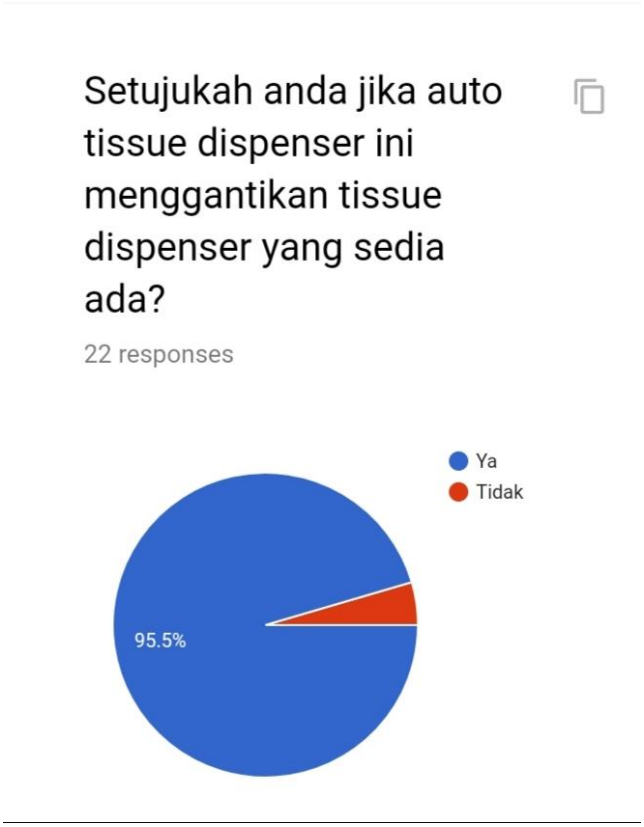
4.2.4 Does waste of tissue cause of environmental pollution

The figure 4.1.4 above showed does waste of the tissue effect to the environmental pollution. The data is important because it to know the tissue is damage for environmental or not. The data shown, 90.5% of the respondent respond yes that the tissue is really bring to the environmental pollution as an example, there are many tissue wasted and it affect to the environmental scenery. There were 9.5% respondent respond no that the tissue will affect to the environmental population. Therefore, most of them agree that the tissue will affect to the environmental if not contained.



4.2.5 Does the have time limit at our product able to reduce wastage tissue

Based on the figure 4.1.5 above showed our product 'Auto Tissue Dispenser' able to reduce the wastage of tissue with the have limit time. It is because, he data that collected is important because it will show that it has a limit time in the tissue dispenser, it will less of the wastage tissue. There were 95.5% of the respondent respond yes that able have a time limit to our product is able to less a wastage tissue. Instead, there were 4.5% respondent respond no for the have a time limit to our product. Therefore, most of the respondent really agree that our product suitable for have a time limit.



4.2.6 Does the ‘Auto Tissue Dispenser’ suitable for change the existing product

The figure 4.1.6 above showed our product ‘Auto Tissue Dispenser’ is suitable for change with the existing product in the market. The data is the most important because it need to know that our product is relevant on the market. The data shown that 95.5% respondent respond yes for the existing product change with our product because it is more relevant instead of, there 4.5% respondent respond no for the our product replace the existing product because them suitable with the existing product. However, most of the respondent really agree that our product is really suitable for the market.

