POLITEKNIK BANTING SELANGOR

ROBOTIC ARM

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JABATAN KEJURUTERAAN MEKANIKAL

SESI 1 2022/2023

POLITEKNIK BANTING SELANGOR RESEARCH OF ROBOTIC ARM

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This report was submitted to the Mechanical Engineering Department as part of the requirements for the award of the Mechanical Engineering Diploma

JABATAN KEJURUTERAAN MEKANIKAL

SESI 1 2022/2023
STATEMENT OF AUTHENTICITY AND PROPRIETARY RIGHTS

RESEARCH OF ROBOTIC ARM

1. **We, MOHAMED FAKHRUSYI SHAKIRIN BIN MOHAMED FADLI (NO IC : 020614030107) ,MUHAMMAD HAZIM BIN HAZLI (NO IC :021113010145) , MUHAMMAD HAZIM BIN ZULHAIMI (NO IC : 020605101401) , MOHAMAD DANIAL BIN MOHAMAD TARMIZI (NO IC :021004080291) is a Mechanical Engineering Diploma student, Polytechnic Banting Selangor, whose address is Persiaran Ilmu , Jalan Abdul Samad 42700 Banting, Selangor. (Hereinafter referred to as 'the Polytechnic')**

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KAJIAN REKABENTUK ROBOTIC ARM

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2. **Saya mengaku bahawa ‘ Projek tersebut di atas’ dan harta intelek yang ada di dalmnaya adalah hasil karya/ reka cipta asli saya sendiritanpa mengambil atau meniru mana-mana harta intelek daripada pihak-pihak lain.**

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Diperbuat dengan sebenar-benarnya diakui oleh yang tersebut

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BIN MOHAMED FADZLI) ……

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AKUAN KEASLIAN DAN HAK MILIK

KAJIAN REKABENTUK ROBOTIC ARM

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AKUAN KEASLIAN DAN HAK MILIK

KAJIAN REKABENTUK ROBOTIC ARM

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AKUAN KEASLIAN DAN HAK MILIK

KAJIAN REKABENTUK ROBOTIC ARM

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MOHAMAD DANIAL BIN MOHAMAD TARMIZI)……..

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ACKNOWLEDGEMENT

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Last but not least, we hope that the work we do will increase our knowledge base and make us more cooperative and responsible .

Thank You .

ABSTRACT

The development of the robot arm is a mechanical concept product specially designed to help today's modern industrial workers, since the use of modern machines and equipment in manufacturing technology is very large and increasing day by day and today's industrial workers are facing the problem of labor shortage. All these tools and machines share one important thing for industrial workers; need energy saving time, therefore this product is designed to overcome that problem. There are some problems we want to solve. First, industrial workers work using their human power. Industrial workers should work quickly and without wasting time so that they reach the (KPI) of the company where they work. Next, can save manpower and can reduce the recruitment of new employees. For the first time this mechanical product is made based on some elements that are commonly used in all kinds of industries around the world, such as using Servo motor , Arduino system, Inventor software mechanical design and fabricated into a Robotic Arm prototype

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Today as we can see the era of our life has developed in many basic industries such as industrial growth in technology, construction and so on. Through these changes it cannot be denied that the world moves with adaptation to the use of technology. When we see our daily tasks in life. As technology increases, people also normalize themselves and face this technology. Although technology increases most people take care of nature and use this advantage to make things easier. It has a positive effect on farmers to develop farms or repair them according to the facilities available today.

In 2020, the world has been shaken by a dangerous epidemic that claims to have claimed millions of lives in the world. The Corona virus has been spreading for several years and has had a bad effect on all countries including Malaysia. The economic status of Malaysia has dropped dramatically and has had a bad effect on all residents who have families. Many people lost their jobs and many were depressed and forced to commit suicide.

With this situation we have got the idea to make a robotic arm machine to save human labor, which is efficiently used. This can be used for industrial workers who have a lot of mechanical work. We created this machine for industrial workers to save costs. We will renew this machine in terms of the materials used and the power supply that does not use a lot of electricity.

1.2 PROBLEM STATEMENT

Based on observations and research results, we have identified several problems faced by local industrial workers today. First, they work not using mechanical concepts. Many modern industrial workers who prefer to carry out their work using their own labor only tire industrial workers and take time and do not adopt mechanical methods in their easier and more effective way of life. The use of manual labor will only harm the industrial workers because the labor is very limited in daily use. In addition, the use of electricity nowadays that is more convenient for users such as robotic arm machines requires electricity to generate it.

Next, this product is very effective for the whole community especially in the mechanical field in addition to industrial workers during the Covid-19 pandemic because we can innovate something new and save all costs.

Finally, it can help industrial workers save on costs that need to be incurred. It can also provide many advantages in terms of economy. For example, it can boost Malaysia's economy which is declining due to Covid-19.

1.3 OBJECTIVE

Based on the problem statement, we came up with some objectives for this project. First, to lift, hold and place objects, especially hot and dangerous objects. The use of robotic arms also being a lesson in the mechanical subject among the applied mechanical sources are electricity and design

Finally, One of the main advantages of industrial robot arms is their flexibility to support a variety of applications from the simplest to the most complex jobs in the safest or harshest environments. Automating these types of tasks not only removes human workers from potentially dangerous situations, but it allows those workers to take on high-value tasks.

1.4 SCOPE OF PROJECT

Given the concern about the scope of work, while undertaking this project, it must be done properly. Here is the scope of work. . First, our products can only be used in small places, for example in a small room or factory. Next, our products can only lift or take smaller items. Lastly, The workplace distance of our robotic arm is very limited depending on the size of the joint and clamp. So will produce products that do not require a lot of electricity

1.5 SUMMARY

In the summary of our project, we will identify the advantages and disadvantages of existing robots to make our project, the robotic arm, a success. next, we will find the right materials and components to produce our project. In addition, we will add used goods and additional components. that being said, we will also discuss article reviews for each component that we have used in our project

1.6 INNOVATION

The difference between our robotic arm and usual arms on the market is that we first use a mixture of recycled materials and commomly found / new materials For example, among the recycled material is steel that has rusted, but we repair and use it again for body part of our project The price of our product is lower that the price of the robotic arm in the market, but it has comparable quality and even better that some other robotic product. We add accessories such as lights to make the work easier.

1.8 DEFINITIONS OF TERMS/OPERATIONAL DEFINITIONS

1.8.1 DEFINITIONS OF TERMS

A robot arm is a particular kind of robot with pieces fixed on a stand and connected in the same way as human arms. The robot arm, which is often constructed from a number of metal components, is the most prevalent manufacturing robot.

1.8.2 OPERATIONAL DEFINITIONS

in this operation, we use the PNP concept which is pick and place. A pick and place machine (PNP) is a robotic assembly device that uses a vacuum to lift components from a piece of tape, rotate them to the correct orientation, then place them on the circuit board.. But for this project, we recommend using the Arduino Uno software. Arduino UNO is categorized as a microcontroller that uses ATmega328 as the controller inside. The Arduino UNO board is used for electronic projects and is mostly preferred by beginners. This robot arm is also the same as the SCARA robot but the robot arm is more flexible and can be controlled well. Next, we also use other components such as PCA9685, it works as a used application where a large number of servo motors are used such as robot arms, hexapods and robots. in addition, HC-05 is also used for transparent wireless serial communication. It is preconfigured as a Bluetooth device. Once it is paired with a parent Bluetooth device such as a PC, smartphone and tablet, its operation becomes transparent to the user. and also a buck converter, works to convert DC voltage to a lower DC voltage of the same polarity. .PNP operations are divided into several stages:

1 The gripper was moved by a robot into the pickup position.

2 Gripper pick-up procedure

3 Robotic motion to position the gripper for placement

4 The placing process of the gripper

1.9 SUMMARY

Robotic arms, so named because they resemble human arms, are usually attached to a base. The arm has several joints that act as axes and allow for some movement. The more rotary joints a robotic arm has, the more freedom of movement it has.

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CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This literature review is necessary to support our study and research. It must do so to strengthen research. The standards they use to create prototype are also taken into account in previous research. We can take the final decisions and improvements they make to ensure the project runs smoothly. This helps them decide whether to use the right standard at that time. This literature review describes related past research and projects. A development that uses a system very similar to this project.

2.2 PREVIOUS RESEARCH

2.2.1 CONTROL FOR PICK AND PLACE TASKS

The robotic arm must understand the commands given by the controller. From the previous article, to complete pick and place tasks efficiently using non-invasive BCI has yet to be shown. In this study we found that by combining two sequential low dimensional control, a group of 13 man subjects could voluntarily change their brain activity to precisely control a robotic arm for tasks require multiple degrees of freedom. After only a few training sessions, subjects were able to successfully control the robotic arm reaching by alter their brain rhythms and they were able to keep this control over several month. (Meng et al., 2016)

2.2.2 MOVEMENT

The movement of the robot arm must move as desired so that the objective can be achieved. To the previous article, the goal of the robotic arm is to learn new motor tasks through physical interactions. The majority of monolithic machine learning approaches, however, do not scale when learning more complex skills. Methods that are specific to the field of skill learning are required for more complex skills. In this paper, we present a new framework that enables a robot to learn cooperative table tennis from physical interaction with humans the task of learning table tennis as an example. (Mülling et al., 2013)

2.2.3 MODEL

The model for the robotic arm should be light to move and durable. From the previous article, both the dynamic interaction with a dense medium and the coupled tendon condition is thoroughly investigated in the model. The model was validated experimentally with th satisfactory result using a soft robot arm work prototype inspired by the octopus arm and capable

of multi bending. The octopus most distinctive movement were validated experimental bending, reaching and fetching. The current model can be used as a dynamic simulation platform and to design the control strategy of a continuum robot arm moving in a dense medium during the design phase. (Renda et al., 2014)

2.2.4 INTERFERENCE EFFECT OF MOVEMENT

Robotic arm movement is likely to have problems such as interference effects, this problem needs to be overcome. From the previous article, we test the hypothesis that observed action should interfere with incongruous executed actions due to the overlap between action observation and execution. Subjects moved their arms while watching a robot or another man move their arms in the same or qualitatively different ways. Variation in the executed movement was used to calculate interference to the movement. (Kilner et al., 2003)

2.2.5 PLATFORM

The platform for the robotic arm should follow the parameters that suit the robotic arm. From the previous article, due to environmental and instrumental error, calibration of microelectromechanical is required to obtain a reliable measurement. Positioning systems are widely used in the calibration and testing of inertial sensors. Robotic arm provide fast and accurate sensor positioning, but some factors should be considered, such as cost, portability, construction feature, and kinematics. (Botero-Valencia et al., 2017)

2.3 SUMMARY

Engineering's field of robotics deals with the creation, design, production, and use of robots. The goal of the area of robotics is to develop smart machines that can help people in a number of ways. There are many different types of robotics.

2.4 REFERENCE

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CHAPTER 3 : METHODOLOGY/ DESIGN

3.1 INTRODUCTION

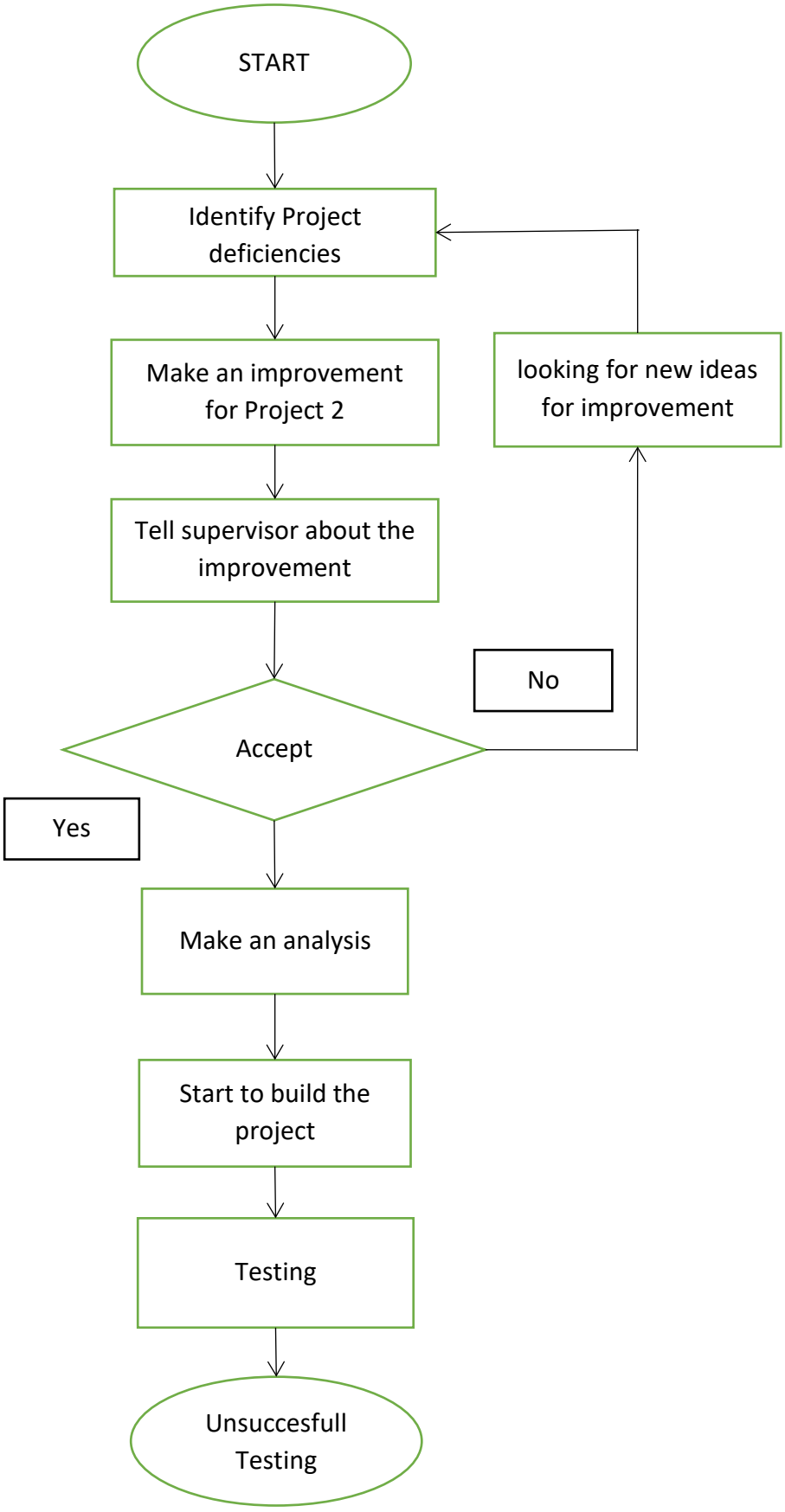
Based on the fourth phase council dictionary, methodology is a system that includes methods and principles in an activity or discipline. Methodology is also a systematic and theoretical method of analysis that is always used in the field of study, especially students. This methodology is different from the method where it uses the theoretical basis to obtain the method. With this, the method or process used to implement a project accurately is known as methodology. So this method must be taken by students to help facilitate the work so that the project they want to do can be implemented successfully. Before a project can be completed, there are various methods that must be done by the student to make it easier in the production to make the project of high quality, therefore this method must be followed and done carefully. There are many stages involved in producing this project. Ideas and concepts developed with the aim of solving the issues that have been considered. The selection of materials and appropriate materials for the components of the product has indicated that the project production process has already begun. In addition, this method is the key for a job to run smoothly, because the methodology helps to understand more broadly to understand the problems that can be avoided before starting a project. Among the methodological methods is to go to the library to add more knowledge about the project you want to do, the results of this method will greatly benefit students. In addition, the method of analyzing data is also an important method to help students solve the problem. With the method of analyzing data, students can see important data to complete the project more easily, because with this it will have a big impact on students. Each study conducted has its own research methodology according to the type of study conducted.

