POLITEKNIK BANTING SELANGOR

PROTOYPE PATIENT TRANSFER WHEELCHAIR

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STATEMENT OF AUTHENTICITY AND PROPRIETARY RIGHTS

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ABSTRACT

This work is aimed at modelling, designing, and developing a wheelchair with IoT that can transfer a patient with advanced monitoring system. This IoT system uses to collect temperature, heart rate and oxygen saturation readings to smartphone. If abnormal condition of patient incurs, warning notification will send to the smartphone. We must install an application in store name Blynk IoT to make this prototype work.

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CHAPTER1: INTRODUCTION

1.1 INTRODUTION

When walking is difficult or impossible because of a disease, accident, age-related issues, or disability, a wheelchair is a chair with wheels. Spinal cord injuries are one of these. Wheelchairs are available in a wide range of configurations to suit the unique requirements of their users. They might have customised controls, specialised seating adaptations, or be designed for a particular activity, like with beach wheelchairs and sports wheelchairs. The most well-known distinction is between manual wheelchairs and motorised wheelchairs, where the propulsive force is provided either by the wheelchair user or occupant pushing the wheelchair by hand, by an attendant pushing from the rear using the handle, or by an attendant pushing from the front using a foot pedal.

1.2 PROBLEM STATEMENT

Many individuals with mobility impairments face significant challenges in navigating their environment, and the use of a wheelchair is often necessary to improve their mobility and independence. However, traditional wheelchairs can be cumbersome, difficult to manoeuvre, and limit the user's access to certain spaces and activities. Additionally, individuals with more severe mobility impairments may require specialized wheelchair designs that can be expensive and difficult to obtain.

Therefore, there is a need for a wheelchair design that is more versatile, comfortable, and affordable, while also being capable of meeting the needs of individuals with varying levels of mobility impairments. Such a design would provide greater mobility and independence to individuals with disabilities and improve their quality of life.

1.3 OBJECTIVE

- To have a convenient process to check the patient's condition.
- To have more convenient design for lifting, transporting, and releasing patients
- To provides greater patient comfort without the need for any additional medical tools such as drip heartbeat monitor and temperature meter.

1.4 SCOPE & LIMITATION

This is a wheelchair that we created to have many features. Which is easier to use and suitable for everyone and everywhere. We make it as a prototype so we can solve every problem before it's used by everyone. Prototype transfer wheelchairs may only support a certain amount of weight, which would prevent heavier people from using them. it can also be used at home to make it easier for patients to use it. the importance is that it is easy for patients to check your health.

CHAPTER 2: LITERATURE REVIEW

2.1 PROJECT REVIEW

A wheelchair is a powered or manually propelled vehicle that is primarily intended for use by someone with a mobility impairment for both inside and outdoor locomotion. All places that are accessible to foot traffic must allow the use of wheelchairs, manually powered mobility aids, walkers, crutches, canes, braces, and other similar equipment made specifically for people with mobility limitations.

2.2 PROJECT FUNDAMENTAL AND THEORIES

Wheelchairs can be one of the most useful and freeing daily tools for persons with impairments or mobility concerns, but issues will undoubtedly arise. Common wheelchair flaws can make them considerably more frustrating to use than they should be, whether the wheelchair's components have broken down or you're having issues with the chair's comfort. The disability of the elderly could be due to lack of technology system which is most of the normal wheelchair are zero technology. This shown that normal wheelchair is mostly useless but only used for delivering patients from A to B. Moreover, even with assistance, doing simple tasks like getting into and out of bed or just moving around becomes a very difficult task due to its design and patient's medical tool such as drip water holder. The right wheelchair can address most of these issues and keep the user comfortable while providing mobility. Moreover, the wheelchair has additional technology to check temperature, heart rate and oxygen saturation readings on the wheelchair which is to enhances the quality of patient care. In this case, we can be able to check the patient's condition only on the wheelchair which have additional technology without any medical tools. Moreover, we also can get any information from the patient without moved them from the wheelchair which is more convenient for doctors to do their work. The accessibility of wheelchairs is an important factor that may impact the patient's loyalty.

2.3 STUDY ON RECENT RESEARCH AND RELATED PRODUCT

A wheelchair is a powered or manually propelled vehicle that is primarily intended for use by someone with a mobility impairment for both inside and outdoor locomotion. In any place that is intended for pedestrian traffic, people with mobility disabilities must be allowed to use wheelchairs and manually powered mobility aids, walkers, crutches, canes, braces, or other similar devices.