4.3 RESPONSE FROM CLEANER WORKER

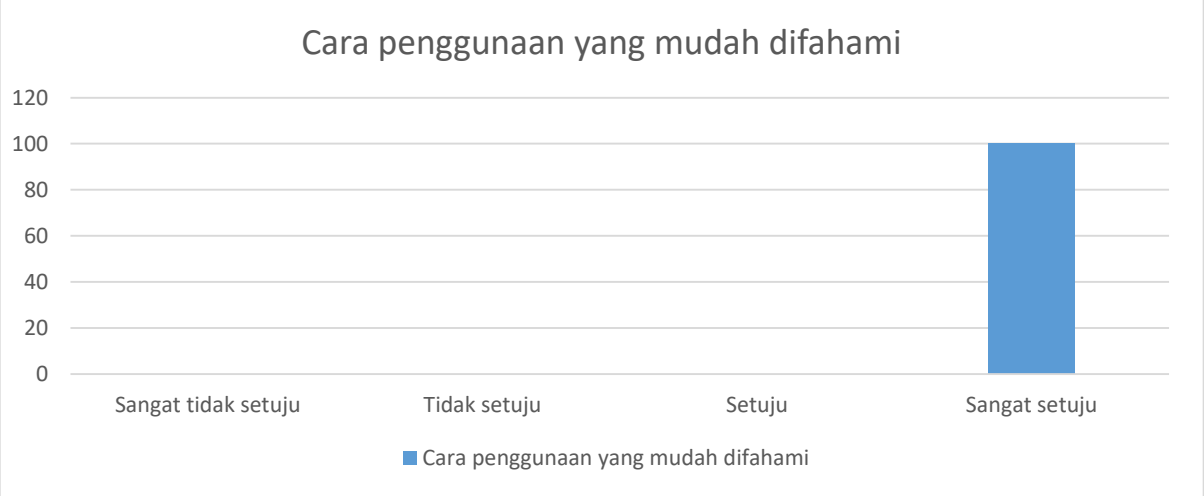


Figure 4.3.1 simple way of using it

The figure 4.2.1 show the simple way of using it, the data shows that everyone agrees that our product is easy to use and that it is very important to show that our product is marketable. In addition, we know that in the future our product will not be a problem for users as it is easy to use.

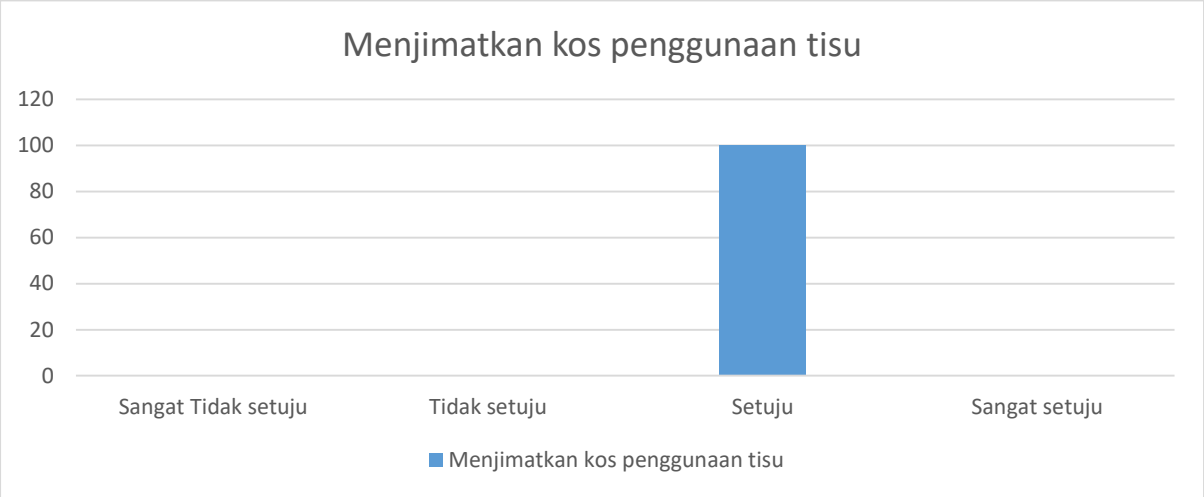


Figure 4.3.2 the save on the use of tissue

Based on figure 4.2.2 above, the save on the use of tissue, data shows 100% they agree that this product can effectively save tissue usage as each use is limited and this can reduce the relatively high cost of tissue purchase alone, and workers say this can ease their work.

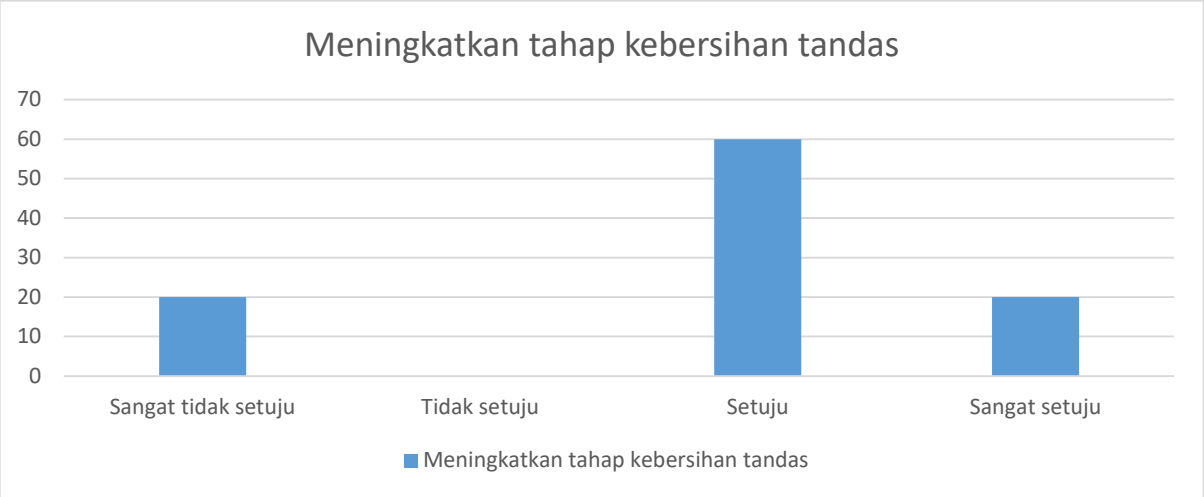


Figure 4.3.3 increase the hygiene level of the toilet

Figure 4.2.3 showed increase the hygiene level of the toilet, we did a survey to find out the level of cleanliness of the toilet and our focus was on the tissue used lying around and making the toilet look messy, excess tissue or even lumps of tissue around the toilet. Of that, 20% disagree, 60% agree and the remaining 20% strongly agree.

