



**KEMENTERIAN  
PENDIDIKAN  
MALAYSIA**



# **PPD's INNOVATION DIGEST 2018**

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## PREFACE

The idea to create Politeknik Port Dickson's Final Year Project Digest was initiated by Mr Roslee bin Yahya, the Director of Politeknik Port Dickson. This is a three-pronged effort: to document students' innovation projects for future reference, to encourage students and supervisors to embark on creative writing, and to showcase students' work in a form of a pictorial digest.

The Research and Innovation Unit of Port Dickson was entrusted with the responsibility to publish this digest and this project came to fruition with the effort of the entire team.

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# COOKING GAS AND BURNING TEMPERATURE SAFETY SYSTEM

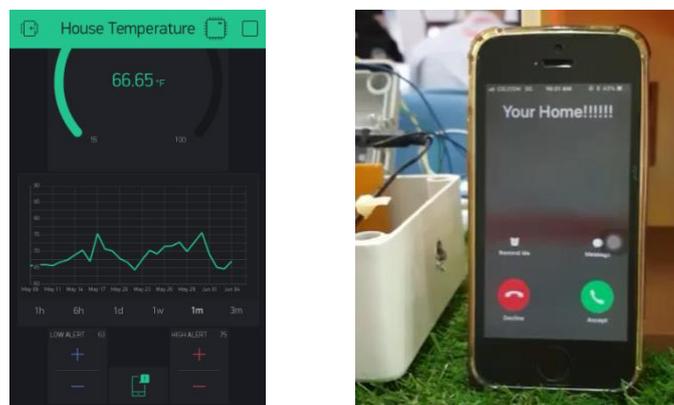
## Product Description

This product monitors and notifies users of gas leakage from pressurised steel LPG cylinders. The hardware used are ESP8266 Wifi Module, GSM Sim900A, Gas and Temperature Sensors and Arduino Uno. There are four main device modules i.e. the gas and the temperature unit; the centralized controller unit; the alarm unit and the IOT platform unit. The gas and the temperature detector unit is located close to the gas cylinders and houses the distribution box and is operated by a 12V power supply. The centralized controller unit is build using the Arduino UNO shield to communicate with the Blynk apps to alert the user of gas leakage and abnormal temperatures (abnormal temperature range 50°C to 100°C). If there is no response from the owner within 10 seconds, then a call will be made using the GSM module.

**Keywords:** IoT, Arduino Uno, Blynk, Monitoring System, Gas Leakage

## Outcome

LPG gas leakage monitoring system and communication through Blynk Apps and GSM module.



**Figure :** (a) Mobile Apps Application (b) GSM operation using handphone

### **Achievements of product**

1. V50 GSM 900A and WiFi Modem is used as output if the sensor detects any fire or gas leakage. The system then alerts the user through Blynk app. If there is no response within 10 seconds, the GSM module will make a call to the user.
2. The Blynk app and wifi module are used in this system for fast response.

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# IoT SMART GARDEN

## Product Description

The IoT(Internet of Things) Smart Garden is a smart system to monitor a garden. This system consists of a fan, a water pump and humidity, temperature and soil moisture sensors. When the moisture sensors detect insufficient water in the soil, the water pump will be activated. The fan will be activated when the ambient temperature and humidity levels are high. This system is attached to a monitoring system by a surveillance camera which monitors the condition of the plants. This IOT system can provide the sensor readings and the condition of plants. It data can be accessed via personal computers and smart phones. The gardening system can save time, cost and is also user and environmental friendly. This project has been protected by MyIPO with registration number LY2019000259.

**Keywords:** IoT, Smart Garden, Automation, Monitoring

## Outcome

The fan and water pumps operate successfully when the sensors detect a lack of water. The IoT system can monitor the actual condition of the plants via personal computers or smart phones.



**Figure :** IoT Smart Garden Prototype

## Achievements of product

1. **Automation system test:** Humidity, temperature and soil sensors have the capability of obtaining real time data from the garden. The system records the moisture and temperature. When the temperature is above 30° C, the cooling fan is activated. Watering the plants will be automatically done when the soil moisture reading is less than 50%. Data can be archived

through internet cloud technology. The microcontroller Arduino Uno need to be connected to the WiFi Module ESP8266 via TCP/IP protocol stack to access the WiFi network.

2. **Monitoring system test:** NodeMCU is needed as a hub for the IoT system. NodeMCU is an open source IoT platform. The real-time values from the sensors are uploaded to Node-RED through NodeMCU. The Node-RED is integrated with mobile apps for control purpose.

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# MINI TIDAL ENERGY

## Product Description

This study intends to use renewable energy sources for the generation of electricity. The Mini Tidal Energy project is a prototype to generate electricity in rural areas which have no electricity grid connectivity. The concept and theory of tidal wave energy as well as electromagnetic induction are applied to achieve the goals of the project. The project prototype has successfully turned on 6V street lights near a water spring at night automatically. The findings give strong evidence that electricity can be generated using the concept of water movement in the water springs.

**Keywords:** Electricity generation, renewable energy, tidal energy, electromagnetic induction

## Outcome

Electricity generation using renewable energy sources



**Figure :** Mini Tidal Energy

## Achievements of product

Electricity generation using water movement in the water strings and electromagnetic induction concept successfully turn on 6V street lights.

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# SMART GAS LEAKAGE DETECTOR

## Product Description

This Smart Gas Leakage Detector System was developed to address the problem of unexpected gas leaks. The system is targeted at consumers of domestic cooking gas using portable gas cylinders. It consists of a 9 Volts battery powered electronic control circuit that triggers the direct current motor to close the gas valve when activated by the gas detector. With a series of tests carried out, it is proven that the system is able to continuously monitor gas leakage. Without such a system gas leakages have the potential to cause explosions and fires. As a result, it is also expected to reduce the number of fire incidences caused by gas leakage in domestic residences.

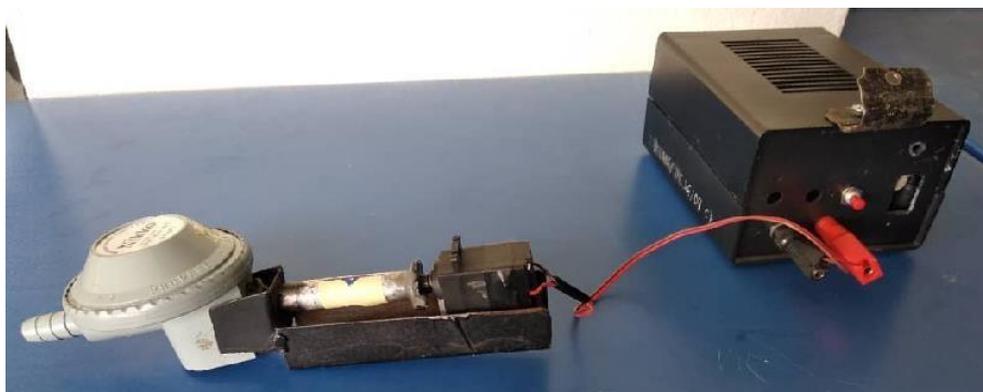
**Keywords:** Gas leakage, Electronic control, Gas detector, Gas valve, Explosion and fires

## Outcome

Avoid continuous gas leakage and stop the fire.