3.2 GANTT CHART

DESCRIPTION	WEEK 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Research Studied - Problem statement - Objective - Scope of project														
Development and Test - Prepare the project equipment - Check the perform of the project														
Project completion - Achieve the planned objective - Make improvement - Inventor drawing														
Report - Finish Chapter 1,2,3,and 4 - Report checked by supervisor														
Presentation and submission -Final project presenttion														
-Submission of final project														

	Planning
	Actual

3.3 FLOW CHART

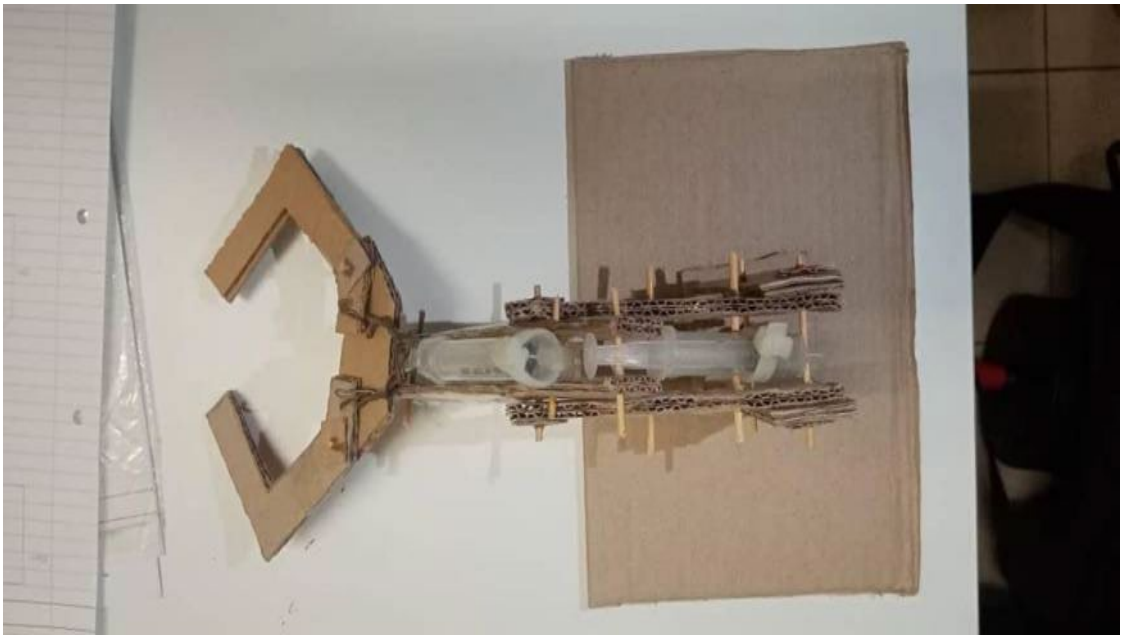


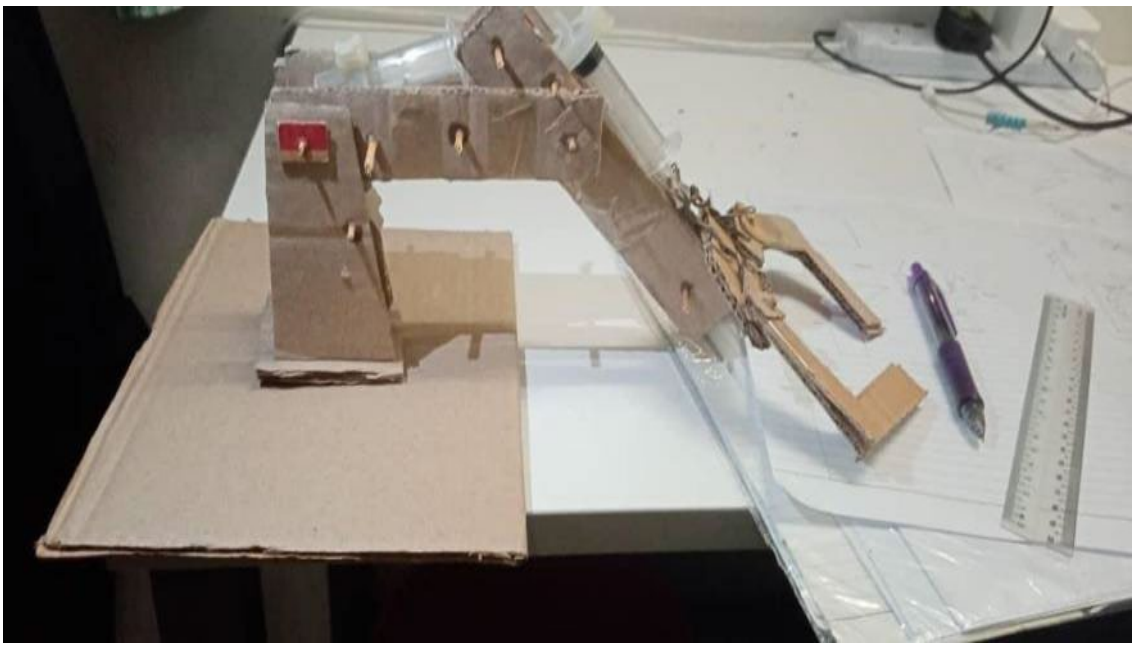
3.4 PROJECT DESIGN

TYPE OF TOOLS USING IN PROJECT

1. **SCREWDRIVER**
2. **PLIERS**
3. **VERNIER CALLIPER**

3.5.1 MODEL/SAMPLE:





3.5 PROJECT PART DESIGN

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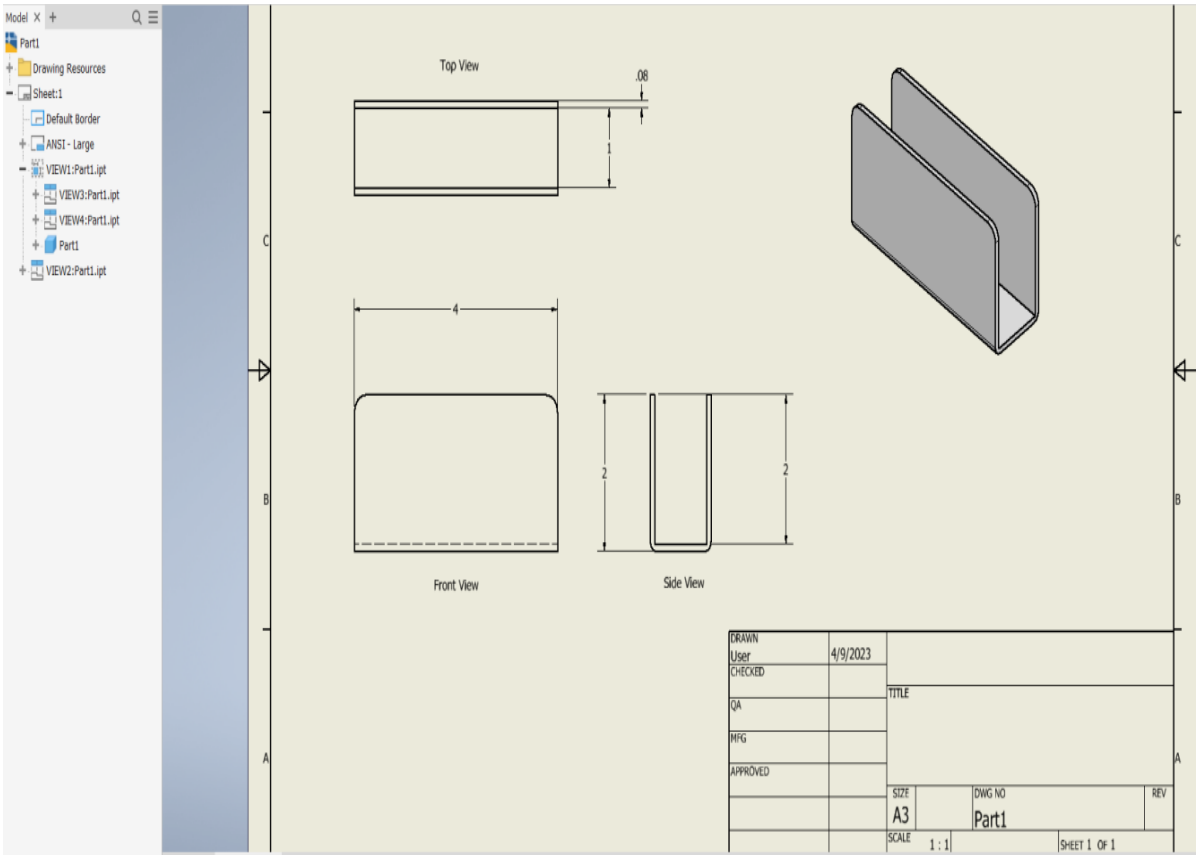