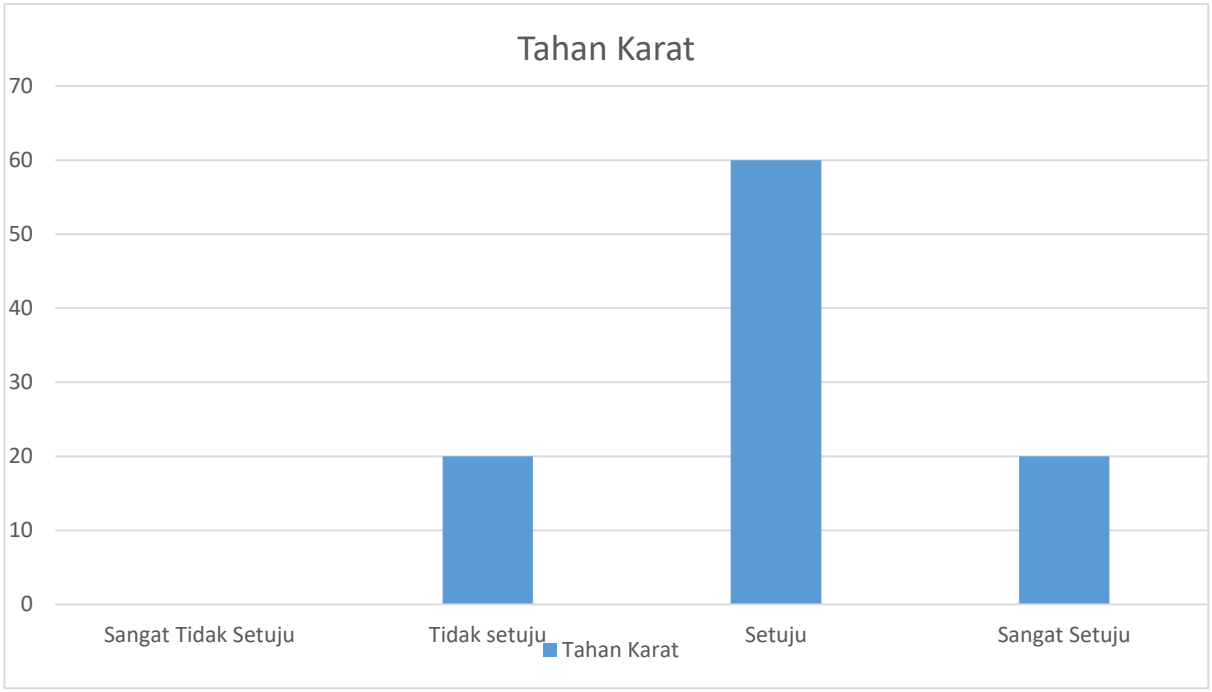


Figure 4.3.4 stainless

Based on the figure 4.2.4 shows this product is are stainless, the result is 20% disagree that this product is stainless, 60% agree that the product is stainless and another 20% strongly agree. We use plastic material as a case and steel as a frame on the inside.

Figure 4.3.5 easy to find spare parts

Figure above show easy to find spare parts, the materials we use are jumper cable (male-female), jumper cable (male-male), jumper cable (female-female), adaptor, arduino uno, infrared sensor and relay 1 CH 12v. Which is very easy to find in electronic stores so when the equipment is damaged it is easy to replace.