Figure 2.2.1: POWERED WHEELCHAIR

A powered wheelchair is a mobility aid that is designed to assist individuals with mobility impairments in moving around. Unlike traditional manual wheelchairs, which require the user to manually push the chair's wheels to move, a powered wheelchair is powered by an electric motor and can be operated using a joystick or other control device.

However, powered wheelchairs can be expensive and may not be covered by insurance in some cases. Additionally, they may require more maintenance than traditional manual wheelchairs due to their electric components. It is also important to ensure that the user has sufficient cognitive and physical abilities to operate the powered wheelchair safely. Nonetheless, for many individuals with mobility impairments, a powered wheelchair can provide significant benefits in terms of improved mobility, independence, and quality of life.

Figure 2.2.2: SPORT WHEELCHAIR

A sport wheelchair is a specialized type of wheelchair designed for use in various sports and recreational activities. These chairs are designed to be lightweight, durable, and agile, allowing athletes with mobility impairments to participate in sports and activities that would otherwise be inaccessible.

However, sport wheelchairs can be expensive and may not be covered by insurance in some cases. It is also important to ensure that the wheelchair is properly fitted and adjusted to the athlete's needs to avoid injury and maximize performance. Nonetheless, for many athletes with mobility impairments, a sport wheelchair can provide an important avenue for pursuing their athletic goals and enhancing their overall quality of life.

Figure 2.2.3: SMART WHEELCHAIR

A smart wheelchair is a type of wheelchair that uses technology to enhance its functionality and improve the user's mobility and independence. Smart wheelchairs can be equipped with a range of sensors, controls, and communication systems that enable them to navigate their environment, avoid obstacles, and respond to user commands and preferences.

Smart wheelchairs can provide significant benefits for individuals with mobility impairments, including increased independence, safety, and social participation. However, they can be expensive and may require significant training and support to use effectively. Nonetheless, the development of smart wheelchair technology has the potential to significantly improve the lives of individuals with mobility impairments, and the field is rapidly evolving with new innovations and advancements.

2.4 TYPES OF MATERIALS

Materials are critical variables in selecting which materials are used in transfer patient wheelchair to generate a standard and enduring product. Material selection is an important step in the design of any physical entity. The primary purpose of material selection in the context of product design is to lower the cost of the product that must be spent. The attributes and costs of candidate materials serve as the beginning point for systematic selection of the best material for a certain application. Efforts to locate reference materials are crucial to ensuring the project's efficacy and report completion. As a result, precise project-related information has been acquired to guarantee that the project is well-known and functional. The study's findings will be reviewed and applied to design in order to ensure that the standards are satisfied and that the needs of the diploma project are addressed.

2.4.1 MILD STEEL

Mild steel, also known as low carbon steel, is a type of carbon steel that contains a low amount of carbon (usually less than 0.3%) and other alloying elements. It is one of the most used materials in the manufacturing industry due to its affordability, versatility, and ease of fabrication.

Mild steel has a relatively low tensile strength compared to other types of steel, such as high carbon steel or stainless steel. However, it is more ductile, which means it can be easily deformed without breaking. Mild steel can also be easily machined, cut, and welded, making it a popular choice for manufacturing processes.

One of the drawbacks of mild steel is that it is prone to rusting and corrosion if not properly protected. To prevent this, mild steel is often coated with zinc, painted, or galvanized. Nonetheless, mild steel remains a popular material choice for many applications due to its affordability, versatility, and ease of use.

2.4.2 SPONGE SEAT

A sponge seat is a type of seat cushion that is made of sponge-like material, such as foam or memory foam. Sponge seats are commonly used in a variety of seating applications, including chairs, sofas, car seats, and wheelchair cushions.

The sponge-like material used in sponge seats is designed to provide cushioning and support, while also conforming to the shape of the user's body for added comfort. The material is typically soft and pliable, which allows it to compress and rebound as weight is applied and removed.