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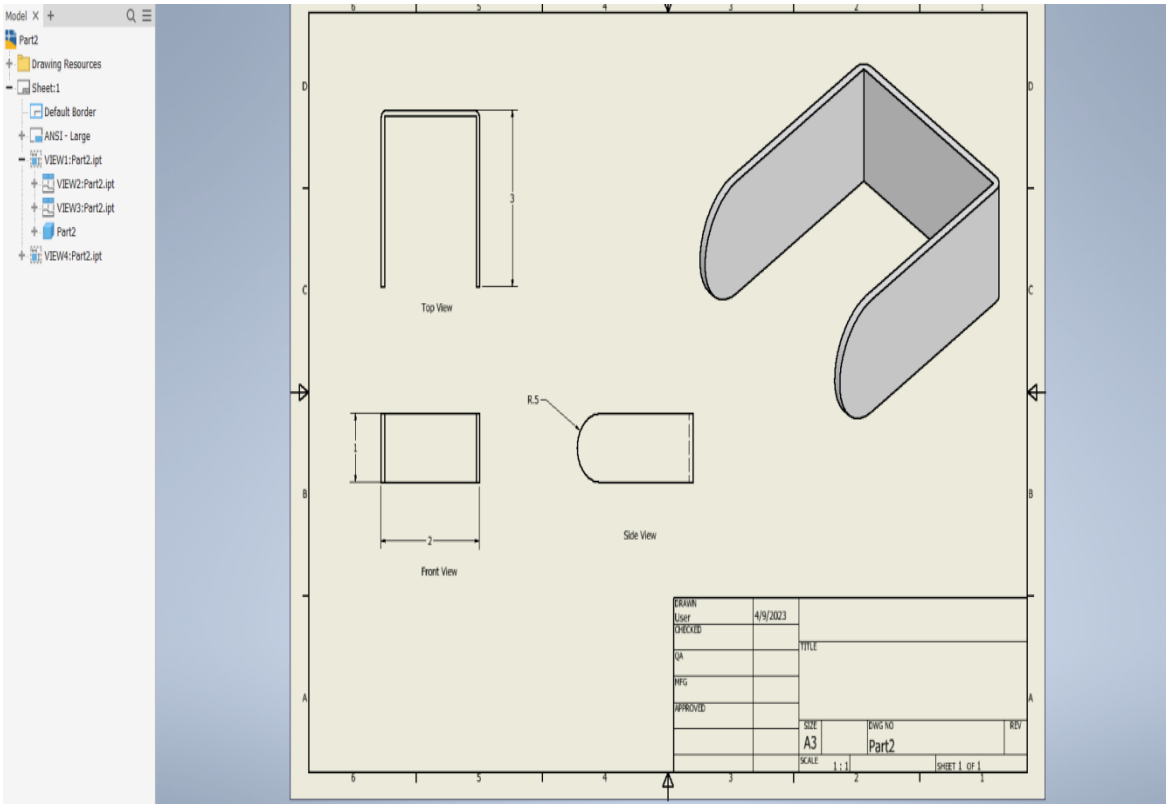
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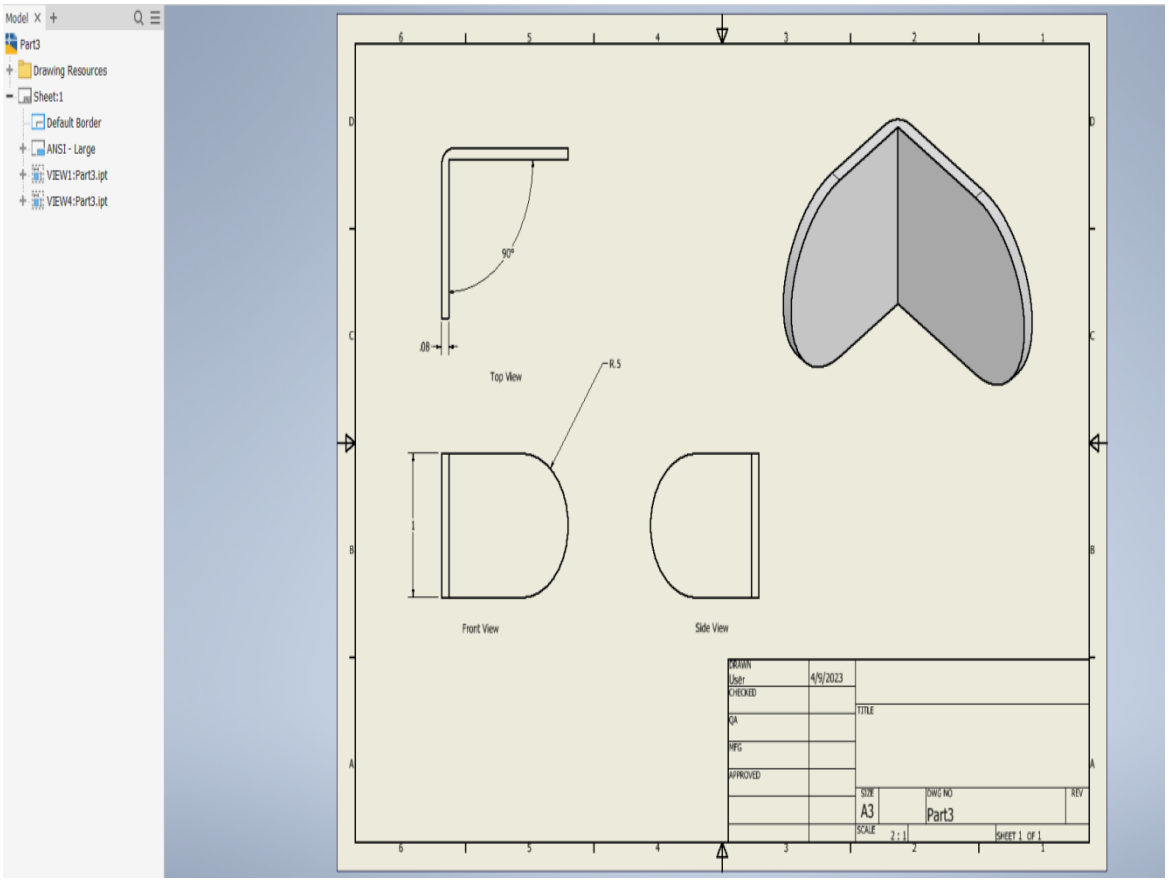
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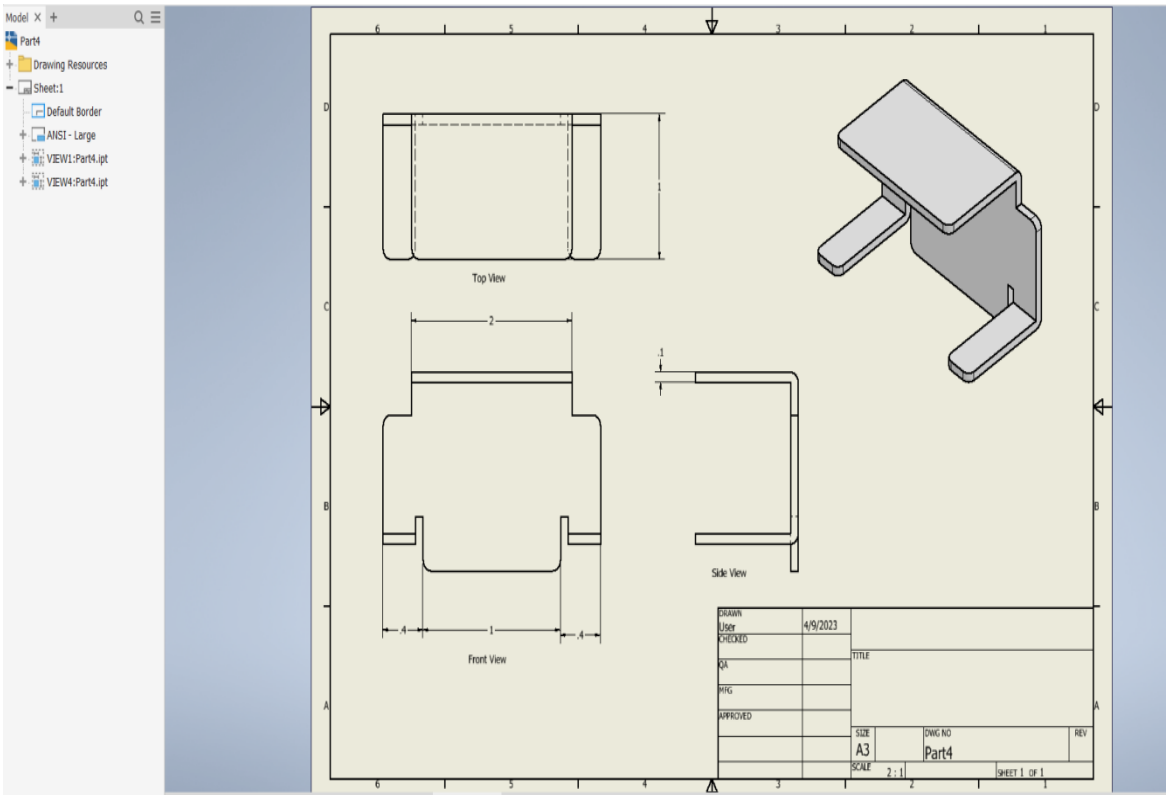
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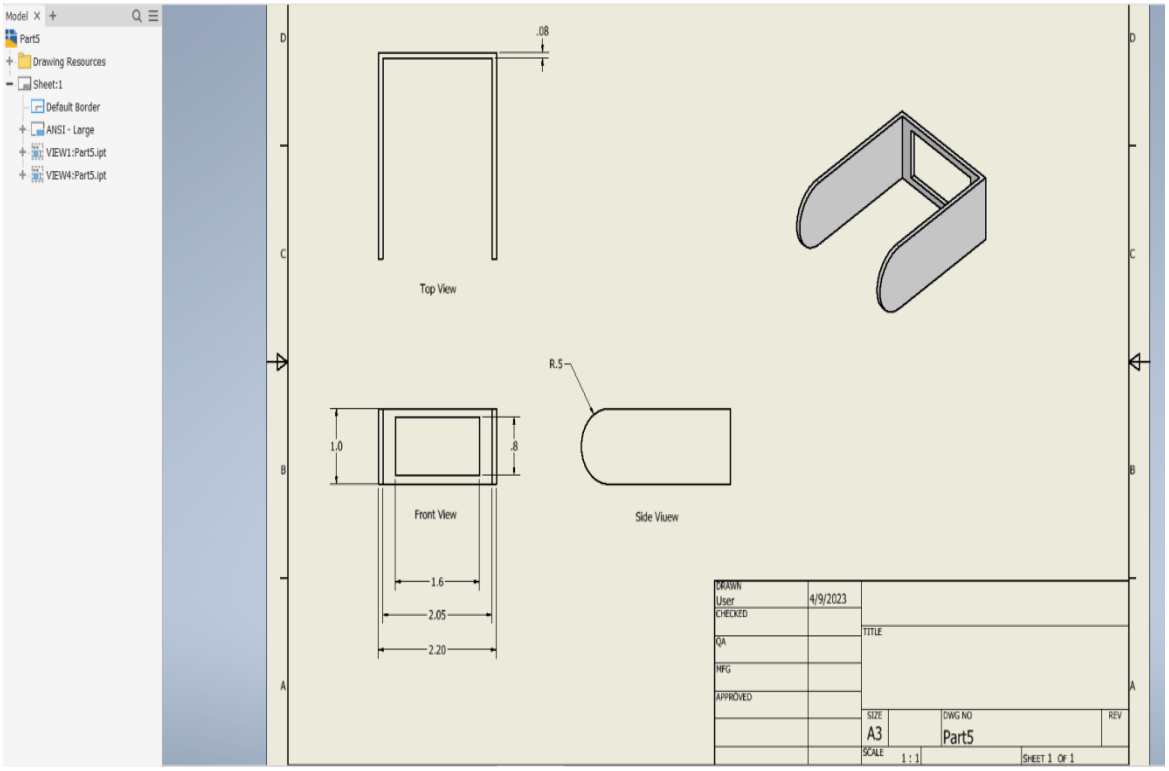
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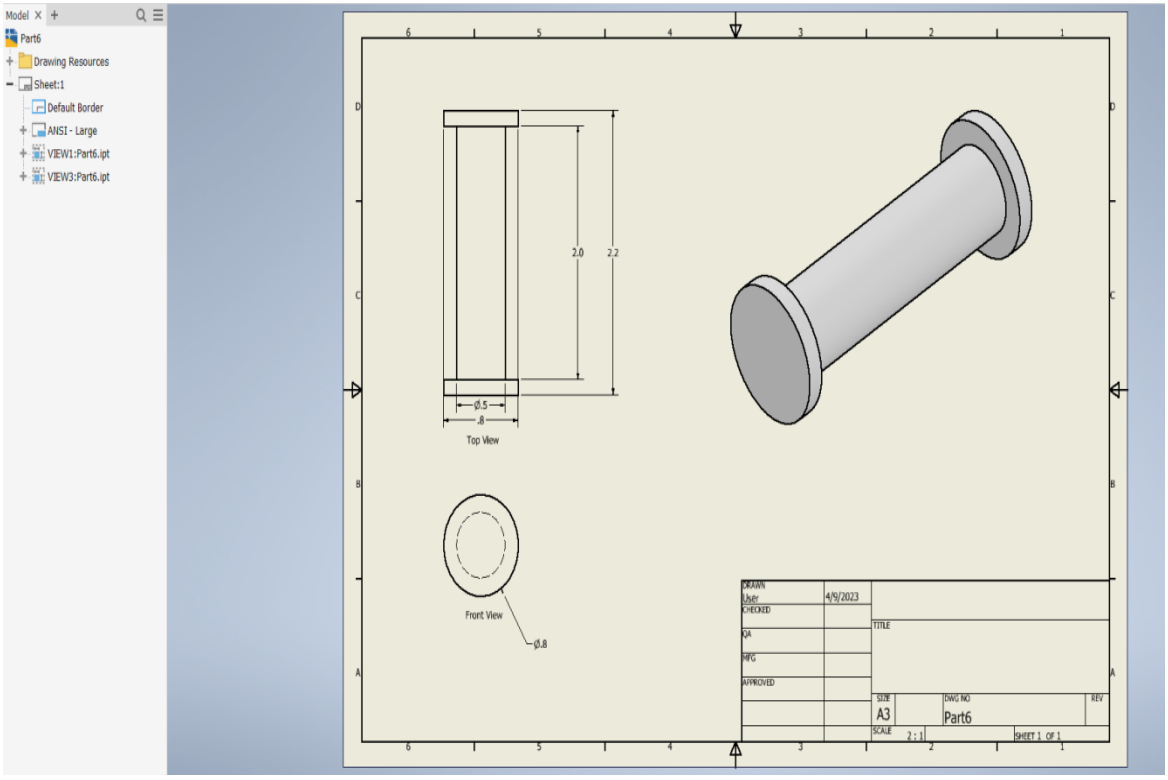
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2.0
2.2
Ø.5
.8
Top View
Front View
Ø.8
DRAWN
User
4/9/2023
CHECKED
QA
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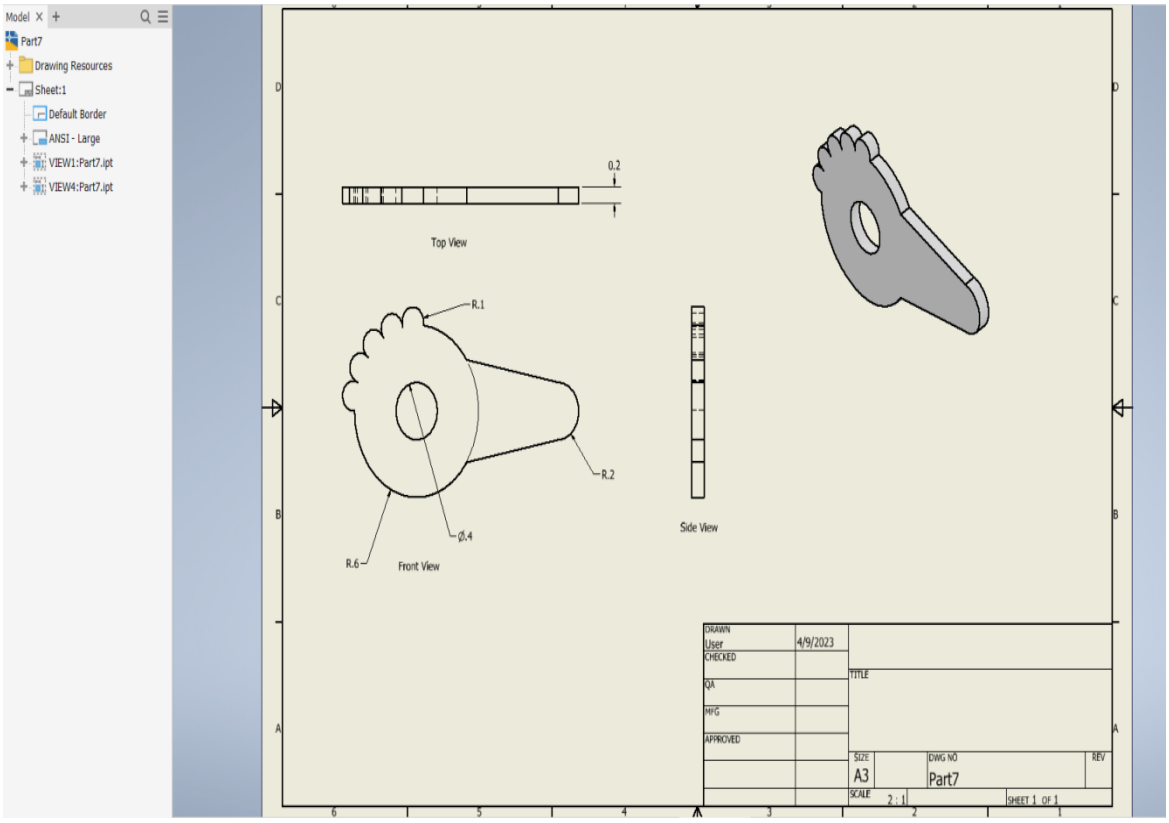
TITLE
SIZE
A3
DWG NO
Part6
REV
SCALE
2 : 1
SHEET 1 OF 1