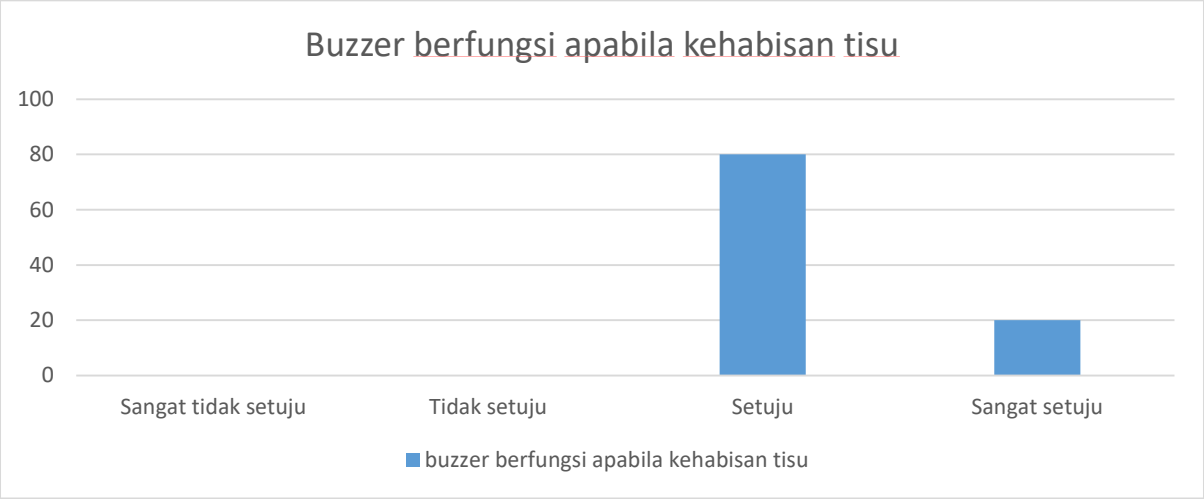


Figure 4.3.6 the buzzer works when it runs out of tissue

Based on figure 4.2.6, our purpose in putting the buzzer is for employees to know when the tissue is depleted and to refill it. In addition, employees should not have to bother to check for existing tissue regularly. That is, when the buzzer sounds the worker can be alert to refill the tissue. The result show, 80% agree and another 20% strongly agree.

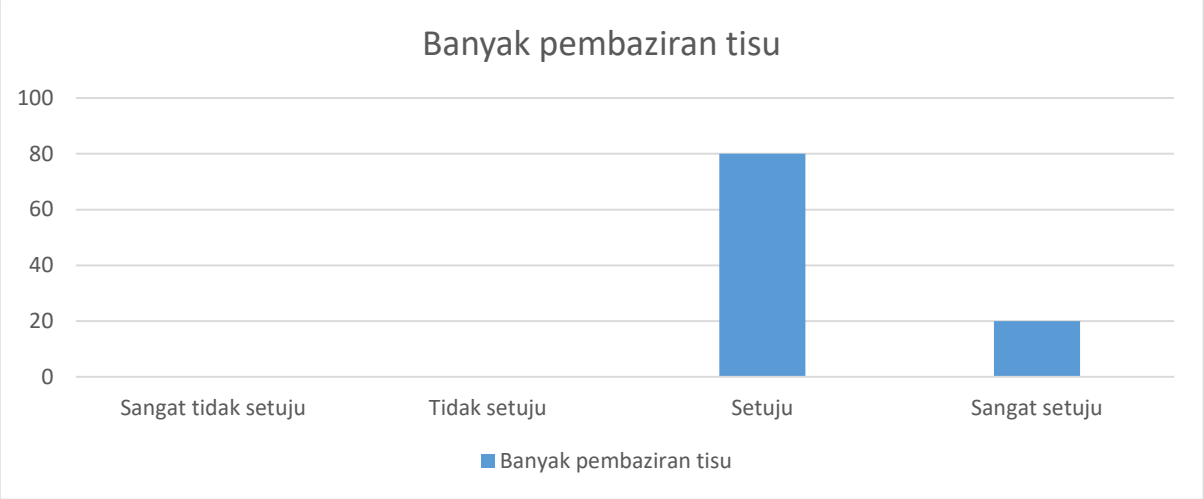


Figure 4.3.7 a lot of tissue wasting

Based figure 4.2.7 showed a lot of tissue wasting, a lot of tissue wasting, it was discovered that there was a lot of waste going on and workers often complained that there was a lot of tissue around the toilet and they had to constantly check the use of tissue used by users. Result shows that 80% agree and 20% strongly agree.