**Figure :** Smart Gas Leakage Detector System



**Figure :** Smart Gas Leakage Detector System Connection

### **Achievements of product**

The system is able to detect gas leakages and turn of the gas from the cylinder automatically.

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# STRAWBERRY COTTAGE

## Product Description

Strawberries can be grown in different climates but cold temperatures are required to break growth dormancy. High temperatures that exceed 30 degrees Celsius can damage the quality of the strawberries. Strawberry cottage is an innovative project designed to ensure optimal conditions for the growth of strawberries. Temperature and humidity sensors are used to detect temperature changes and signals will be sent to the PIC microcontroller to activate the fan and water pump to lower the temperature when high temperatures are detected.

**Keywords:** Strawberry cottage, Temperature sensors, PIC microcontroller

## Outcome

Encourage planting of strawberry plants in tropical climates using a automated temperature and humidity control system.



**Figure:** Project Prototype Strawberry Cottage

## Achievements of product

1. The system inside the cottage will ensure the temperature and humidity are 20°C and 70% respectively.
2. The system can be operated in two ways; from solar energy and Direct Current (DC) supply voltage. Solar energy is used when there is sunlight and the DC supply voltage will be used when solar energy is no longer supplying power to the system

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# RECYCLE VENDING MACHINE

## Product Description

The Recycle Vending Machine (RVM) aims to encourage the public to recycle disposable waste. This machine collects recyclable materials such as plastics and aluminium. This product will use the “waste to wealth” concept by motivating and encouraging Malaysians to recycle as they will be rewarded. This will eventually increase their awareness on the importance of recycling waste. The sensors of the machine are activated when someone puts plastics and aluminium into it. If the weight of the waste is within a certain range as displayed by the LCD screen, there will be reward such as a packet of healthy food. This project uses an Arduino Microcontroller and the system has been implemented on a small scale for user testing. The system has been found to be effective in achieving the goals of the project for handling the whole process and it may be needed to save our environment.

**Keywords:** Sensor, Arduino Microcontroller, LCD Display, plastic and aluminium.

## Outcome

RVM is an automated machine that can collect, sort and reward. The LCD display shows the weight of the targeted plastic and aluminium waste.



**Figure:** a. Side view



b. Top view



c. Demonstrate the function of Recycle Vending Machine

### Achievements of product

#### **MACHINES FOR COLLECTING PLASTIC BOTTLE CONTAINERS FOR**

1. To collect bottles plastic and canned drink.
2. To count a number of bottles plastic and canned drink.
3. To convert the maximum number of bottles plastic and canned drink to healthy food as a reward.

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# AUTOMATIC MOP MACHINE

## Product Description

The mop is a commonly used floor cleaning tool. A mopping machine can help users to easily clean a horizontal floor. The machine is small, and is easy to use and maintain. The machine comes with a clean water bucket, a soap drain, a sponge, a water heater, wheels and batteries for power. The bucket contains clean water and soap. Soap is sprayed in places where there is dirt and the sponge wipe the floor. The water pull tool draws water out. In addition, this mop uses wheels to facilitate movement. This mop machine only uses chargeable dry cell batteries. These batteries can be charged using the mains power at home. This mop machine can simplify floor cleaning work. This machine is safe to use as it only uses dry cell and is wireless.

**Keywords:** Machine, Mop, Automatic, Dry Cell

## Outcome

Automated floor cleaning mop using water, soap and sponge built and tested.



**Figure:** Automatic Mop Machine

### **Achievements of product**

1. Water pull tool to draw water out
2. Dry cell and wireless
3. Sponge wipers

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# MULTIPLE AUTOMATIC DISPENSER

## Product Description

MULTIPLE AUTOMATIC DISPENSER is a new innovation that can provide a solution to the problem of consumption of sauces and water in food premises. This project works using an ARDUINO circuit that uses three types of DC motors, two 12V peristaltic motors and one 12V water pump motor. The touch sensor circuit is integrated to control the output of water to the motor. Two IR Sensors are used to send signals to the Arduino to activate the sauce motor.

**Keywords:** Arduino, peristaltic motor, water pump, automatic dispenser

## Outcome

An existing water dispensing machine is modified to built this water and chili sauce dispensing machine. The machine is clean and durable and includes storage capacity for 2 litres of chili sauce and 10 litres of water.



**Figure:** Multiple Automatic Dispenser

## Achievements of product

1. By simply inserting a sauce bowl in the space provided it can automatically dispense chili or tomato sauce. For drinking water, a push button or touch sensor activates the drinking water dispenser.

## Owner

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# SMART SHARPENER SHREDDER

## Product Description

This smart sharpener shredder project is designed to meet the needs of kindergartens or educational institutions such as Architecture laboratories to draw architectural drawings. The pencil sharpening process can be done quickly by students. In addition, the project is equipped with a mini paper shredder machine to destroy confidential paper documents. The system is built using a power supply, and 6V and 12V motors as the main components of the pencil sharpening and paper A4 size cutting process.

**Keywords:** Power Supply, Smart Sharpener, Paper Shredder

## Outcome

High strength durable materials are made of wood for the storage of pencil and paper waste.



**Figure:** Smart Sharpener Shredder

## Achievements of product

1. Capable of sharpening wood pencils automatically and also cutting A4-sized paper for destruction.

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# AQUACONTROL

## Product Description

Aquacontrol is a system developed to monitor and control the activity of an aquarium by using a smartphone or a computer that have internet connectivity. This system was developed to solve problems related to aquarium management such as fish water temperature monitoring, aquarium lighting and fish feeding. The system was developed using a 5V dc supply and a ESP8266 microcontroller based sensors to monitor temperature, lighting and the feeding process. The water temperature sensor is used to monitors and reads the ambient temperature of water in the aquarium. A light dependent resistor detects the light intensity in order to turn on or off the LED lighting automatically. The feeding system turns on or off the motor by using either a timer or manually. The system was developed to enable the user to manage the operation of the aquarium remotely by a login user interface through WiFi connectivity or Internet of Things (IoT) platform. The system helps the user to monitor and control the aquarium environment remotely to ensure the fish breeders successfully.

**Keywords:** ESP8266, Internet of Things, Sensor, WiFi

## Outcome

Aquacontrol system successfully developed and enable the user to control the aquarium environment by using WiFi and IoT Platform.