PART 6


Model
Part7
Drawing Resources
Sheet:1
Default Border
ANSI - Large
VIEW1:Part7.ipt
VIEW4:Part7.ipt
0.2
Top View
R.1
R.2
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Front View
Side View
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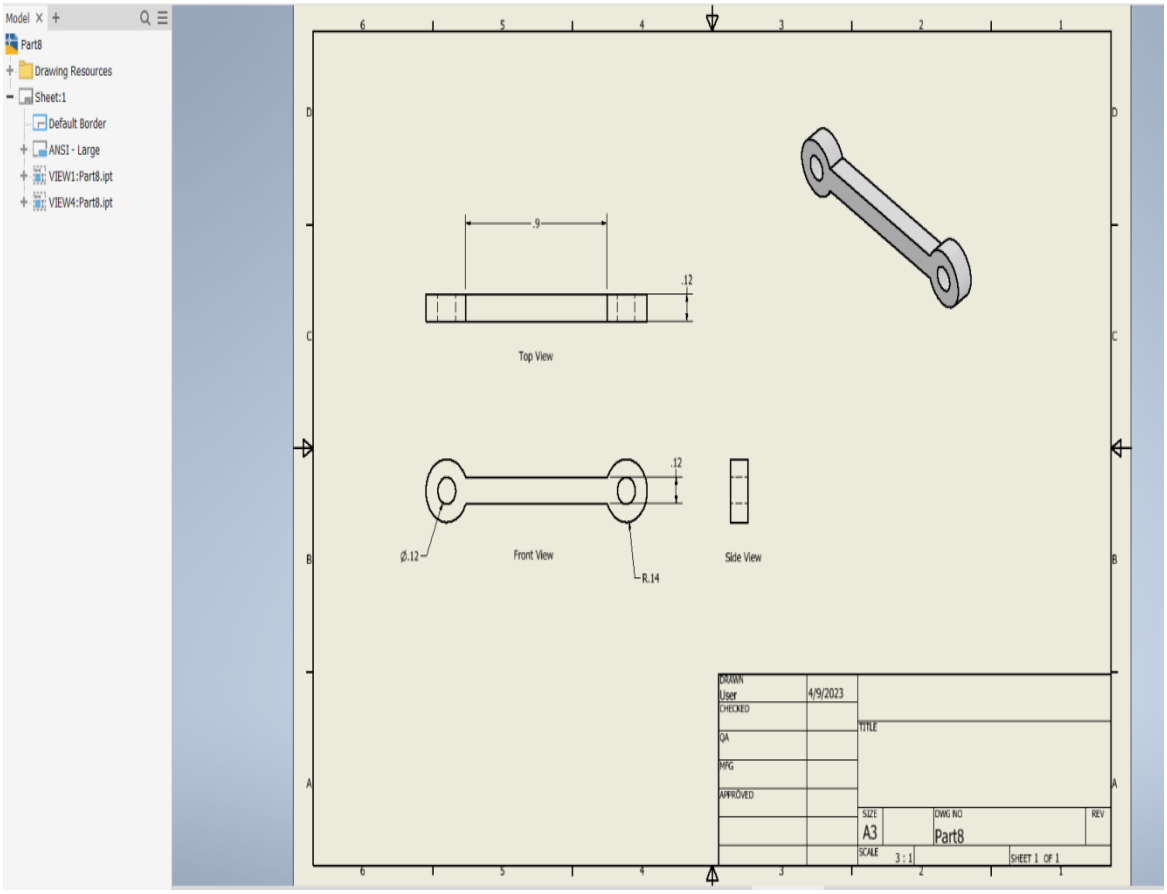
SHEET 1 OF 1

PART 7


Model
Part8
Drawing Resources
Sheet:1
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VIEW1:Part8.ipt
VIEW4:Part8.ipt
.9
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Top View
Ø.12
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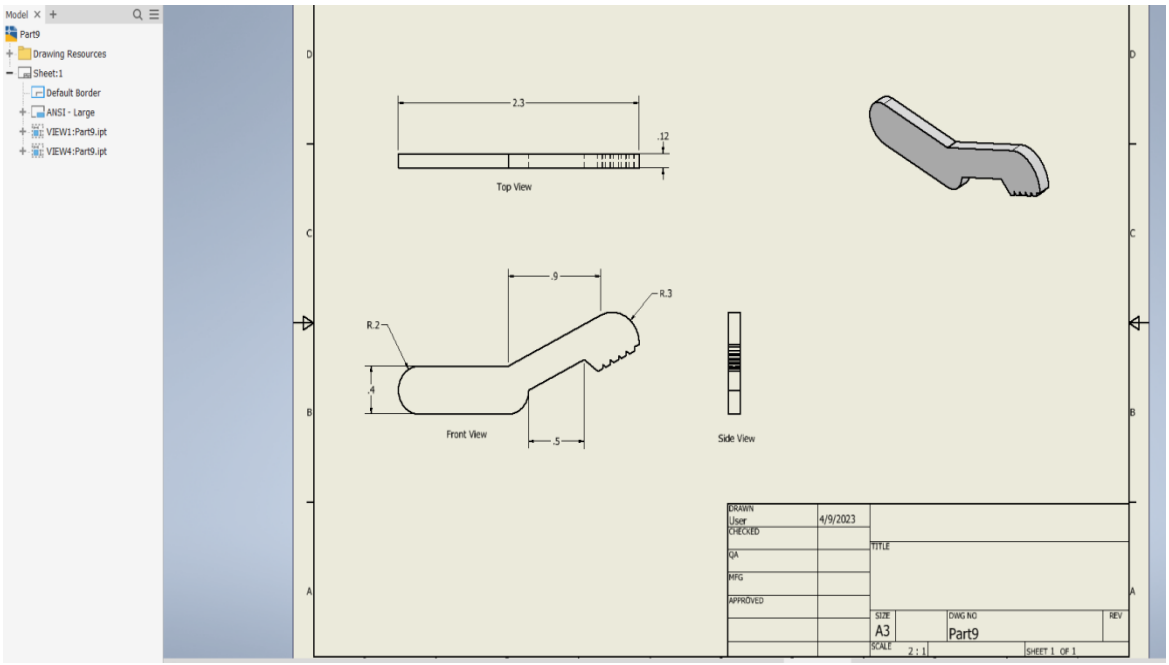
SHEET 1 OF 1

PART 8


Model
Part9
Drawing Resources
Sheet:1
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VIEW4:Part9.ipt
2.3
.12
Top View
.9
R.3
R.2
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Front View
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Side View
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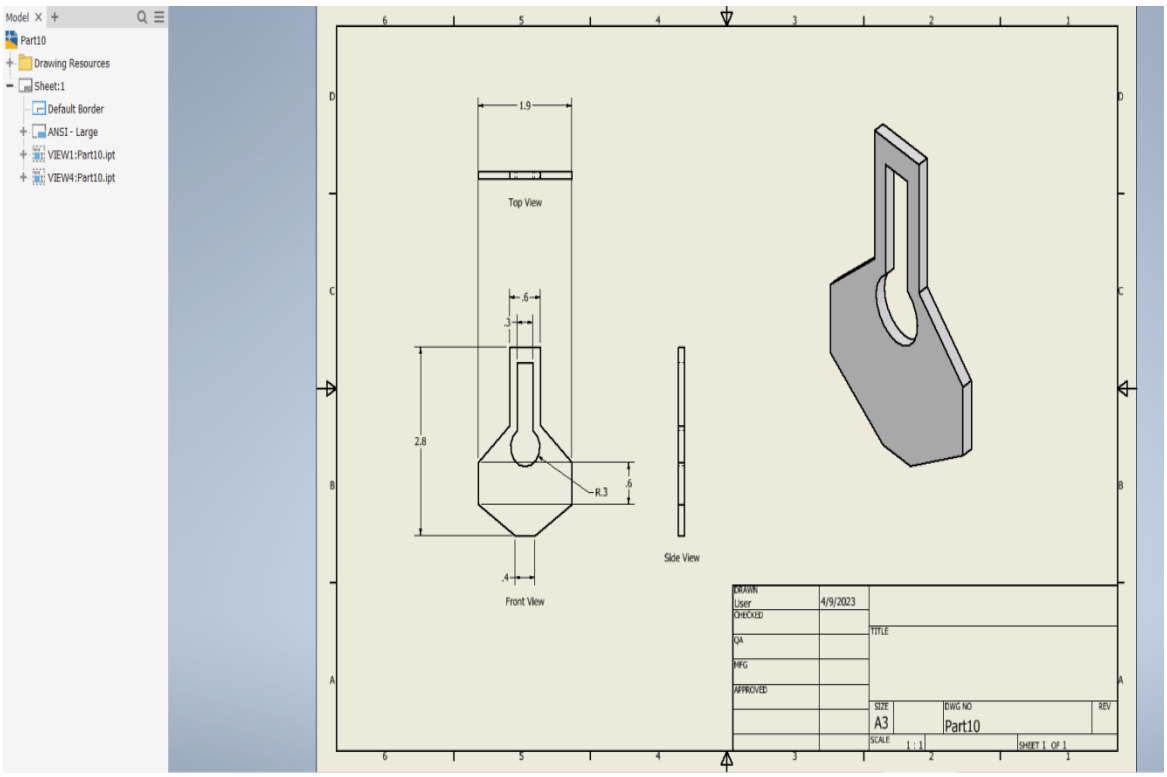
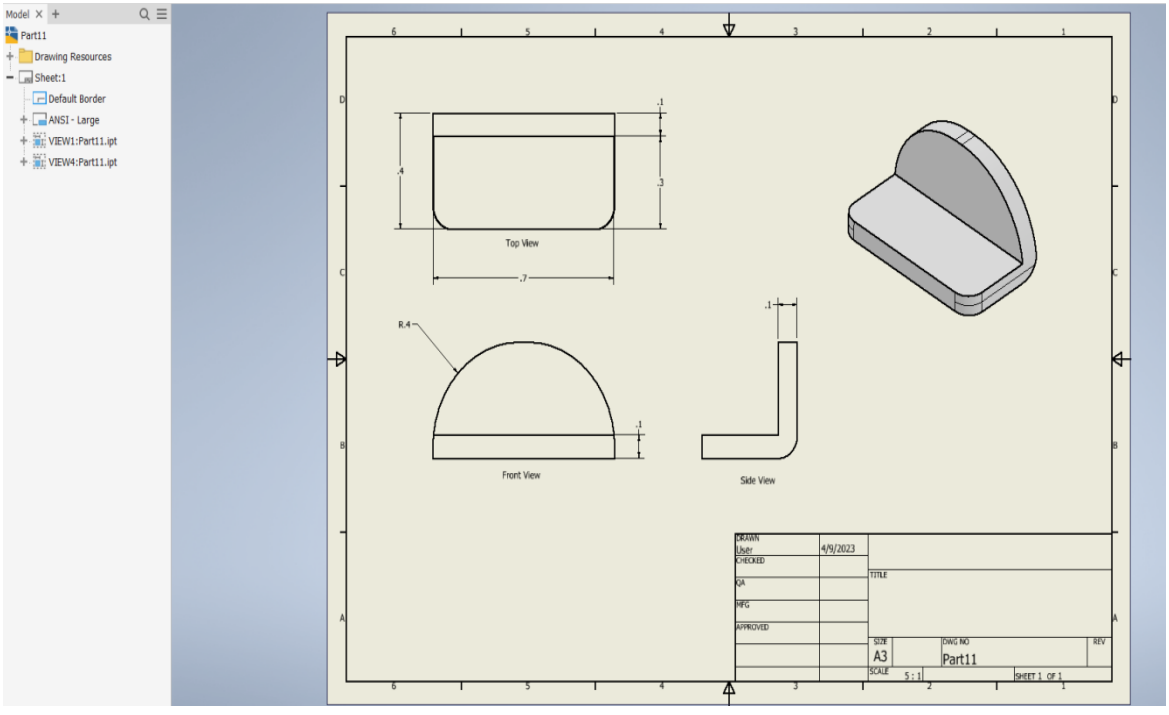
SHEET 1 OF 1