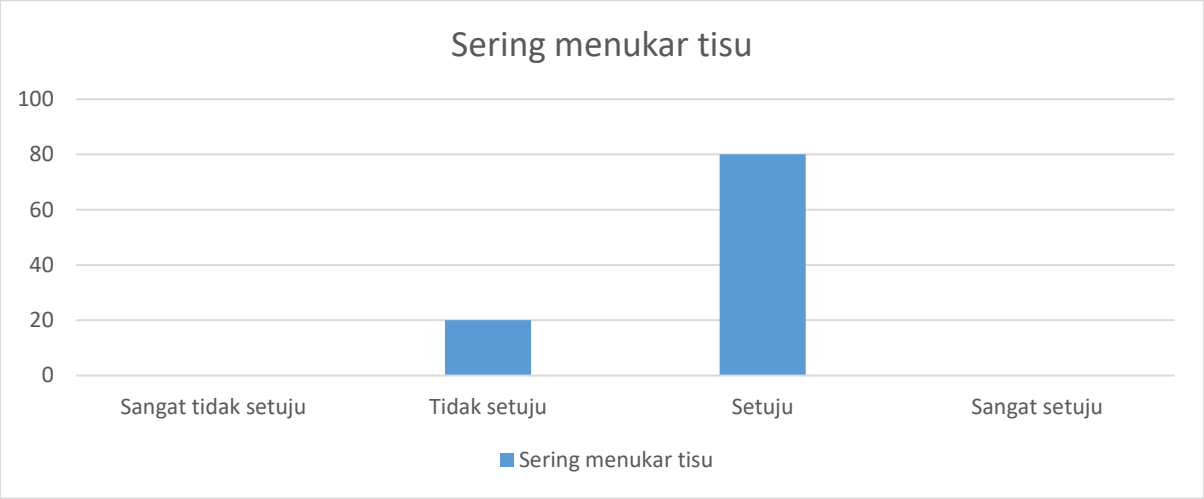


Figure 4.3.8 often change tissues

Based on figure 4.2.8, workers often say that they often change tissues because the tissue is depleted too fast, causing them to lack stock for future use. Consumers usually use or draw tissue from the tissue more than it should, which can cause the stock to run out and no more tissue to fill. The result show 80% agree with this statement and another 20% disagree.

4.4 SUMMARY

In this chapter, questionnaire that had been done to the student and cleaner worker of Polytechnic Sultan Salahuddin Abdul Aziz Shah are to get their opinion about the research. All the data collection and the data analysis. The main purpose of doing this research is to find out the number of toilet user and amount the tissue that use daily.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

5.1 INTRODUCTION

This chapter describes the project that were successfully completed over a 2-semester period of 12 months. In addition, there are some suggestions for improving our project to give the benefits to the future generations. In this chapter, decisions are also made based on the results obtained from the testing and product discussions that have been conducted in the preceding chapters. The objectives and recommendations of the study have also been carried out to prove that our product testing is going well. Finally, conclusions are included for this experiment.

5.2 DISCUSSION

Our product, '*Auto Tissue Dispenser'* has been tested with cleaning workers and students at Sultan Salahuddin Abdul Aziz Shah Polytechnic. When our products are tested, our products are in good shape and achieved a good level. Our products succeed in meeting the objectives of the listed study. One of these is that our products can produce toilet paper by using infrared sensors in good contact while being tested with students at Sultan Salahuddin Abdul Aziz Shah Polytechnic. This can provide convenience to users. Accordingly, our product provides a warning buzzer to indicate that toilet paper is running out. This buzzer is the latest innovation from us as the previously released product lacks the use of warning buzzer as the toilet paper marker has run out. So, we've been innovating our products by adding new tools like this warning buzzer.

5.3 SUGGESTIONS

After conducting tests on this product, we found that this product could benefit consumers and cleaning workers as it facilitates and saves the use of toilet paper. As such, this product is highly satisfying to consumers and cleaning workers.

To address the weaknesses of this product, several suggestions have been made such as:

- ✓ The product framework must minimized so it doesn't take up much space
- ✓ The warning buzzer must also be in the cleaning workers' office because it will make the process easier to inform the cleaning workers when they are not around the toilet.

5.4 SUMMARY

Each project undertaken must have its own interests and objectives. So does the *'Auto Tissue Dispenser'* project. There were no difficulties during this project and the objectives for this project were finally achieved.

The project was able to automatically remove toilet paper using infrared sensors with touch. The presence of this infrared sensor saves the production of toilet paper because for subsequent toilet paper users must wait 5 seconds. This project has achieved its first objective of saving toilet paper production.

In addition, our products have achieved the second objective of using alarms as a warning when running out of toilet paper. During testing with a cleaning worker, we received positive feedback about this warning buzzer.

Based on the results of the research in the creation and completion of this project, it is believed that the objective of the product being produced has been achieved successfully. In addition, it benefits many parties as it facilitates cleaning workers to replenish the exhausted toilet paper and to increase the saving of toilet paper.

Lastly, we hope that this project will be beneficial, acceptable and applicable and in keeping with the technological developments of this era and that the proceeds from this project will meet the needs of all users.