**Figure:** Aquacontrol System to control aquarium environment

## **Achievements of product**

### 1. WHEN USE WI-FI

- Turn on the power supply
- Connect to the AQUACONTRO Wi-Fi network by using smartphone
- Open browser
- Type <http://192.168.43.56/> IP address in the search box
- Enter username (pasurian) and password (pasu123)
- Click OPTION > DEVICES to monitoring the temperature of the water
- Type <http://192.168.43.56/control?cmd=GPIO,0,0> to switch off the feeder
- Type <http://192.168.43.56/control?cmd=GPIO,0,1> to switch on the feeder
- Light will switch on/off according to the climate changes

### 2. WHEN USE IOT PLATFORM

- Open browser and type <http://peoplesiot.xyz/> in search box
- Enter username (pasu) and password (abcd12345)
- In this webpage can monitoring the temperature and control the feeding system.

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# LOUVRE WINDOW CLEANER

## Product Description

*Louvre Window Cleaner* is a semi-automatic window cleaner with motor control. The main objective of this product is to overcome the ergonomic problems that are often encountered when doing building window cleaning. According to the International Ergonomics Association (IEA), ergonomics is defined as “The scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance” (IEA, 2015). This product has been designed to be used to clean almost any type of window surface in Malaysia. It is also designed to reduce ergonomic hazards while ensuring that window cleaning is done quickly and safely.

**Keywords:** window cleaner, ergonomic hazard, product design, window surface, safely

## Outcome

Successfully reduce the ergonomic problems that cleaning workers often face. It also reduces the risk of workers falling from high places.



**Figure:** Louvre Window Cleaner

### **Achievements of product**

This product speeds up the windows cleaning process quickly and safely.

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# SMART GARBAGE DISTRIBUTOR

## Product Description

The smart garbage distributor is a semi-automatic waste bin for efficient and orderly collection of waste. The main problem addressed by this project is to sort waste into three main categories such as paper, plastics and glass. Plastic bottles and canned beverages are the most common waste. According to the Ministry of Housing and Local Government's (KPKT) website, the government has required the separation of solid waste at home since September 1, 2015. The implementation of this is in accordance with the Regulations under the Solid Waste Management and Public Cleaning Act 2007 (Act 672). The Smart Garbage Distributor machine is used to assist cleaning contractors to prevent waste debris. Furthermore, it can help to facilitate the community to dispose of waste and sort waste according to the recycle (3R) concept of Reuse, Reduce, and Recycle.

**Keywords:** semi-automatic bin, sort waste, regulation, cleaning contractors, 3R concept.

## Outcome

The Smart Garbage Distributor machine has been built to assist cleaning contractors to prevent waste debris and also to facilitate the community to dispose of waste and sort waste according to the recycle (3R) concept of Reuse, Reduce, Recycle.



**Figure:** Smart Garbage Distributor

### **Achievements of product**

This product helps users avoid mistakes while sorting out garbage and thus bring success to recycling campaigns.

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# SMART HOME VOICE AUTOMATION SYSTEM

## Product Description

In this modern era, current generations are more exposed to technology usage in daily life routine. Older generations have also learned to adapt to this situation and are moving forward towards technology. Smart Home Voice Automation System was developed to help users to control the electrical loads based on Bluetooth input signal at a maximum distance, 100 meter. The Bluetooth device receives this input signal from user's android device. The purpose of this project is especially beneficial in case of handicapped or aged people who find it difficult to walk and operate the electrical switches to turn on or off the loads. This system solves this issue as now the user just has to give voice commands to turn on or off the loads. In this project, 4 loads are used for demonstration, i.e. light, fan, heater and air-conditioner. All these loads can be individually turned on or off. This system interfaces with home appliances that switches these loads based on the inputs received from an android device.

**Keywords:** Smart Home, Bluetooth, Android

## Outcome

Users can easily control the home appliances such as fan, television, lamp and air conditioner from a remote place.



**Figure:** Smart Home Voice Automation System prototype

### **Achievements of product**

This product serves users to control electrical home appliance remotely for convenience.

### **Owner**

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# STATIONERY VENDING MACHINE USING RFID CARD

## Product Description

Vending machines are in high usage in developed countries like United States and Japan as transaction media to overcome the problem of lack of human resource. In Malaysia, vending machines have started to become popular because users can obtain food or drinks easily and quickly. Vending machine usage are in high demand where there are a large number of users such as universities, polytechnics, and hospitals. Therefore, many other daily necessities such as stationery could also be sold through vending machines. Stationery is one of the essential items for lecturers and students in polytechnics. The difficulty in getting stationeries is a problem for students and lecturers in polytechnics due to the distance of retail shops. Thus, a stationery vending machine developed to satisfy both student's and lecturer's needs quickly and easily at any time of the day is very useful. This vending machine uses an RFID (Radio Frequency Identification) system which enables lecturers and students to buy stationery without using cash. The purpose is to help lecturers and student to get stationery easily and quickly within the polytechnic. Apart from that, vending machines operate 24 hours a day to facilitate purchases done at any time. The usage of the RFID system is to support cashless society as done by developed countries nowadays. With the existence of this kind of product, hopefully it can solve the problem faced by polytechnic's lecturers and students. This product can also be placed at the high potential area and meet other consumer demand.

**Keywords:** vending machine, RFID, cashless society.

## Outcome

With the development of this product, it will facilitate lecturers and students to buy stationery easily and quick. Students and lecturers no need to take long time to get the stationery needed because this vending machine will be placed in area which lecturer office and lecture room. Lecturer and student also able buy stationery at any time because it operates 24 hours a day and stationery will be added from time to time according to consumer demand. Apart from that, with the existence of this product encourage lecturers and students to use the RFID system.



**Figure:** Stationery Vending Machine Using RFID Card

### **Achievements of product**

This product solves the problem faced by lecturers and students to purchase stationery easily and quickly at any time since the product operates 24 hours a day.

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# HONEY SUCTION MACHINE

## Product Description

The aim of this design is to produce bee placement using the novel methods. Bee placement is very important in increasing the quality of honey due to the sensitivity of bees to environmental change. The placement bee colonies should also be produced using appropriate materials especially when the bee colonies are exposed to toxic chemicals that can affect honey production. The bee colony is easily disturbed and threatened during the honey extracting process. The honeycomb is very fragile and it can be easily damaged during honey extraction. It will take a long time for the bee colony to repair the honeycomb. The objective of this study was to design and produce a honey harvesting technique by applying a mild suction method. This study was carried out at the Port Dickson Polytechnic honey bee farm. The machine is very efficient in extracting honey from the honeycomb quickly without damaging the honeycomb itself. Both the suction system including battery and the electric motor are powered by a 12V DC electrical circuit. The honey is then collected in a glass jar through a small plastic tube. The extraction process is fast and does not damage the honeycomb itself.

**Keywords:** honey bee, honeycomb extracting process suctioning system

## Outcome

A honey extraction machine has been designed and the extraction process is fast and does not damage the honeycomb itself.