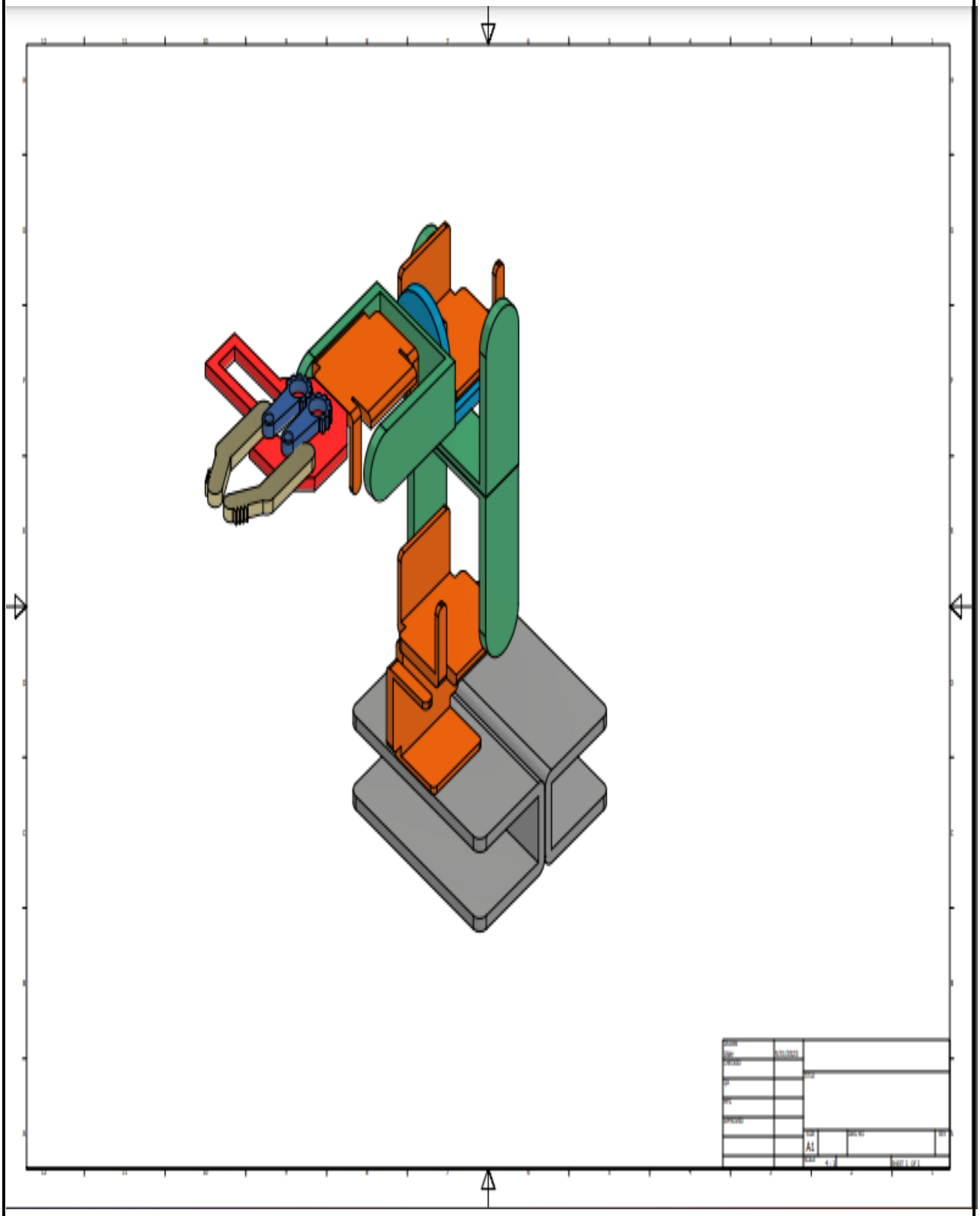
PART 9



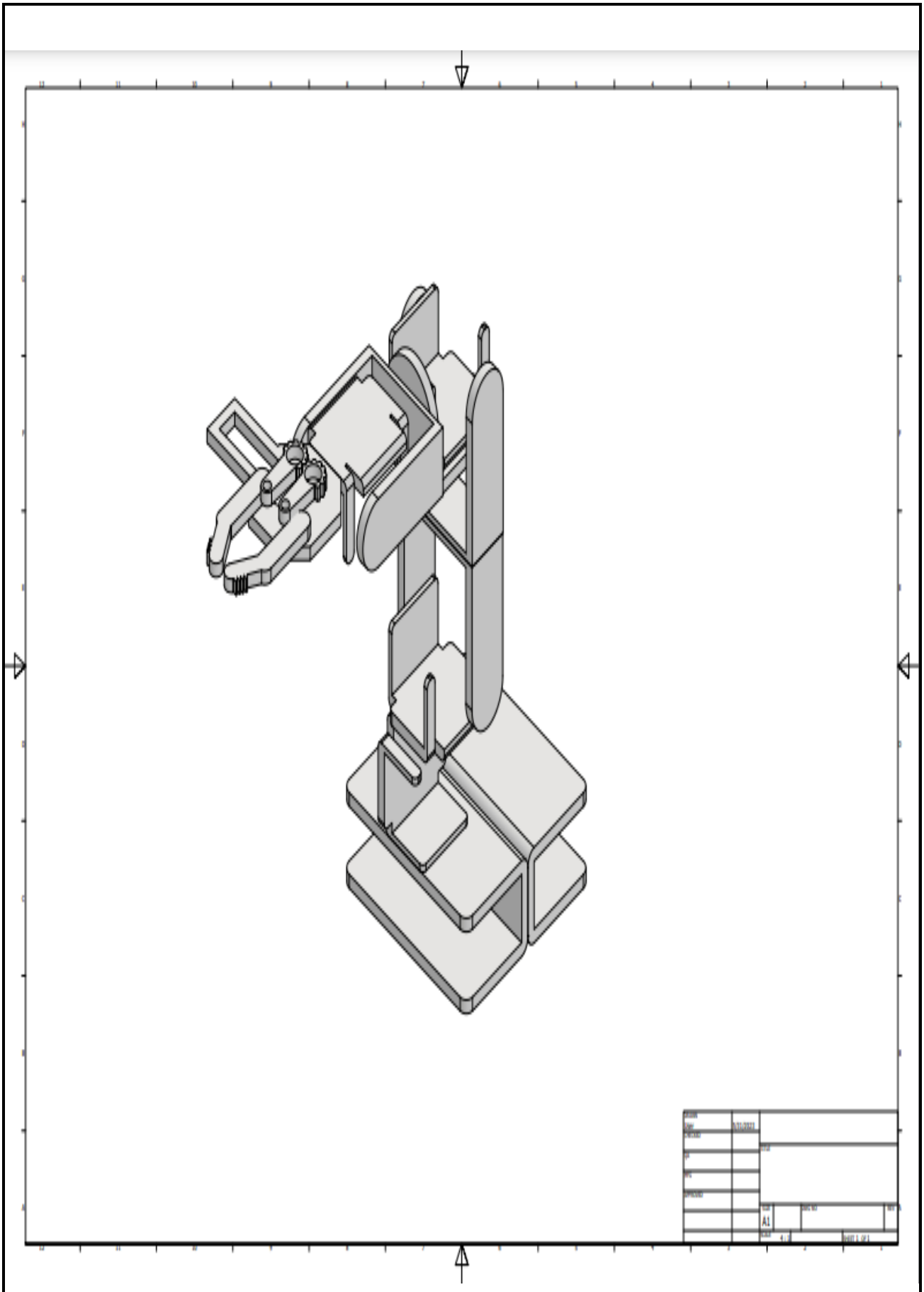
PART 10



PART 11



Assemly drawing 1

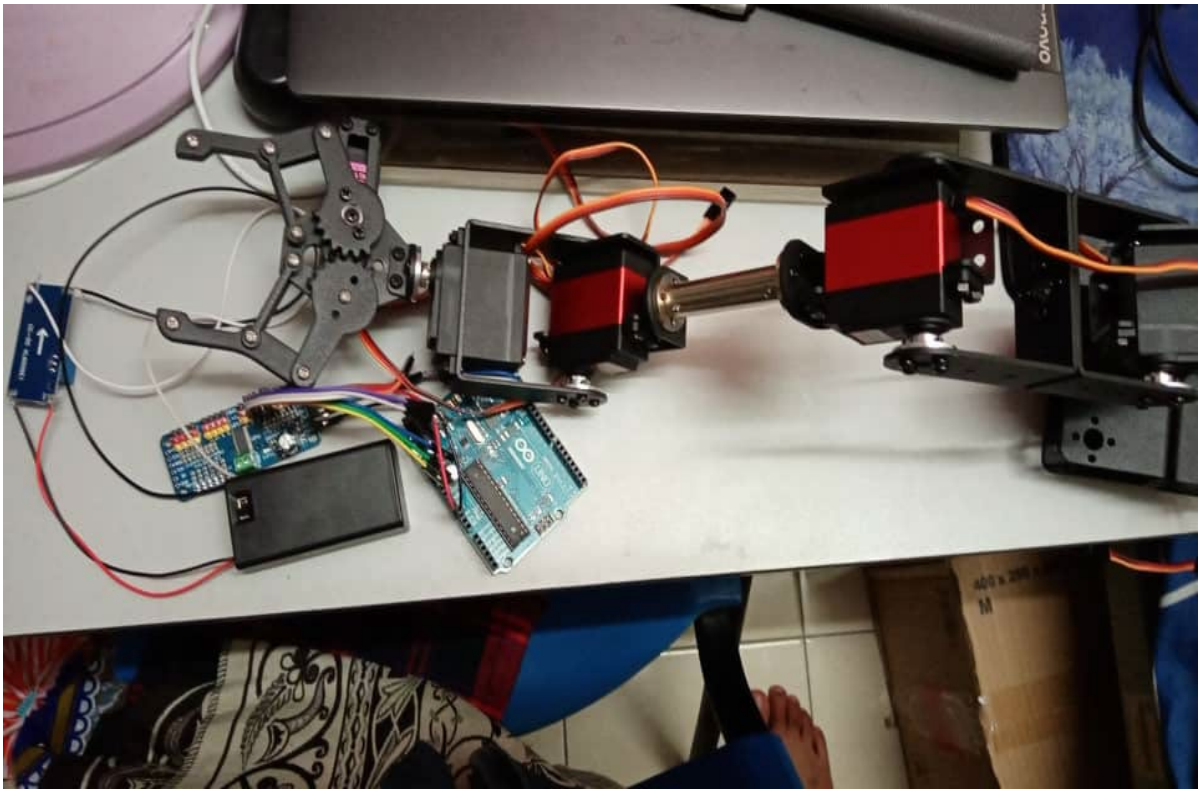


Assembly drawing 1.1

3.6 RESEARCH INSTRUMENTS

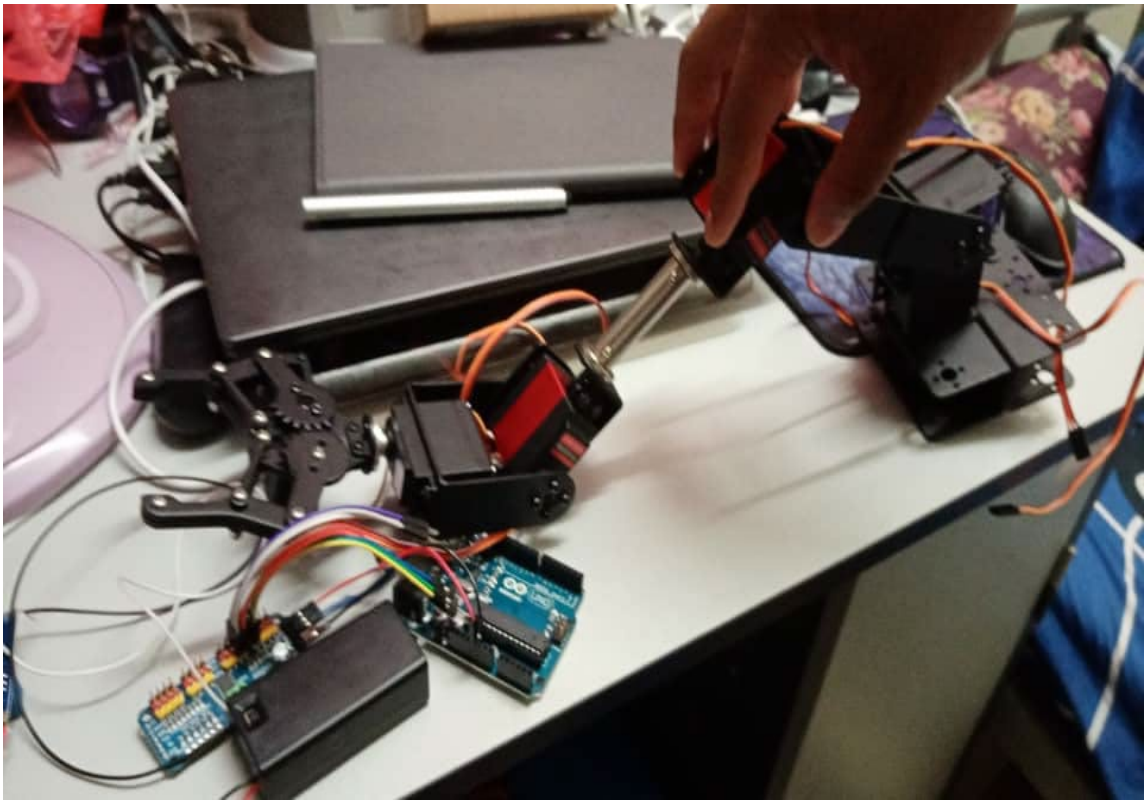
We searched through all the websites that were related to our topic in order to collect the survey data using Google Chrome. Additionally, we frequently ask our supervisor questions about the project in order to gather useful information.

3.7.1 Assembly Process



Assembly part process is done ghastly and secure , because this process using less work. All the joint has be combine with bold screw. It has absolute nothing wrong with the assembly process.