APPENDIXS

APPENDIX A

No	Components	Code	Quantity	Price
1	Jumper cable (Male-Female)	A4	1	RM 39.00
2	Jumper cable (Male-Male)	A5	1	RM 29.00
3	Jumper cable (Female-Female)	A6	1	RM 19.90
4	Adaptor	A7	1	RM 39.90
5	Arduino Uno	A3	1	RM 130.00
6	Extender Board	A8	1	RM 40.00
7	Infrared Module	B4	1	RM 7.80
8	Relay 1 CH 12v	G21	1	RM 48.00
9	Casing	-	1	RM 160.00
TOTAL PRICE				RM 1002.60

APPENDIX B

POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH
KEMENTERIAN PENDIDIKAN MALAYSIA
Persiaran Usahawan, Seksyen U1,
40150 Shah Alam
SELANGOR, MALAYSIA

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH
Tel: 603-51634000
Faksimili: 603-55691903
Laman Web: www.psa.edu.my
Facebook: psaaa

Rujukan : PSA/JKA/02/07/002 Jld 4 (133)
Tarikh : 28 Januari 2019

Kepada:

Sesiapa Yang Berkenaan

Tuan/puan,

KEBENARAN MENGUMPULKAN MAKLUMAT KAJIAN BAGI PELAJAR JABATAN KEJURUTERAAN AWAM, POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Dengan hormatnya perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa pelajar jabatan ini perlu mengumpulkan maklumat kajian bagi memenuhi keperluan kursus yang sedang diikuti yang merupakan salah satu syarat penganugerahan diploma.

3. Butiran kajian dan pelajar yang terlibat adalah seperti berikut:

KURSUS :	**DCB 5171 PROJECT 1**
TAJUK :	**AUTO TISSUE DISPENSER**

BIL	NAMA PELAJAR	NO. MATRIK	NO. TEL
1.	NUR SYAZA SYAKIRA BT MD MARISA	08DPB17F1239	013-6801216
2.	MOHAMAD HAKIM BIN MOHD GINEN	08DPB17F1139	017-3179081
3.	NUR AQILAH SYARAFANA BT ROESTAM A SANI	08DPB17F1233	017-3326571
4.	NURUL ATHIRA BT SALIM I @ SALIM	08DPB17F1133	014-9342449

4. Sehubungan dengan itu, kerjasama dari pihak tuan/ puan amatlah diharapkan untuk membenarkan pelajar tersebut mendapatkan maklumat kajian yang berkaitan. Sekiranya terdapat sebarang pertanyaan, tuan/ puan bolehlah menghubungi penyelia **PN NORMALINI BINTI MANSOR** di talian **019-2286408**.

5. Segala kerjasama dari pihak tuan/ puan amatlah dihargai dan didahului dengan ucapan ribuan terima kasih.

Sekian,

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

.....
(ZARINAH BINTI ZAINI)
b.p Pengarah
Politeknik Sultan Salahuddin Abdul Aziz Shah.

50

APPENDIX C

BORANG SOAL SELIDIK

Borang kaji selidik ini dilakukan bagi mengetahui masalah kegunaan tissue dispenser dan penilaian terhadap Auto Tissue Dispenser.Maklumat yang diperolehi daripada penilaian ini adalah untuk kajian kami dan untuk menyokong dapatan kajian kami.

Pengenalan Produk

Penghasilan produk 'Auto Tissue Dispenser' ini terhasil daripada tissue dispenser yang kebanyakan digunakan di tandas bagi memudahkan pengguna.Produk kami menggunakan konsep penjimatan tisu dimana kami menggunakan sensor bagi mengawal jumlah tisu yang keluar sebagai contoh produk ini perlu menunggu selama 5 saat untuk mengambil tisu yang seterusnya.Produk ini mampu menjimatkan lagi penggunaan tisu yang sedia ada di tandas.Selain itu,pada produk kami juga mempunyai buzzer yang berfungsi untuk berbunyi apabila mengesan kehabisan tisu yang berada di dalam dispenser tersebut.SILA JAWAB SOALAN DENGAN MENANDAKAN (/) PADA RUANG YANG DISEDIAKAN

Jantina: ☐ Lelaki ☐ Perempuan

Umur: ☐ 20-35 tahun ☐ 36-50 tahun ☐ 50 keatas

Masa yang sesuai untuk menunggu: ☐ 5 saat ☐ 10 saat ☐ 15 saat tisu seterusnya keluar