**Figure:** Honey suction machine powered by 12 DC electric motor

## **Achievements of product**

The machine is able to extract honey fast without damaging the honeycomb

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# KITCHEN TIMER

## Product Description

Kitchen Timer is a project undertaken and it aims to simplify the process of frying. It is suitable for entrepreneur's especially small businesses because it can save time and energy. The kitchen fryer has an electronic system for controlling the set time. This means that users can perform two tasks at the same time. It will give a signal when the set time has expired. The motivation for this project began with an understanding that most cooks and housewives are unable to do other work while cooking. With this Kitchen Timer, users no longer need to wait in the kitchen while cooking. This system is very compact and is suitable in the kitchen. It also can reduce the risk of fire in the kitchen. The frying system operates by controlling the frying net according to the timer based on the cooking option selected.

**Keywords:** small entrepreneur cooking timer, drop and pull up system frying net

## Outcome



**Figure:** Frying machine with electronic cooking oil drainage control system

### **Achievements of product**

1. The fryer can cook various types of food according to a pre-set condition and frying time
2. It easily lifts and dips the food items to be fried using an automatic timer and control.

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# TEACHING AID FOR GEARING SYSTEM

## Product Description

The Teaching Aid for Gearing is a practical approach for student learning experience to understand a complex equipment such as the gearing system. It is difficult to understand the gearing system from images without practical observation of the system. Using this product, students can easily understand the theoretical and practical aspect of the gearing motion mechanism. The gearing system used in this teaching aid is a helix gear combination with various number of gearing tooth. By using this device, a student can easily differentiate the speed of the input and output shaft that is connected to the gear. It is very helpful to students understand the gear mechanism during changes in the speed of shaft.

**Keywords:** teaching aid, helix gear system, output shaft, increasing speed, reducing speed.

## Outcome



**Figure:** Complete system for gearing teaching kit

### **Achievements of product**

1. Students are able to better understand the combination of helix gear.
2. Students can easily observe the turning differences between the input and output of the shaft.

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# REAR POWERTRAIN UNIT SYSTEM (RWD) TRAINING KIT

## Product Description

The “Rear power train unit system (RWD) training kit” is designed for use in teaching and learning RWD. The kit helps teachers to explain to students, the position and function of each component in the system. This project was designed because many students do not know the function and position of the components in RWD. Before the project was implemented, discussions and a detailed review of all aspects was done, especially on the function and working mechanism of various components as well as the cost estimate for the project.

**Keywords:** rear powertrain, training kit

## Outcome



(a)



(b)

**Figure:** Rear powertrain system (RWD)

### **Achievements of product**

1. Students learn to assemble a new rear car axle on the rear drive power transmission of the car.
2. Students can learn the working mechanism of axles the car is in motion.

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7. Muhammad Asri Bin Md Rais

# COOLING SYSTEM LEARNING MODEL

## Product Description

The project "Cooling System Learning Model" is designed to be used for teaching and learning in Automotive Workshop under the Department of Mechanical Engineering. The project designed to assist a lecturer in explaining to the students the position and function of each component in the engine cooling system. Thus, this project helps students create a maintenance or service record on the engine cooling system. Before the project is implemented, discussions and detailed study were carried and a cost estimate was made. The project is implemented in stages starting from the selection of materials, installation of billboards and cleaning materials.

**Keywords:** cooling system

## Outcome



**Figure:** Complete system for cooling system learning model

## Achievements of product

1. Students will learn to assemble the cooling systems.
2. Students can learn to identify problems when a car cooling systems car is not functioning.

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7. 4.Muhammad Syafiq Hakimi Bin Jasmi

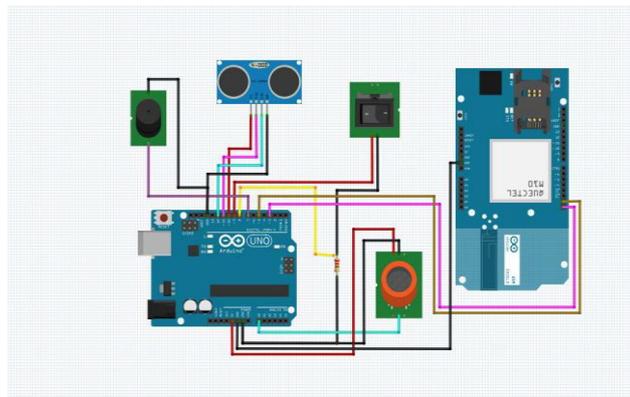
# FUNCTIONAL OPERATION GUARD SYSTEM (FOGS)

## Product Description

The Functional Operation Guard System (FOGS) gives an emergency alert signal to registered users. The motivation for this project came about after an observation that fires often happen unexpectedly. This project is designed to detect fire and send an alert signal to the user. The system consists of various components such as Arduino, G11SM, Ultrasonic sensor, Smoke detector and buzzer. The scope of this project is to detect smoke and motion in houses. Finally, this project can reduce the risk of fire in houses.

**Keywords:** guard system, emergency signal fire signal Arduino

## Outcome



**Figure:** FOGS circuit diagram

## Achievements of product

1. The systems respond quickly even to small amounts of smoke.

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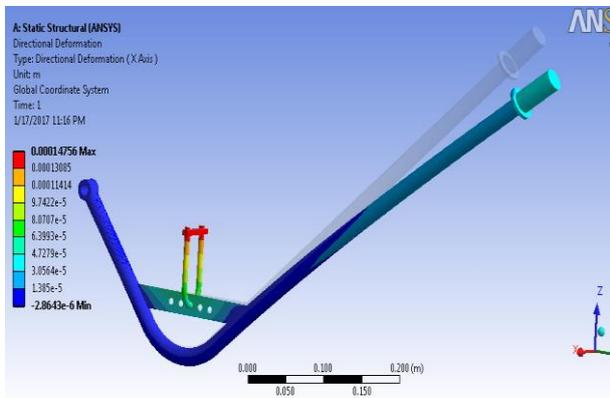
# THE KRAKEN: SPECIAL TOOLS FOR CAR SUSPENSION MAINTENANCE

## Product Description

The suspension system which is a major section in a car and it ensures the stability and comfort during driving on various road conditions. There are two types of car suspension systems available, the Mc Pherson and the Double Wishbone. Both systems are connected with several other components such as the lower arm, sway bar absorber, and knuckle. Each has its own role for proper functioning of suspension system. This project aims to help car mechanics to easily dismantle or reassemble the various components in the suspension system. The tools are developed by applying the pull up lever concept and it is useful to dismantle the lower arm of the car. As a result, this method which uses special the Kraken tool, reduces the time taken during the suspension maintenance process compared to the conventional method.