3.7.2 Wiring Process



For the wiring process, all the wiring comes from our knowledge. So first the battery will be connected to the buck converter so that we can adjust the voltage to the amount we want. Next, the buck converter will be connected to Pca 9865 and all the servo motors will connect to Pca 9865. Lastly, PCA 9865 will be connected to Arduino and the hc-05 will also connect to the Arduino board

3.8 SUMMARY

Overall, the objective of this project has been achieved which is the robotic arm using 6 servos and Arduino, and connecting them using Bluetooth and connected to the phone. The robotic arm can perform the operation of the loop lifting and placing system on the 'Wheelie' project. From the analysis that has been made, the robotic arm can be used easily with the presence of Arduino and Bluetooth. In terms of the shape of the robotic arm, we designed a simple design with many benefits, firstly it is small and easy to carry anywhere. the second is that the materials used are environmentally friendly. third, this product is affordable for most schools and small industries. There are 3 parts to the robotic arm, namely the head, arm, and base. The head works as a clamp, it will be used to hold objects. While for the arm part we have designed it successfully because the movement of the robot including the Arduino can be controlled more easily. As for the base part, we only designed it to be larger than the other parts, in order to be able to accommodate the force when the robotic arm is moved. This robotic arm can overcome problems such as holding

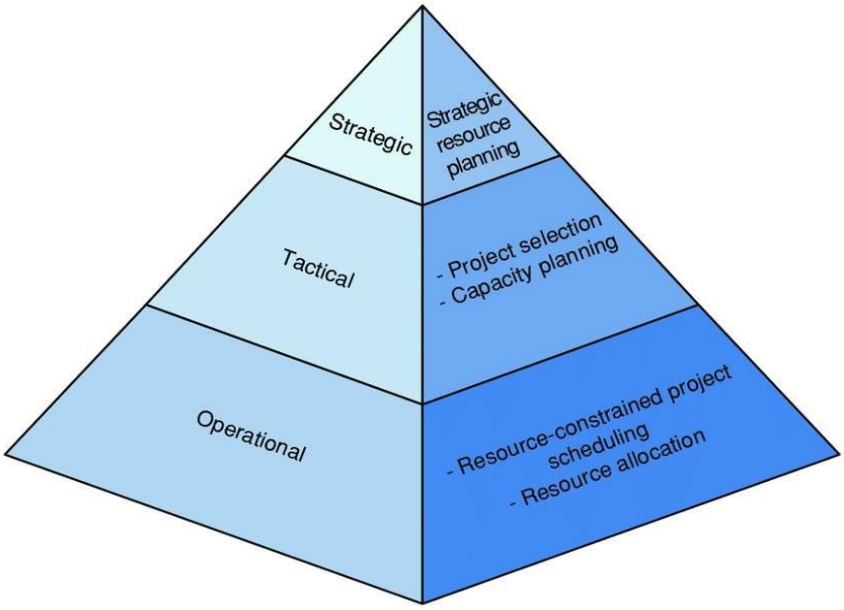
dangerous objects, which pose a threat to students, such as hazardous items. For small industries, it is very good for them to use it in small and dangerous areas. Overall, this project is very easy to use because, with the manual book, you can use the robotic arm easily. For the design session, it took us 3 months to prepare a suitable form for the market and it required some thought to design it. But since we want this robotic arm to be used well and smoothly, we must do every job carefully in order to avoid any damage and loss, with this we believe that this robotic arm can benefit others.

Author: MUHAMMAD HAZIM HAZLI(24DTP20F2009)

CHAPTER 4: ANALYSIS

4.1 DESIGN AND STRESS ANALYSIS

A typical design analysis starts with design conceptualization, the process of coming up with ideas for the best solution to the design issue in light of the intended use of the final product. Essentially, design analysis is a decision-making process. Process of creating a product model that can be turned into a real product using analytical methods from mathematics, statistics, and fundamental science. Our designs are based on works done in small places such as rooms orworkshopsp and our designs are often used o tables.T he manufacturing process is divided into three decision stages in the design analysis, as depicted and detailed below.



4.1.1 Design Explanations

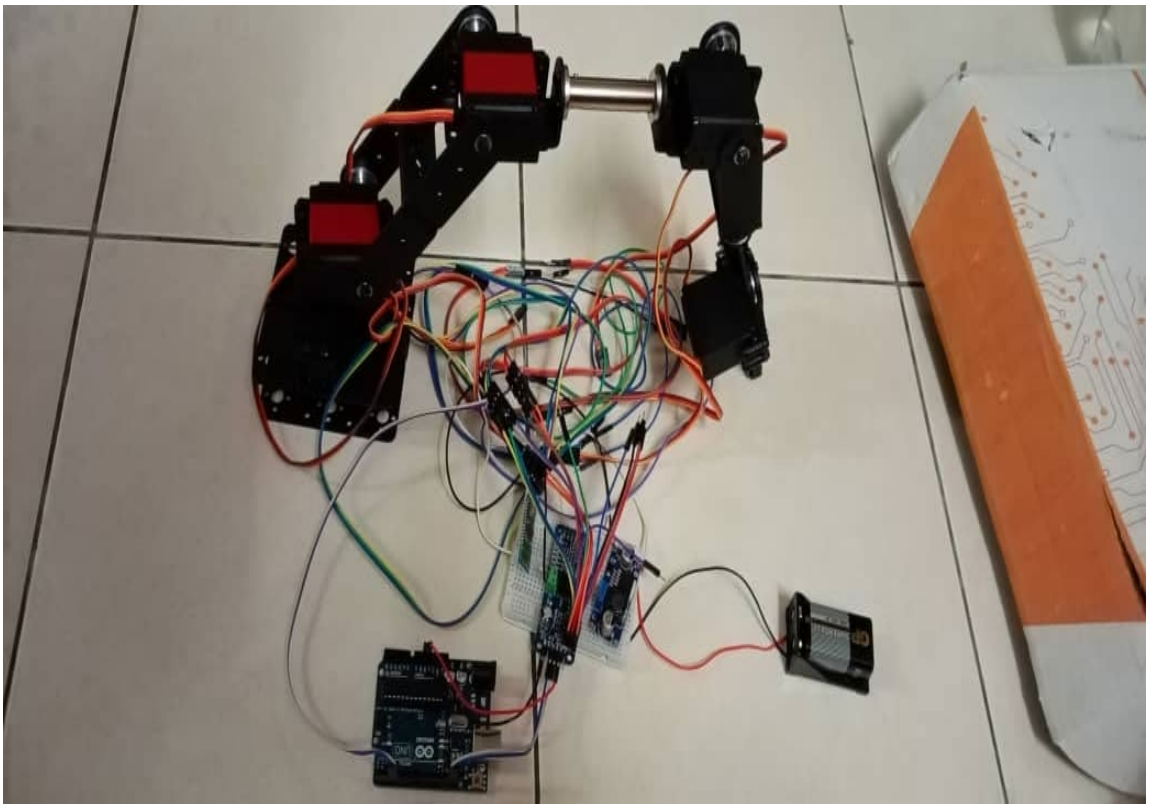
The concerns identified from observations from prior projects served as the foundation for the design that was created. Whereas the majority of robotic arm are enormous in material, functionality add and price. Now we create a robotic who has innovation about what has been said before this verse. The decision to choose this design was also influenced by the problem/issues that were created, which were then examined to discover the market's design issues. Additionally, this design's specialty is determined by the user himself, who has been examined. This robotic arm can be operated alone without the help of others, which causes time and energy savings to occur, that is why this design has been chosen in order to help workers out here.

4.2 FUNCTION EXPLANATION

The purpose of our design is to lift/move items, especially dangerous items. The next function is to add other advantages compared to robotic arms on the market such as using recycled materials and lights to make work easier. This robotic arm is controlled using an Arduino board and is supported by several gears and servo motors in each joint of the robotic arm to create movement. Our, project uses a combination of recycled materials and new materials such as body kits that have been used. Next, every movement or addition of function is controlled by the Arduino board, which is all the components must be connected to the Arduino board by using wires and a soldering process. Each function must be coded and placed in the Arduino. To do that, we download the ARDUINO IDE which is the software that must run if want to make a code of Arduino, the second step is to connect the USB cable to the Arduino. The third step is, to verify if the device is detected or not. Fourth, write your first sketch in the ARDUINO IDE and then compile that sketch.

Lastly, upload your first sketch and try if it's functioning or not. Finally, this robotic arm can be used in a short time and is easy to handle.

1)



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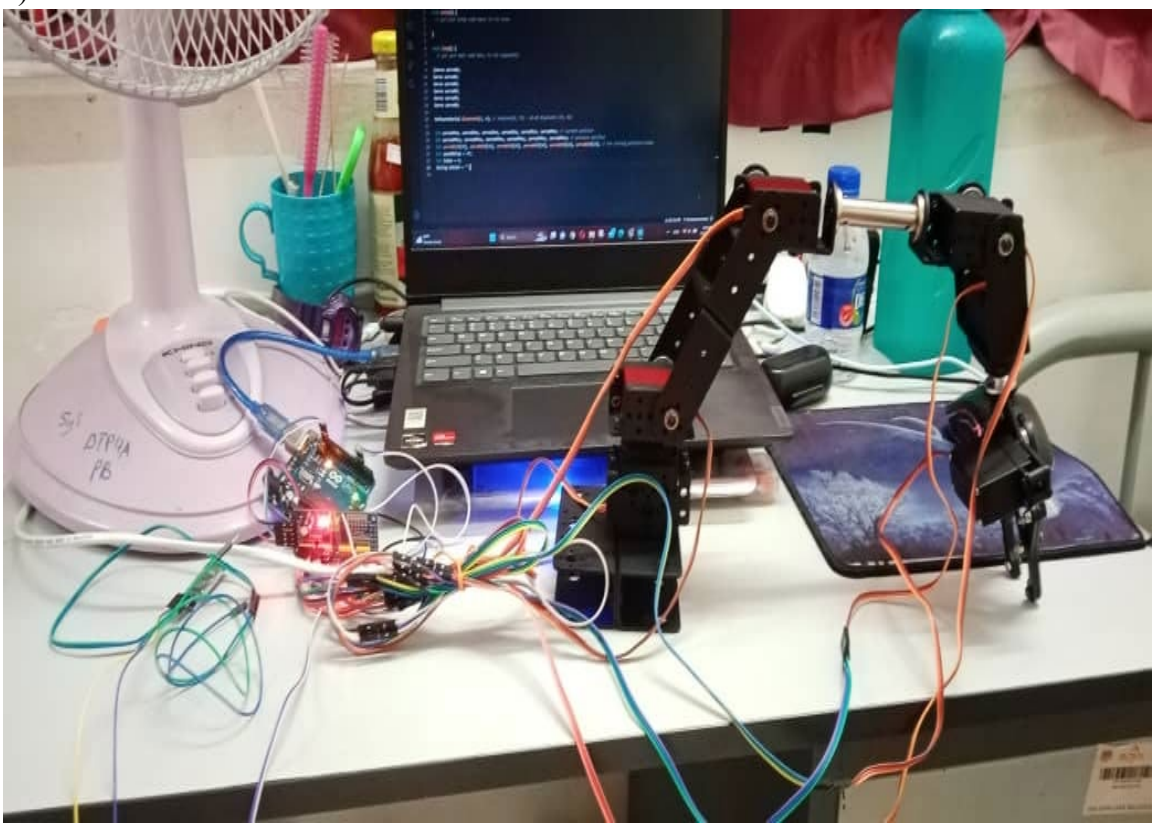
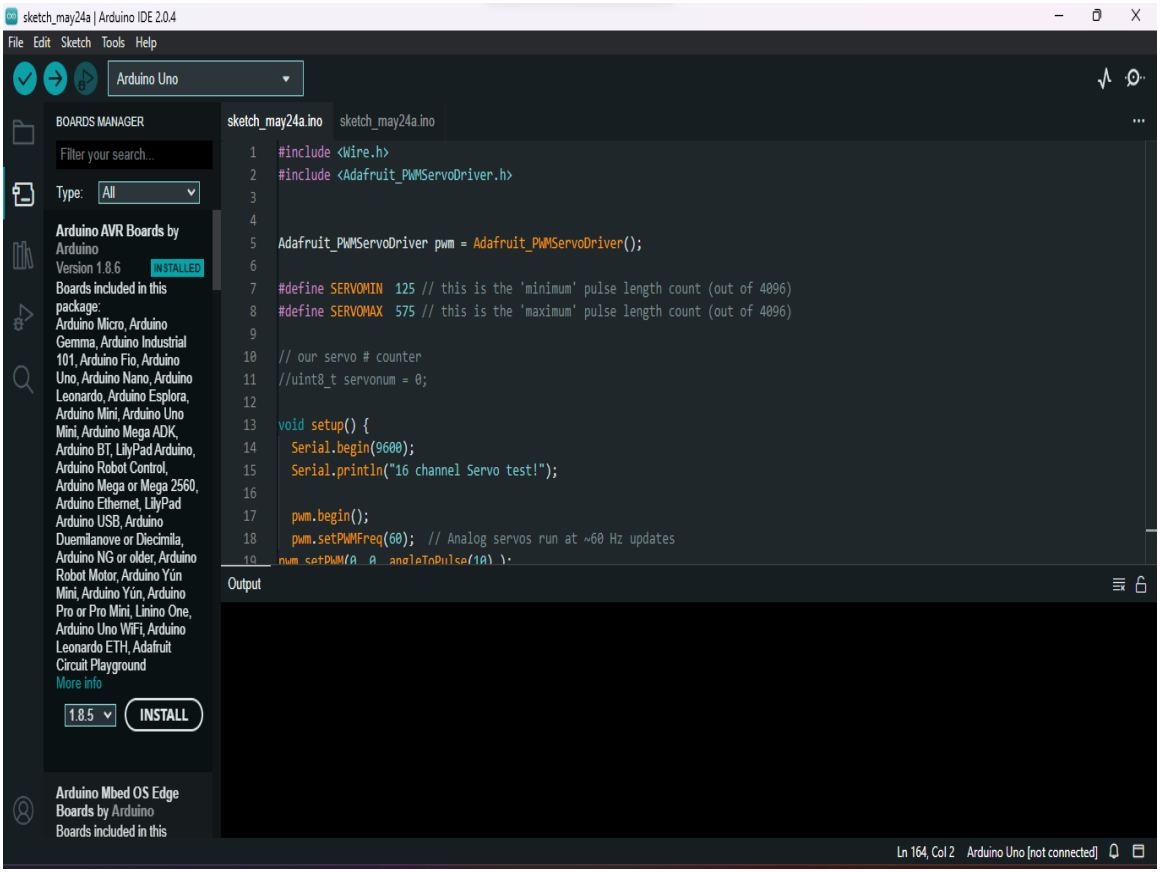
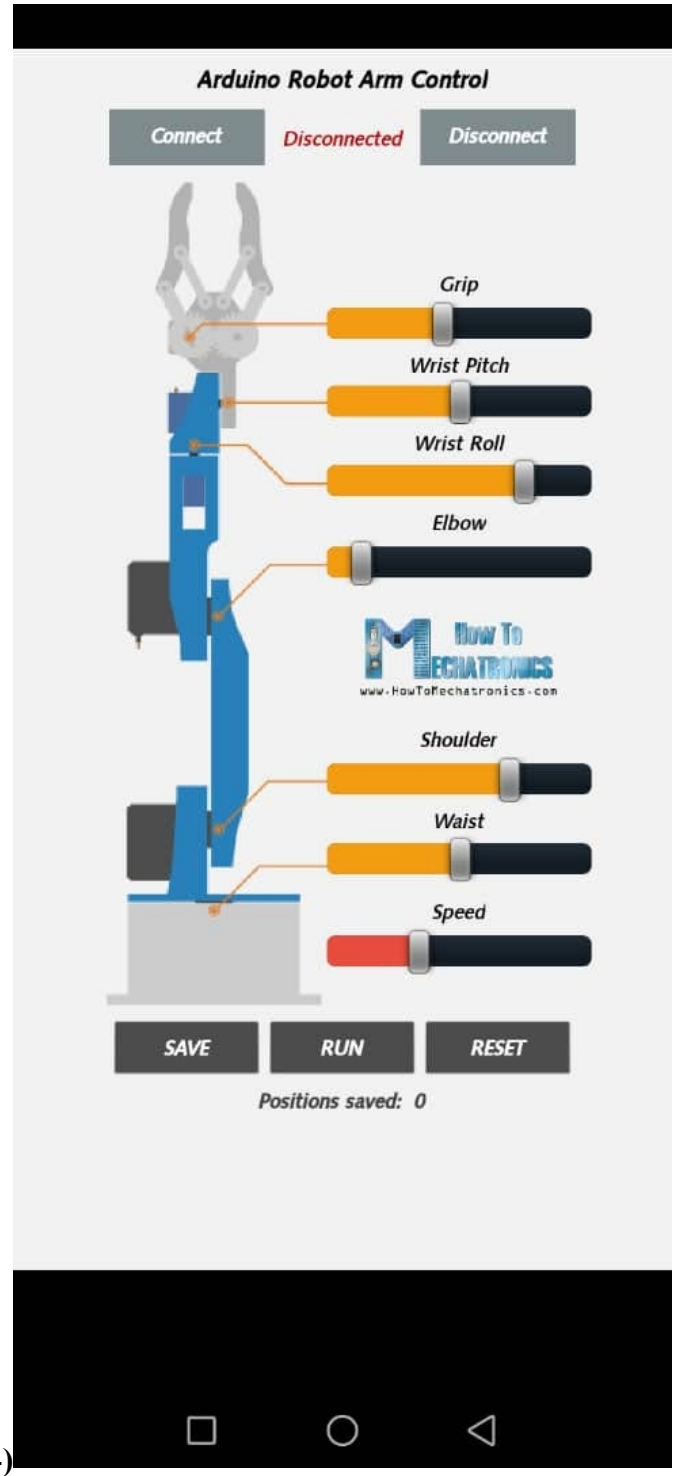