Nombor di bawah mewakili kepuasan responden

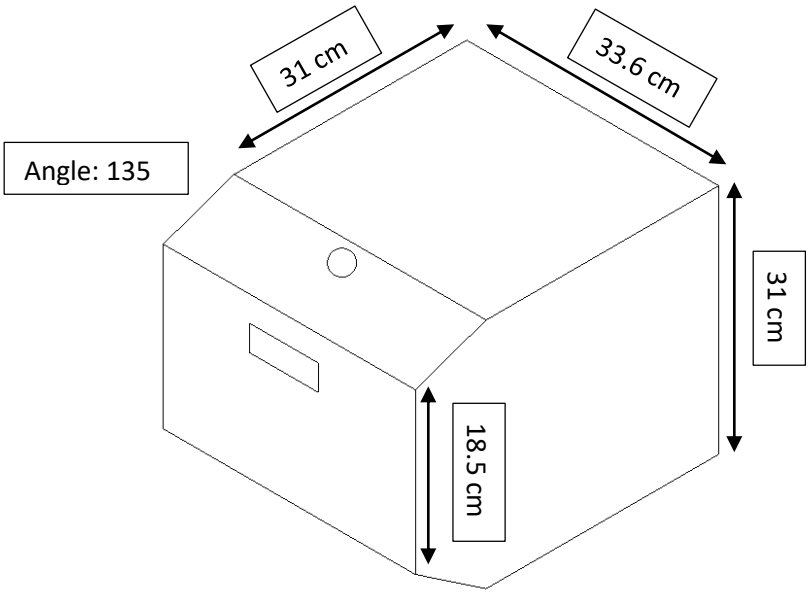
1	Sangat setuju
2	Setuju
3	Tidak secftuju
4	Sangat tidak setuju

KEPUASAN TERHADAP AUTO TISSUE DISPENSER	1	2	3	4
CARA PENGGUNAAN YANG MUDAH DIFAHAMI				
MENJIMATKAN KOS PENGGUNAAN TISU				
MENGELAKKAN PEMBAZIRAN PENGGUNAAN TISU TANDAS				
MENINGKATKAN TAHAP KEBERSIHAN TANDAS				
TAHAN KARAT				
MUDAH MENCARI ALAT GANTI				
BUZZER BERFUNGSI APABILA KEHABISAN TISU				

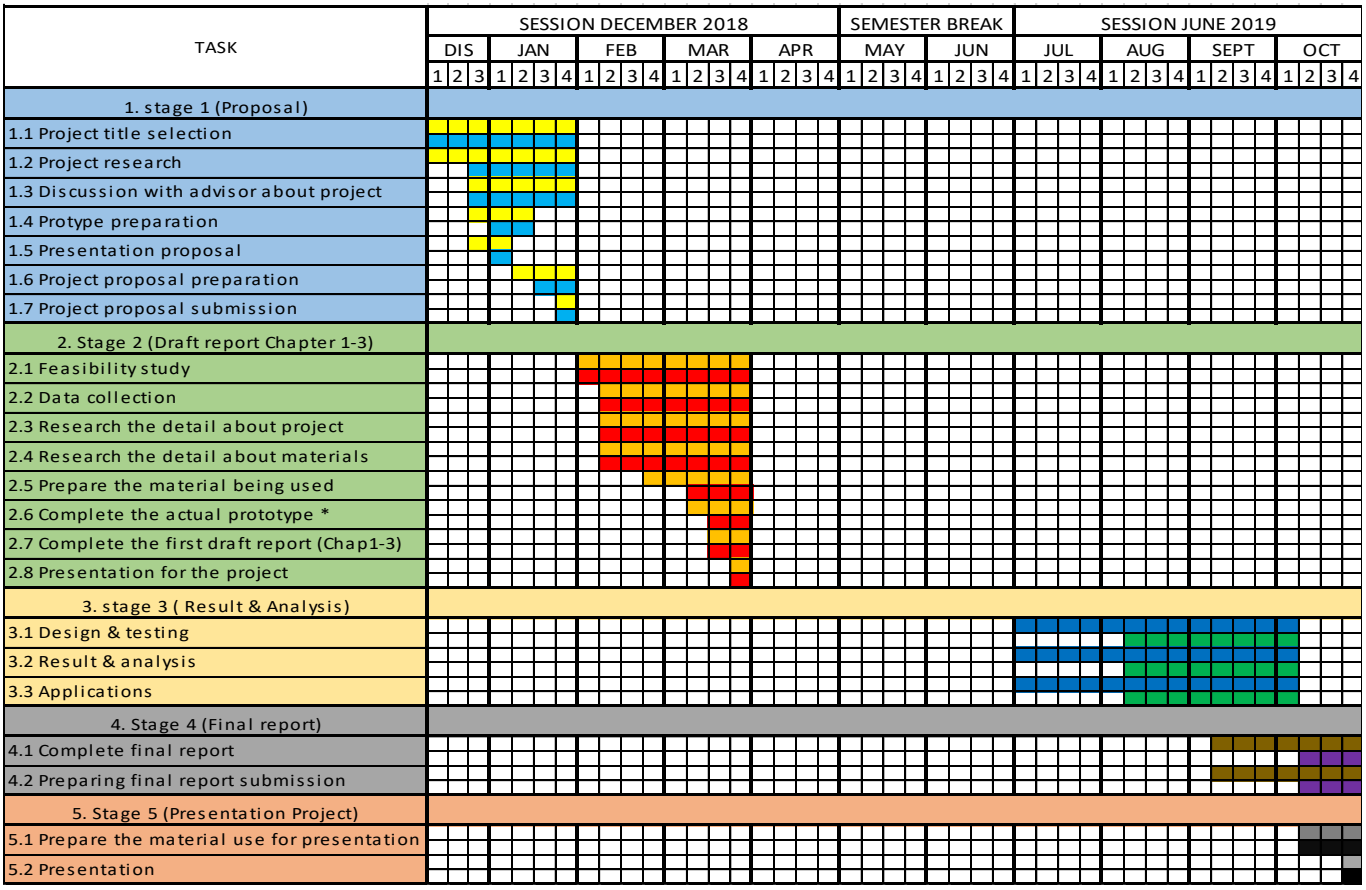
MASALAH TISSUE DISPENSER	1	2	3	4
TIADA HAD PENGGUNAAN				
BANYAK PEMBAZIRAN TISU				
SERING MENUKAR TISU				