**Keywords:** suspension system, maintenance assemble and dismantle

## Outcome



**Figure :** Kraken suspension system

### **Achievements of product**

1. Car mechanics can dismantle and reassemble the suspension system quickly during the maintenance process.

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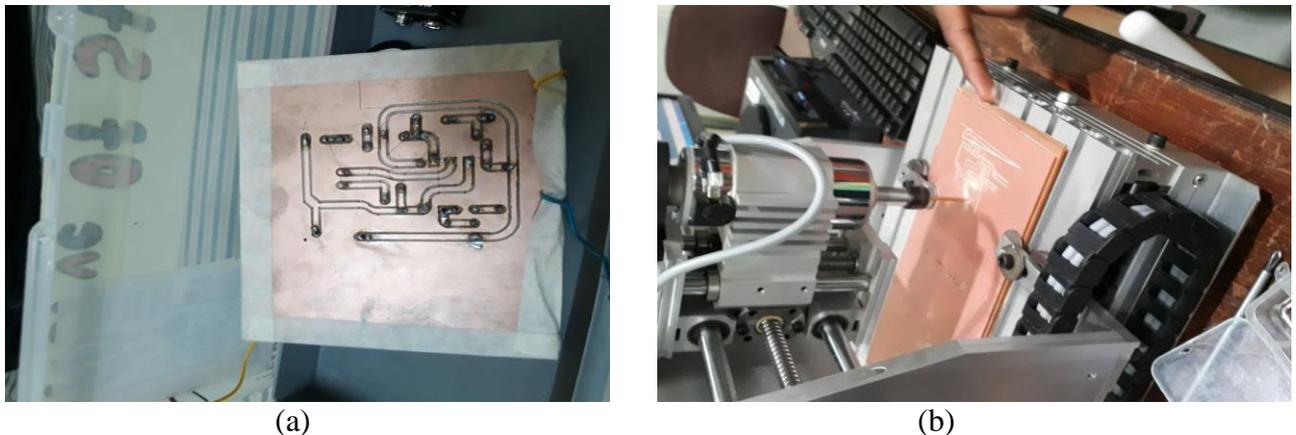
# HANDS ON SOFTWARE USING ENGRAVING MACHINE

## Product Description

Engraving is the process of using creating an engrave or mark on an object. A CNC Milling System is used to drive the movement of the machine head to engraving and cut PCB boards, wood and plastics. The CNC based engraving process gives a clean and precise end-product. This project aims to integrate Mach 3 software to support CNC machines and to integrate the lazycam to engrave a PCB board. Lazycam supports DWF, DXF, DRW, CGM, PLA, PCT, WMF, EMF and GERBER files. Using Eagle software, DXF files are designed to set the depth, set origin, scale, drill and transferred to Lazycam. Using Mach 3 the feed rate, spindle speed, toolbit home position are set for cutting the PCB board. Then CNC milling system is then able to cut the PCB boards with precision and safety.

**Keywords:** CNC milling, PCB board G code Lazycam

## Outcome



**Figure:** Engraving using CNC milling system

## Achievements of product

1. The machine is useful for making a basic electronic circuits in a short time.

## **Owner**

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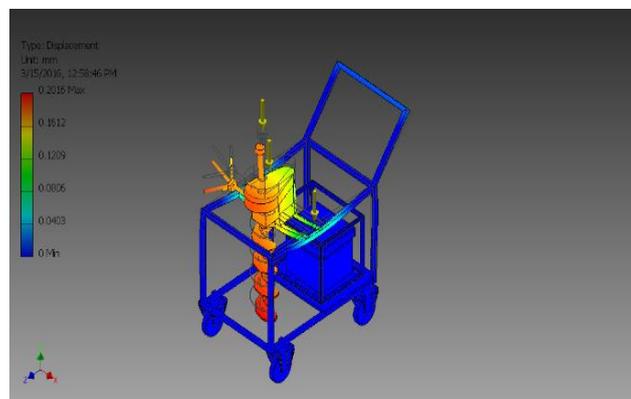
# SOIL DIGGER DRILLING MACHINE

## Product Description

Drill is a tool fitted with a cutting tool attachment, usually a drill bit, used for boring holes in various materials or fastening various materials together with the use of fasteners. The attachment is gripped by a chuck at one end of the drill and rotated while pressed against the target material. The tip, and sometimes edges, of the cutting tool does the work of cutting into the target material. This may be slicing off thin shavings, grinding off small particles, crushing and removing pieces of the work, piece countersinking, counter boring, or other operations. There are various problems faced by small-scale farmers to dig the ground. Accordingly, various machines have been created to solve this problem but, this time machine is designed based on the concept that it's easier and more environmentally friendly. The aim is to ensure that the work becomes more effective and efficient. Materials used for this project is a hollow steel and welding rods for the system framework of this project. Next, the components used were mixed ice machine motor, battery, inverter and tires. This machine is started using the battery source of electrical power. Costing for this project is RM 1728.92. The components that have been used in this project are drill bit, ice crusher machine, generator and hollow steel for chassis. Then, the machine will be connected to the inverter to increase the voltage, power and current. These three elements will be sent to the machine motor and the motor will rotate the drill bit to dig the ground. The design of this project has been built based on studies that have been done on height and diameter polybag, the balance of the machine and the type of tree that you want to plant. In conclusion, this project can be helpful in facilitating the work of digging holes for planting saplings.

**Keywords:** soil digger, cutting tools motor

## Outcome



**Figure:** Soil digger drilling machine

### **Achievements of product**

1. The machine is able to dig a hole in standard size and suitable for nursing the small plants

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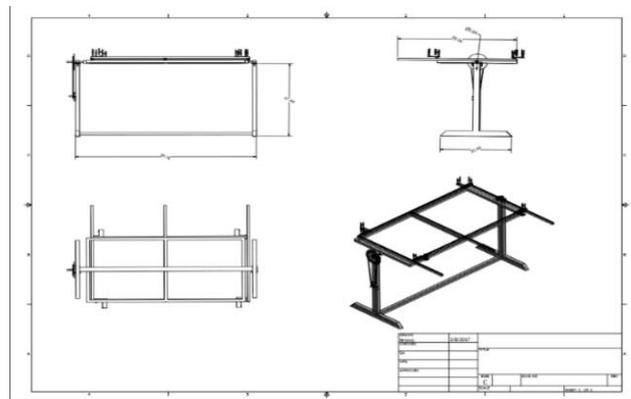
# JIG AND FIXTURE WELDING FRAME

## Product Description

Welding is the process of combining the metals in various positions. For a moderate welder with lack of skills in welding techniques, they will face difficulties to combine the metal for difficult welding position in the short duration of time. So, this study was implemented by developing the Jig and Fixture Welding Frame Clamp especially used in welding various sizes of 90<sup>0</sup> frame shape. The required frame will be attached to the aluminium railing platform according to its length and width dimension. It also comes with an electronic motor with the speed of 10rpm to change the platform incline. The aluminium platform strength was also analysed by using the Autodesk Inventor Professional 2012 to observe the part when it is working with the load of the metal frame. Unfortunately, the result showed that, this platform is not able to hold a heavy frame and it needs to be made from bigger size of metal shape dimension.