3)


sketch_may24a | Arduino IDE 2.0.4
File Edit Sketch Tools Help
Arduino Uno
BOARDS MANAGER
Filter your search...
Type: All
Arduino AVR Boards by Arduino
Version 1.8.6 INSTALLED
Boards included in this package:
Arduino Micro, Arduino Gemma, Arduino Industrial 101, Arduino Fio, Arduino Uno, Arduino Nano, Arduino Leonardo, Arduino Esplora, Arduino Mini, Arduino Uno Mini, Arduino Mega ADK, Arduino BT, LilyPad Arduino, Arduino Robot Control, Arduino Mega or Mega 2560, Arduino Ethernet, LilyPad Arduino USB, Arduino Duemilanove or Diecimila, Arduino NG or older, Arduino Robot Motor, Arduino Yún Mini, Arduino Yún, Arduino Pro or Pro Mini, Linino One, Arduino Uno WiFi, Arduino Leonardo ETH, Adafruit Circuit Playground
More info
1.8.5 INSTALL
Arduino Mbed OS Edge Boards by Arduino
Boards included in this
sketch_may24a.ino
sketch_may24a.ino
#include <Wire.h>
#include <Adafruit_PWMServoDriver.h>
Adafruit_PWMServoDriver pwm = Adafruit_PWMServoDriver();
#define SERVOMIN 125 // this is the 'minimum' pulse length count (out of 4096)
#define SERVOMAX 575 // this is the 'maximum' pulse length count (out of 4096)
// our servo # counter
//uint8_t servonum = 0;
void setup() {
Serial.begin(9600);
Serial.println("16 channel Servo test!");
pwm.begin();
pwm.setPWMFreq(60); // Analog servos run at ~60 Hz updates
Output
Ln 164, Col 2 Arduino Uno [not connected]

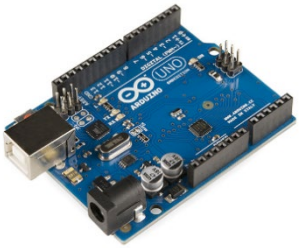
4)


Arduino Robot Arm Control
Connect
Disconnected
Disconnect
Grip
Wrist Pitch
Wrist Roll
Elbow
How To MECHATRONICS
www.HowToMechatronics.com
Shoulder
Waist
Speed
SAVE
RUN
RESET
Positions saved: 0

4.3 TESTING EXPLANATION

In each project that gas been created , is it necessary to find out the effectiveness of the product.

4.4 BILL OF MATERIALS

MATERIALS	COST
	**RM250**
	**RM3**
	**RM 42.90**
	**RM 0.10 each**
	**RM22.90**

	**RM13.90**
	**RM4.50**

4.4.1 COSTING ANALYSIS

According to the cost we have used. The cost of manufacturing this robot arm is RM350. For us, it is very worthwhile and reasonable for the industry and all institutions that want to acquire our project. with its body made of aluminum, servo strength that can support force up to 5 kg, the use of a 9V alkaline type battery that can support the electric power needs of this robot, and all the components used are of good quality and affordable. even the lifespan of our project can reach up to several years if it is used according to the specifications that have been placed.

4.5 TECHNICAL ANALYSIS

Among the experiments we have done on our project, in terms of construction there are no problems, everything can be done 'on the go'. However, for Arduino and app coding activities, we are facing problems. For the first attempt, after entering the coding into the Arduino and the Bluetooth, it was paired with the phone, but nothing happened because apparently, the coding used only had hc-05 components without pca9685 coding.In thee second attempt, the coding of all the necessary components has been entered but there is still no response from our robot arm 6 servo. In the third attempt, we entered the coding for our robot arm to move automatically without remote control and it worked. So the servos are all in good condition. Until now, we still haven't been able to solve the Arduino coding problem that we face because of the lack of knowledge and exposure to the use of Arduino in more detail

4.6 IMPACT OF PRODUCT

This initiative specifically targets customers and users who will be working in the workshop, Because they can further demonstrate and test the usefulness of this design. But is not just the workers in a workshop that just can use this product. But also all the type of jobs that is suitable. The advantages and disadvantages are in the table below:

ADVANTAGES	DISADVANTAGES
• Is the price reasonable compared to the exixtexistinget price • Additional functions such as loading variuvariousrials and having surveillance lights instead of only having the function of	• Workplaces that have limits • Our product can only be used on materials that are smaller than his

lifting and moving items like most robotics arms nowadays • The hook of our robotic arm is anti-heat and slippery .so our product will be more durable and have a higher safety value than other robotic arm products	

4.7 SUMMARY

In conclusion, all the research and discussion we did was only to make this project a success. Although our product still has some shortcomings, it is still being innovated from the many robotic arm products on the market

REFERENCES

- WIKIPEDIA ABOUT ROBOTIC ARM
- MENDELEY
- SUPERVISOR/LECTURER
- VIDEOS

CHAPTER 5
DISCUSSION & CONCLUSION

5.1 INTRODUCTION

Discussion is a key to the success of a project, that always has been used in this era of globalization. In this chapter, we discuss the discussion and conclusion that has been made for the manufacture of this project.

5.2 DISCUSSION

The goal of this study is to make it easier for education and small industries. There are many robotic arms have been created, but they were created for big industries like automotive, manufacturing, and engineering. Next, we do some innovation for the robotic ar, we put some lead to make it can be used in a dark place. And we make collaboration with The Wheelie project to make our project can be moved easily controlled by Handphone and use Bluetooth to connect them.

In addition, we add some new accessories that will be applied to our robotic arm, first, we add some led lamps to its clamp, so it can be used in dark places. Although this is very useful for us. It is because we don't have to use our torch to light the area where the robotic arm operates. Besides, we want to add a small fan to our robotic arm so that it can clean the dirt that has been done after the work is done, but we found that the voltage we need is very high and we don't have enough voltage, and we decided to drop that idea, for the sake of voltage stability in the robotic arm.

When we wanted to present at Aeromech, we found out that our product had a failure in our power supply, the power supply caught fire due to excessive voltage. So for the further, we will put a resistor on the robotic arm so that the high voltage can be released, and with this, the robotic arm can move smoothly.

5.3 RECOMMENDATIONS AND SUGGESTION

After completing this project, we plan to change the base of the robotic arm from an empty base to a transparent base so that we can organize the wire and electronic board in the base to make it neater. Thus, the user can see if there is damage to the wire and electronic board so the user can see the causes from a transparent base.

Next, we plan to change the precision of our robotic arm we need to enhance the precision so its sensors and feedback systems are more precise and accurate. The user also will be satisfied with precision because it sensor can move faster and with precision to the command given by frbyhe user.

Finally, we assume that installing a LED light on the gripper of the robotic arm, The LED light on the gripper can give the user more vision of the object so it can be more accurate to pick and place the object. The LED light also can be switched on or off that installed at the base

5.4 CONCLUSION

In this conclusion, in producing this robotic arm, we have experienced some problems such as battery board burning. the reason for the fire is, we have wiring on the power supply. we use small wires in the production of our project, in addition, we also have problems with coding to move our project. Next, we also added led lights to our robot arm. LED lights work to launch the movement of our robot when working in the dark

In producing this robotic arm, we used Arduino Uno. purpose Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into various electronic projects. This board can be connected to other Arduino boards, Arduino shields, and Raspberry Pi boards and can control relays, LEDs, servos, and motors as outputs. And also, we use PSA9685, HC-08, and buck converter as the main components to drive and get signals from the software

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MUHAMMAD DANIAL TARMIZI(24DTP20F2030)

CHAPTER 6

CONCLUSION

The conclusion that we get from this project is that just one of the objectives has been achieved. The one objective that we are achieved is, to design and develop components and body kits for the robot arm. Because the other objects that we want to achieve is getting worse because our power supply has be not functioning the night of the last day to present this project. Our objective has been created from general knowledge and environmental activity. So we created Google Forms to get help us gather the information. So here is the proof of what we got from our survey

QUESTIONNAIRE

INTRODUCTION

so for this Google form, the task is to collect information about how exposed this robot arm is to the students so that they are more aware of this issue. apart from that, our objective is to design and develop components and body kits for the robot arm. with the help of Arduino and hc-05 the making of the robot arm becomes better and more efficient because Arduino is able to control all the inputs that go into it and the hc-05 Bluetooth module will help us to control the robot arm remotely. in conclusion, our product can reduce the hazard to humans when working, and followed by the items we use to make robot arms are very affordable

SECTION A: RESPONDEN BACKGROUND

1)

What is a robotic arm?

- a) A device used for playing music
- b) A mechanical arm that mimics human arm movements
- c) A type of computer software
- d) A tool for measuring temperature

2)

What is Arduino?

- a) A brand of robotic arm
- b) A programming language
- c) An open-source electronics platform
- d) A type of sensor for measuring distance

3)

What role does Arduino play in a robotic arm system?

- a) It serves as a power source for the arm
- b) It controls the arm's movements
- c) It provides internet connectivity to the arm
- d) It measures the weight of objects lifted by the arm

4)

Which programming language is commonly used with Arduino?

- a) Python
- b) Java
- c) JavaScript
- d) It provides internet connectivity to the arm

5)

What types of sensors can be used with a robotic arm controlled by Arduino?

- a) Cameras for taking pictures
- b) Accelerometers for measuring speed
- c) Potentiometers for position feedback
- d) Microphones for recording sound

6)

How are the movements of the robotic arm programmed with Arduino?