RESPONDEN,

APPENDIX D



APPENDIX E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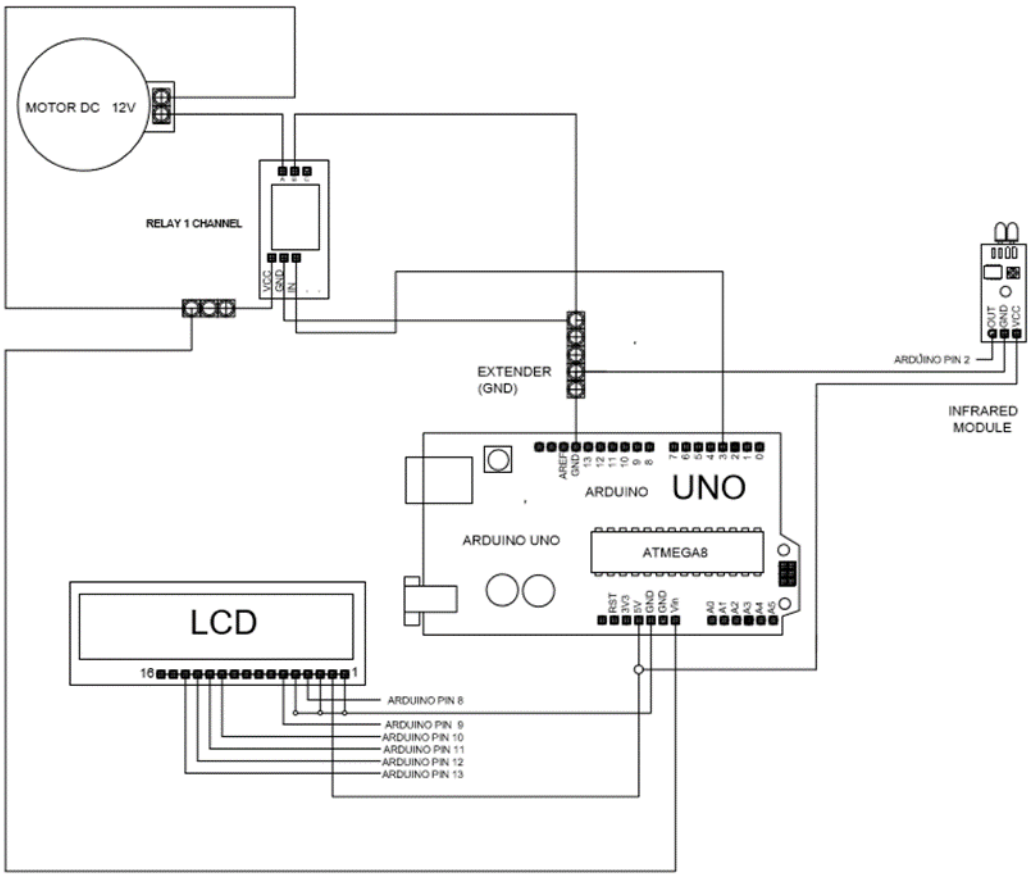
1. stage 1 (Proposal)
1.1 Project title selection
1.2 Project research
1.3 Discussion with advisor about project
1.4 Protype preparation
1.5 Presentation proposal
1.6 Project proposal preparation
1.7 Project proposal submission
2. Stage 2 (Draft report Chapter 1-3)
2.1 Feasibility study
2.2 Data collection
2.3 Research the detail about project
2.4 Research the detail about materials
2.5 Prepare the material being used
2.6 Complete the actual prototype *
2.7 Complete the first draft report (Chap1-3)
2.8 Presentation for the project
3. stage 3 (Result & Analysis)
3.1 Design & testing
3.2 Result & analysis
3.3 Applications
4. Stage 4 (Final report)
4.1 Complete final report
4.2 Preparing final report submission
5. Stage 5 (Presentation Project)
5.1 Prepare the material use for presentation
5.2 Presentation

APPENDIX F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