**Keywords:** Autodesk Inventor, Jig

## Outcome



**Figure :** Jig welding machine

## Achievements of product

Able to guide the beginner welders to weld a precise and mild square shape steel easily.

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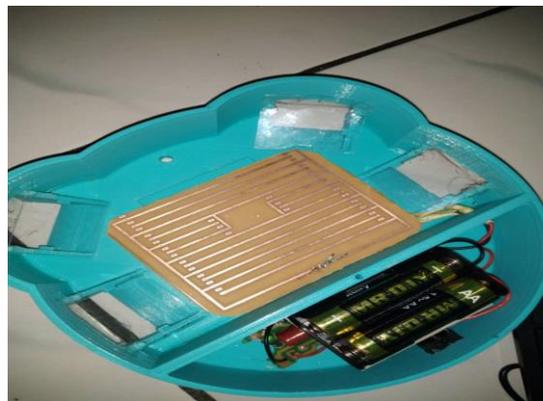
# PORTABLE LIZARD TRAP

## Product Description

Lizard is one of the pests that needs to be control especially from lizard dung. It can spread a harmful bacteria and create bad environmental view. To realize an effective way of controlling the number of lizards in certain areas, this study was carried out by creating a smart and hygienic lizard trap. The Portable Lizard Trap is an invention to kill the lizards and other small pest like cockroach by using a 12v battery powered voltage swatter similar to fly swatter. The killing area were also modified by creating the printed circuit board (PCB) that provided the bate feeding area in the middle of the board. For the trap casing material, the 3D printed plastic was used and the trap design was created by using the Autocad Inventor considering the overall trap casing dimension especially the size of trap door and PCB mounting. The result showed that, Portable Lizard Trap were so effective in killing the various sizes of lizards in a short period of time and easy to remove it from the trap by opening the top case and flip bottom case until the lizard's carcass fall off.

**Keywords:** lizard trap, PCB swatter, plastic casing

## Outcome



**Figure:** Complete system for portable lizard trap

## Achievements of product

Able to catch more lizards effectively using the trap and easy removal of the carcass from the trap.

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6. Syawal Shazwan Bin Muhammad Khairi
7. Wan Muhamad Adip Bin Wan Mat Yunus
8. Surendar s/o Muthusamy

# UPGRADING THE CONTROLLING SYSTEM FOR FORMULA STUDENT CAR

## Product Description

The purpose of this project is to upgrade the controlling system of the formula student car which is suitable for high speed driving in a racing competition. In this project, we have upgraded the 3 basic components for controlling system which are braking, alignment and powertrain. Base on the previous project, there were several problems occurred and one of the major problems was the braking performance while making a sudden stop. Besides that, the unbalanced turning condition of the steering system, makes the car difficult to turn firmly. The driveshaft will always break during the high speed driving due to weak fabrication on the customized driveshaft. The upgrading proses started with simplifying the complex braking line system to simple setup base on four output master pump. Each brake line output will control each braking piston calliper. The steering system was also upgraded by using a single turn steering rack for quick response of turning action to two turn steering rack. The weakness of the driveshaft was also solved by fixing a cylindrical slotting between wheel and sprocket connected shaft before it was welded. As a result, the formula car generated an excellent driving experience in a high speed condition and turning during cornering action.

**Keywords:** break system alignment system, powertrain driveshaft

## Outcome



**Figure:** Complete system for formula student car

### **Achievements of product.**

No failure occurred on the drivetrain system during the high speed driving.

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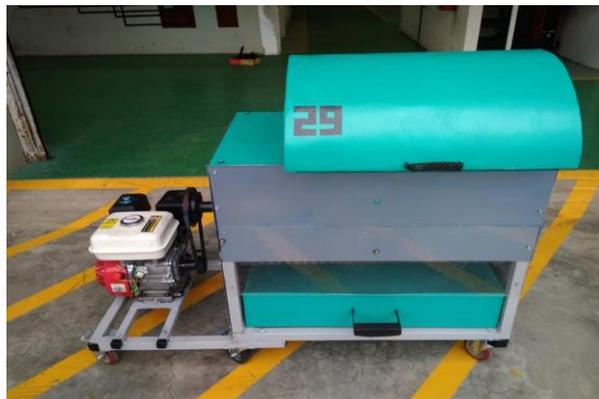
# COCONUT HUSK SHREDDING MACHINE

## Product Description

Coconut coir and peat are very useful as soil replacement alternative in planting. The problem that are frequently faced by the farmers is to get this two form of coconut husk in a mass volume or quantity. It is also hard to get the coconut coir and peat by using a knife. The objective of this project is to come up with a machine that can be used to extract the coconut coir and peat together as well as faster compared to conventional method. This machine will be started by using 5hp OHV motors to rotate the blade using the V belt systems. While the machine operates, both form of coconut husk (the coir and peat) will be extracted from the husk by rolling them on the rotating blade and the peat will drop on the container. The machine is very useful to the farmer in increasing the volume of their planting during the nursing process.

**Keywords:** shredded machine, coconut peat, coconut coir

## Outcome



**Figure:** Coconut husk shredding machine

## Achievements of product

1. The machine is able to produce two type of shredded coconut husk in single time.

## Owner

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# CASSAVA FLOOR TILE (PARQUET)

## Product Description

This study is about creating an innovative product using cassava waste and cocopeat to produce floor parquet. The objective of the study is to establish an innovative way of doing floor parquet using cassava waste and cocopeat as well as to study tiles in terms of water absorption and fire resistant. The mixed ratio of bagasse cassava trunk and cocopeat with resin is 2:1, 4:3, 5:3 and 1:1 in two size of tiles samples in 75mm x 30mm x 8mm and 150mm x 150mm x 8mm. The production process of the floor tile took place at Politeknik Port Dickson. The fire resistant test and water absorption test data was analyzed to identify the mechanical properties of the floor tile in this study. Based on the test, the result shows that water absorption percentage is the highest for the ratio 4:3. The sample does not absorb and exceed the European standard specification. For fire resistance tests with high temperatures and fairly rugged fire, the ratio at 4:3 already reached the standard.

**Keywords:** Cassava waste, cocopeat, parquet floor tiles, water absorption, fire resistant

## Outcome

High strength of water absorptions and fire resistance parquet floor tiles.