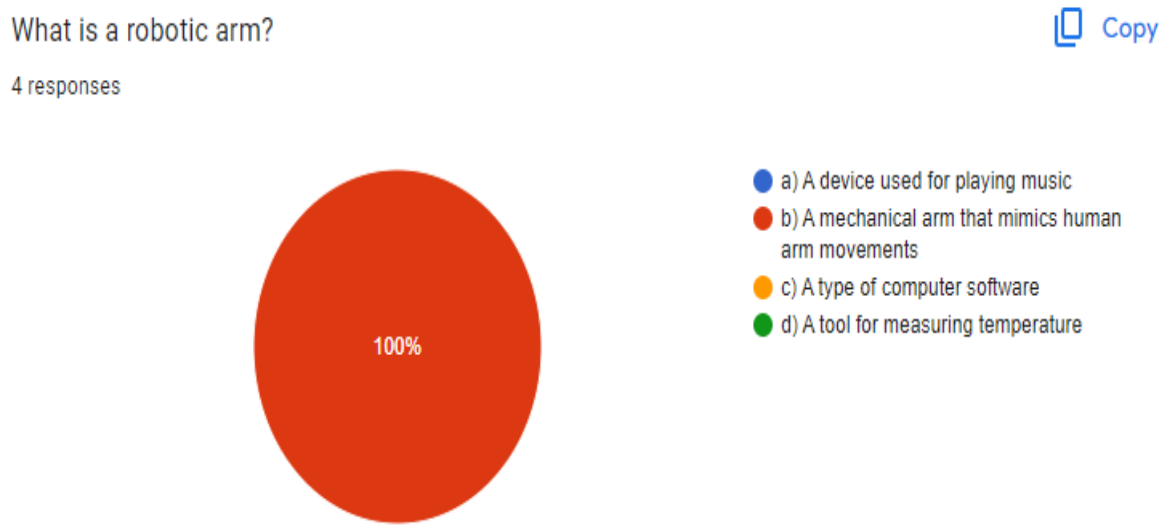
- a) By using hand gestures
- b) By writing code that specifies desired positions and trajectories
- c) By physically moving the arm and recording the motions
- d) By using voice commands

7)

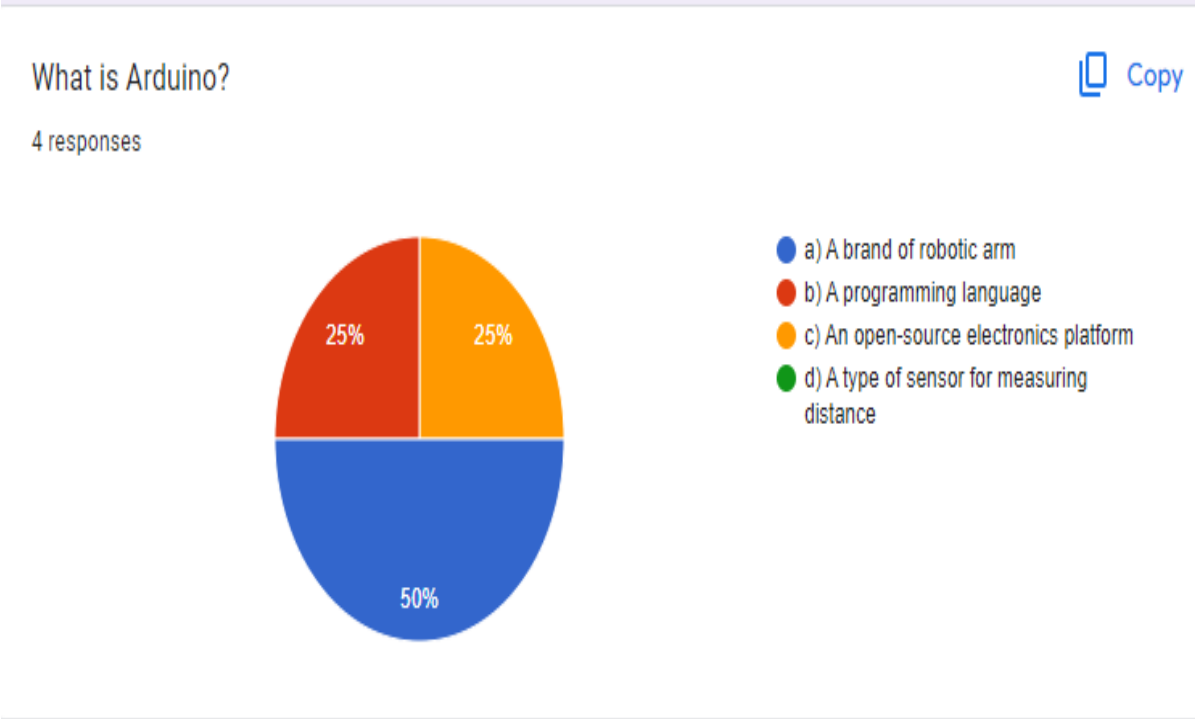
Can a robotic arm with Arduino be used in industrial applications?

- a) No, it is only suitable for educational purposes
- b) Yes, it can be used for tasks like assembly lines or material handling
- c) Only if it is connected to a high-performance computer
- d) No, it is not capable of precise movements required in industrial settings

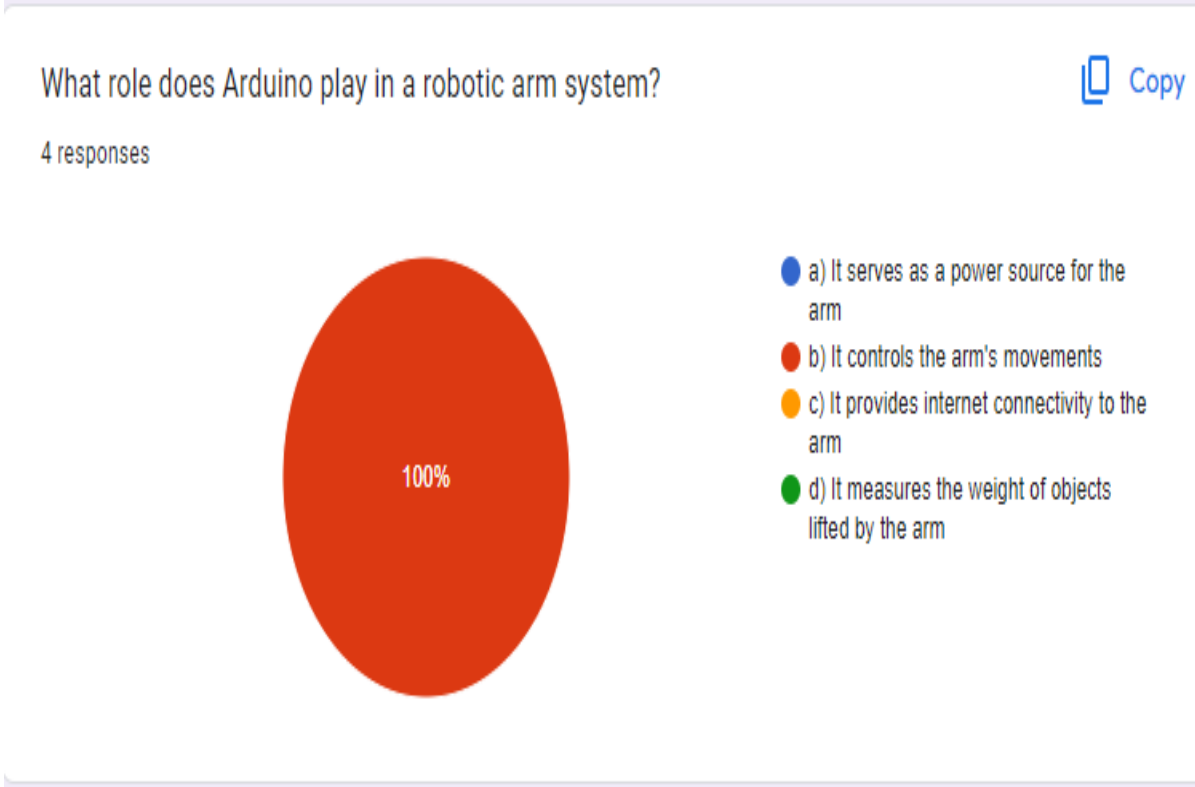
RESPONSE ANALYSIS



This survey has been fill by students. From this question we know that the students know about basic of robotic arm



Arduino board is one the component like a 'brain' for mechanical/ robot purposes. All the data must come to him and it will transfer all the input to our robot arm for the movement

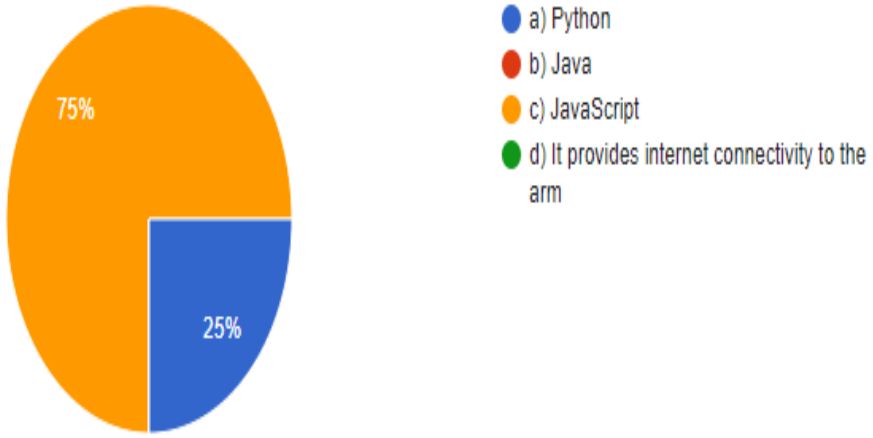


This pie chart has the same meaning as the top one explanation

Which programming language is commonly used with Arduino?

Copy

4 responses

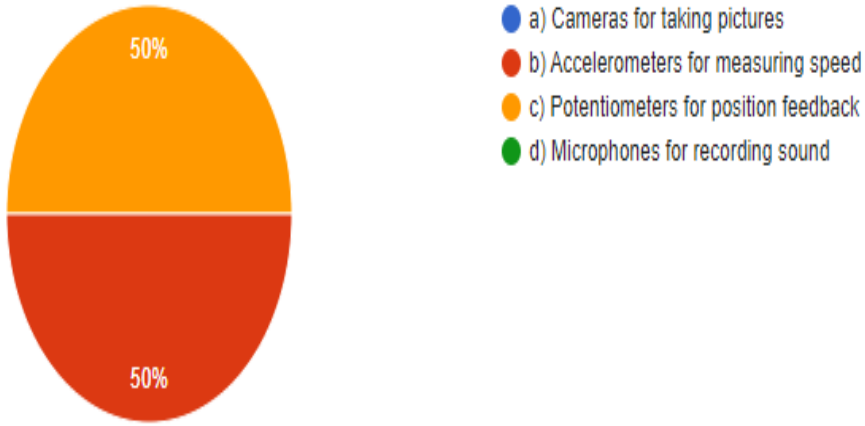


All the respond give the wrong answer , the truth answer in JAVA. Is suitable for windows, macOS aand Linux operating system

What types of sensors can be used with a robotic arm controlled by Arduino?

Copy

4 responses

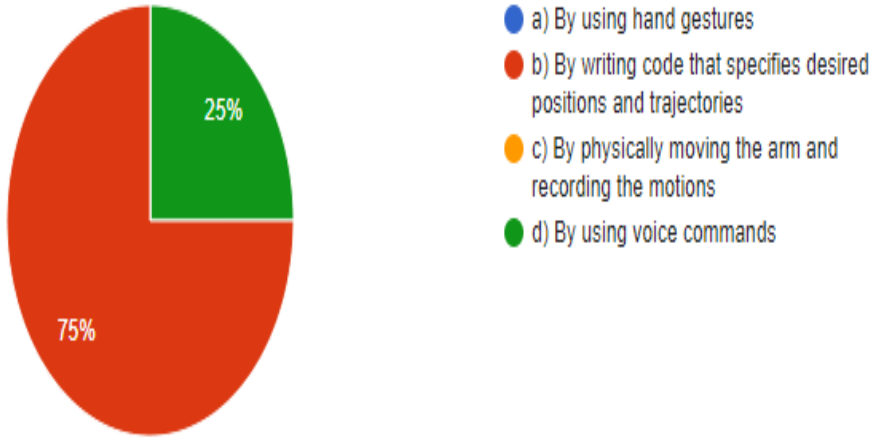


So all the responses get the right answer, it has 2 right answers here the red and orange. These kinds of sensors are very important to create a robot arm

How are the movements of the robotic arm programmed with Arduino?

Copy

4 responses

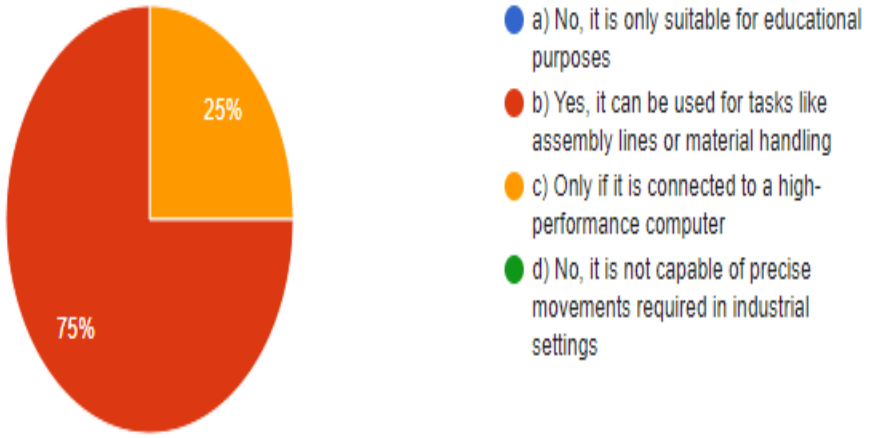


For this questions it have 3 right answer, the blue,, red and green colour. All this type of how to control our robot arm it's depend on what kind of 'remote' that we build.

Can a robotic arm with Arduino be used in industrial applications?

Copy

4 responses



Truly, the robot arm did not have a specific industrial type or occupation to have it. If someone fell that there is need for this robot and will make the robot do all the accessibility that he has, so it also will be the type of person who worth using it

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