**Figure:** Cassava floor tile

## **Achievements of product**

Table 1: Testing of Water Absorption

Ratio	Weight before (g)	Weight after (g)	Absorption rate	Standard	Remarks
4:3	29	31	6.90%	< 9	Exceed

Table 2: Testing of Fire Resistant

Ratio	Start fire	End fire	Standard	Fire resistance rate (%)	Remarks
4:3	41s	5min 61s	>8	12min	Exceed

## **Owner**

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# THE UTILIZATION OF SUGARCANE BAGASSE IN DRY WALL AS SOUND ABSORPTION

## Product Description

This research focuses on identifying the potential of manufacturing products using the sugarcane waste. The objectives of the study is to review the effectiveness of sugarcane waste as an alternative sound insulation material due to their lightweight and suitable sponges applied in the manufacture products. The process was carried out by mixing the dried sugarcane with polymer, compact and wrap up the sugarcane bagasse using net before placing in sample of gypsum board and wood frame. Data of sound absorption was recorded using the digital sound level. The results showed that the product was able to increase the value of the sound absorber panel.

**Keywords:** Sugarcane bagasse, sound insulation, lightweight, sound absorption

## Outcome

Used sugarcane waste to fine fibre will mark the panel more effectively in absorbing the sound.



**Figure:** Dry wall

### **Achievements of product**

The criteria of dried sugarcane bagasse that is light and spongy are able to absorb sound or noise and appropriate as an alternative material in producing the alternative sound insulation of product materials.

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# COCONUT FIBRE IN CONCRETE ROOF TILES

## Product Description

The main aim of this project is to use the coconut fibre as additional substances in designing the roof tiles to produce good cementitious. The objective is to study the strength of using the coconut fibre in roof tiles and to obtain the value of the water absorption. The coconut fibre has various type of benefits which is durable, strong and can support the strength of the load. The mixed coconut fibre as additive were used in different percentage. For sample A is 0.5% and sample B is 1%. Using variety of loads, from 10N to 100N to test the bending strength and soak coconut fibre in curing tank for 24 hours to test the water absorption abilities. The finding shows that the use of coconut fibre in concrete roof tiles will increase the roof tiles' bending strength.

**Keywords:** Coconut fibre, roof tiles, bending strength, water absorption

## Outcome

The sample of roof tiles was weighed before and after soaked in the curing tank.



**Figure:** Finished concrete roof using coconut fibre

### **Achievements of product**

1. **Bending strength test:** The data shows that the average of coconut fibre used in concrete roof tile for sample A is 695N and for sample B is 800N, this shows that the samples are stronger compared to the standard roof tiles.
2. **Water absorption test:** The data shows the percentage of water absorption for 50g and 100g of coconut fibre which showed a low permeability percentage while sample B showed a high permeability percentage but both of the samples still not more than 10% of water absorption.

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# TRI-UNIQUE SAND TRAP

## Product Description

Sand trap is a kind of tool to trap the sand from being thrown into the drainage system. This trap can help to solve the problem of sand wastage. The materials used to make this sand trap are steel plate, hinges, and nets. These materials are attached using a welding method where we use, used materials from scrap metal stores. Spray paint is used as the finishes of this product. The safety feature we are practicing in this product design is the drain cover that can prevent a person from being injured. Subsequently, low workability can reduce the stiffness of the body and spinal muscles. These sand traps are usually placed in the drainage gutters near the brick workshop.

**Keywords:** Sand trap, Drainage system, Drainage gutters, Brick workshop

## Outcome

This product would be able to curb the sand wastage in a more effective and practical way.



(a)



(b)



(c)

**Figure:** Design process for sand trap

### **Achievements of product**

From the test, we found out that our product is able to trap 97% of the sand which is higher than the existing product which have only 5% of sand trapped in it.

### **Owner**

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# ROAD DIVIDER ENHANCER

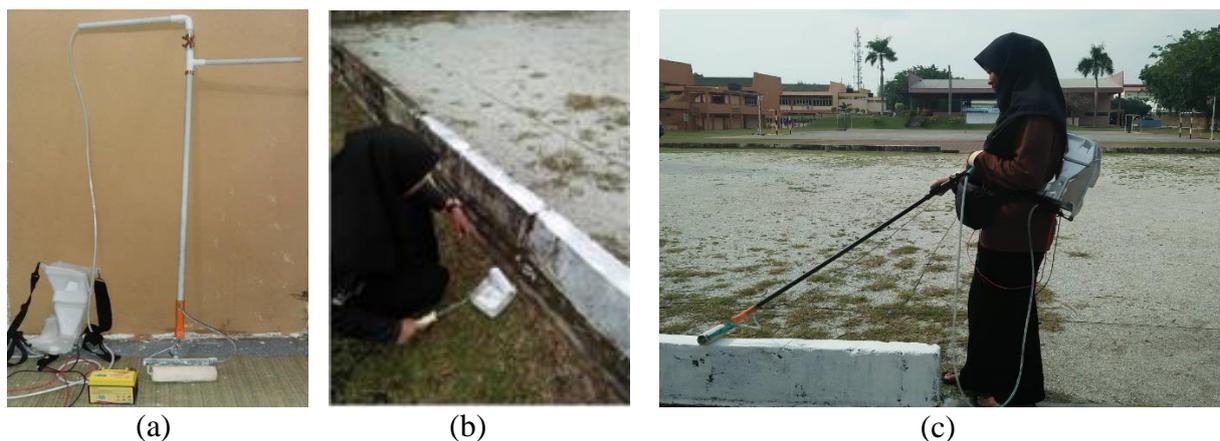
## Product Description

The advancement of technology has been on the rise in this current era. This includes the painting process. The innovation in painting products is one of the issues being debated frequently, especially the road divider painting. Good painting work done on a Road Divider makes it easier for safe driving for the road users like us. Therefore, it is very important to have some innovation on painting the road dividers. But, the paint is fading away very fast nowadays. Normally, the worker will paint it with roller and roller tray which will take a long time. Because of that, we decided to come up with this product that can give many advantages to painters or workers. The benefit of this product is that it is very easy to use. Other than that, it also more ergonomic than using a conventional way. It can reduce backache while painting the dividers. Furthermore, it also can save the time taken to paint the divider. If using the roller and roller tray which is a conventional way, it will take more time to finish the painting. But if we use this product, we can save time.

**Keywords:** Road divider, Road painting, Ergonomic road equipment

## Outcome

Road Divider Enhancer is a perfect creation that takes agronomical factors into consideration and helps to obtain great results within a short span of time.



**Figure:** (a) Road divider enhancer complete device, (b) before using road divider enhancer, and (c) after using road divider enhancer

### **Achievements of product**

1. Reduces the time taken in painting the divider.
2. Reduces manpower and increases efficiency.
3. Reduces workload.

### **Owner**

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3. Nur Iffah Binti Abdul Rahim
4. Nur Fhaizah Binti Che Shap

# BEIJING GRASS CANDY

## Product Description

For this project, we have chosen to design a vegetable-based marketing plan from Beijing Grass which is also known as peking grass, Chinese grass or angel grass. Its scientific name is *Loriformis Murdannia*. The Beijing grass was used by the Ancient Chinese as a healing herb, more than 1,000 years ago. They have been using Beijing grass for the purpose of longevity, to stabilize the body as well as to build and activate new cells. Beijing grass is also used to treat patients suffering from liver cancer, stomach cancer, colon cancer, leukemia, and others. Beijing grass is an excellent natural remedy for cancer and diabetes and it is safe and effective to use. Beijing Grass from the Medical Corner Recent studies has found that Beijing grass can treat several diseases.

Candy production aims to help not only for eczema patients but also disease such as improve body immune system, cleans the kidneys, reduces pain due to chemotherapy and relief fever and ulcer pain, clears lymphatic system of waste. Not only that, it is also an alternative treatment for cancer.

The main ingredient of our product is Beijing Grass which comes from natural plant. Beijing Grass herbs are known to have various nutritious values. Our products guarantee that consumers' health will always be in good health. This product will be an alternative treatment to consumers.

**Keywords:** Beijing grass, *loriformis murdannia*, eczema, lymphatic system

## Outcome



(a)



(b)

**Figure:** (a) Beijing Grass candy baking, and (b) Baked Beijing grass candy

### **Achievements of product**

Beijing grass is proven by Medical Corner Recent studies as natural remedy for diabetes and several other diseases.

### **Owner**

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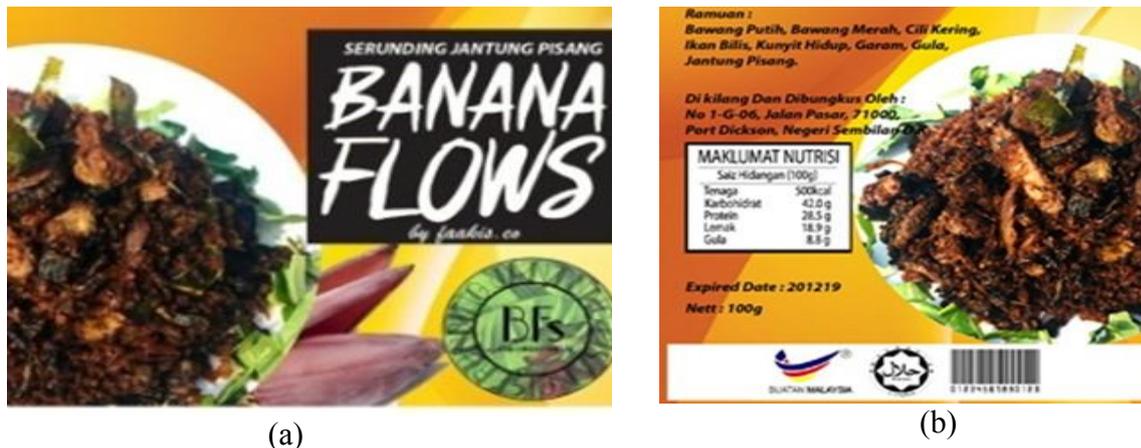
# BANANAFLOWS

## Product Description

*Serunding* have many varieties nowadays and we can add another new type of *serunding* in the market. Furthermore, this *serunding* is a new innovation that cannot be found in the market. Normally, *serunding* is made of beef or chicken and the reason that bananaflows is invented as a substitute of beef or chicken *serunding* because it has the same taste and texture. This *serunding* is made of heart of banana and it has a lot of benefits and it is famous as one of Malay cuisines.

**Keywords:** banana flows, substitute, *serunding*

## Outcome



**Figure:** Packaging for banana flows

## Achievements of product

Instant food product and for vegan and vegetarian market.

## Owner

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# THE GARDENING COWPOT

## Product Description

This product's name is cowpot and it is a biodegradable, eco-friendly and plant-able pots. This product is used to seed a plant before transferring it to the permanent pots. The reasons of this innovation is to create substitute pot that has eco-friendly function. These pots can withstand several months in the greenhouse and will be dissolved within 4 weeks and can be as fertiliser for small plants. Other function is to help farmers reduce the nutrient load on their farms which directly contributed to a better and cleaner environment. From this study, we found that cowpot is not only biodegradable, plant-able replacement for plastic pot but have additional benefits as well

**Keywords:** cow pot, biodegradable, plant-able, eco-friendly

## Outcome



**Figure:** Cowpot

## Achievements of product

Eco-friendly, biodegradable and plant-able replacement for plastic pot.

## Owner

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# SALAK FRUIT SKIN BAG

## Product Description

As we know “buah salak” is well known as a good source of nutrients, vitamins and minerals and some individuals use the fruit to make juice and so forth. The salak skin has a lot of benefits too. In this study, the salak skin is used to make a bag. By using this salak skin, it is possible to reduce pollution emissions generated by incinerators during the process of waste disposal. At the moment, there are no products or inventions that uses salak skin so far in Malaysia. The objective of this study is to produce an innovative product which uses this salak skin like bags and et cetera. Moreover, this also helps to maintain the preservation of nature. The result of this study, indicated that the use of salak skin is one of the best strategies to support the 3R campaign as it preserves the mother nature.

**Keywords:** buah salak, salak skin, waste disposal, preservation of nature, marketable product

## Outcome

The reusable and recycle of salak skin to make a trending bag.

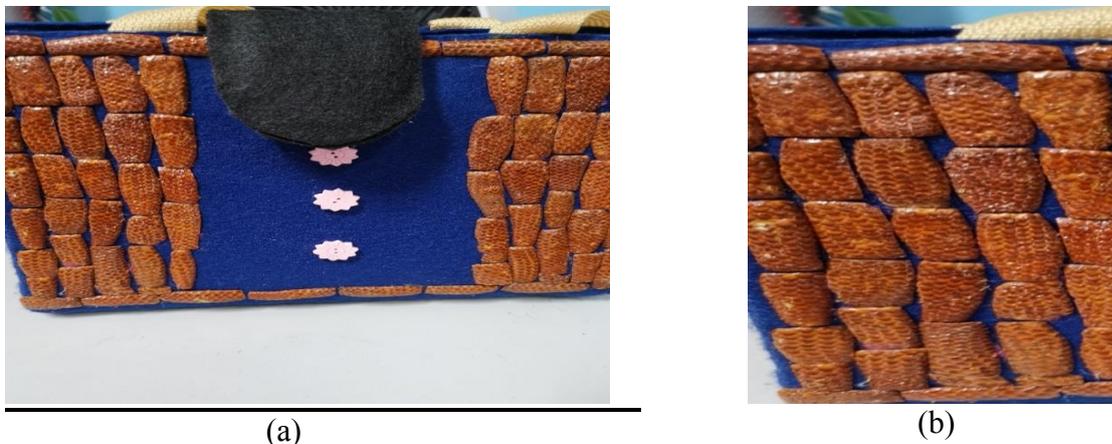


Figure : Salak skin bag

## Achievements of product

Reusable and recycle of salak skin fruit will decrease the pollution problems.

## Owner

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