CHAPTER 3: METHODOLOGY

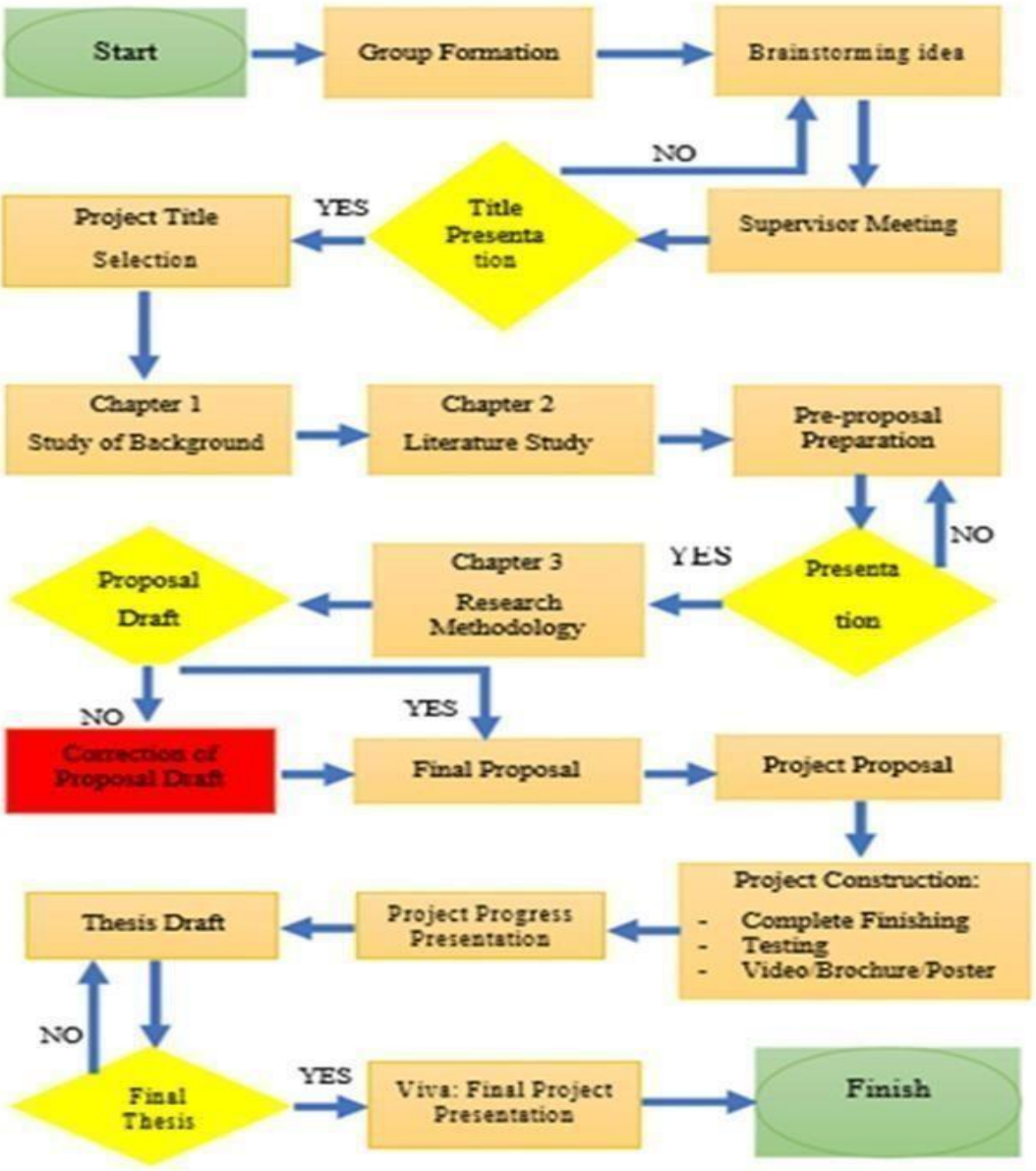
3.1 INTRODUCTION

A wheelchair is suitable if it accommodates the user's needs and the surrounding circumstances, offers proper fit and postural support based on sound biomechanical principles, is safe and durable, and can be obtained, maintained, and sustained in the nation at the most reasonable and cost-effective price. A wheelchair that is appropriate can help the user enter a new world, moving from exclusion to inclusion, participating in all societal activities, sports, and recreation, all of which promote independence, better health, and a higher quality of life.

3.2 FLOW CHART

Project planning is one of the important parts of this project. It is based on the Flow chart and Gantt chart to plan a project progress and report about it later. It is a good tool during the project implementation as it compares the project objectives to the planning, reacts to the plan deviations, provides a planning of a schedule, and therefore controls the project implementation.

Flow chart shown in Figure 13 represent the steps have been taken. Meanwhile, Gantt Chart in figure 14 show the duration of each task or activity until the concept design completed.


Start
Group Formation
Brainstorming idea
NO
Supervisor Meeting
Title Presentation
YES
Project Title Selection
Chapter 1 Study of Background
Chapter 2 Literature Study
Pre-proposal Preparation
NO
Presentation
YES
Chapter 3 Research Methodology
Proposal Draft
NO
Correction of Proposal Draft
YES
Final Proposal
Project Proposal
Project Construction:
- Complete Finishing
- Testing
- Video/Brochure/Poster
Project Progress Presentation
Thesis Draft
NO
Final Thesis
YES
Viva: Final Project Presentation
Finish

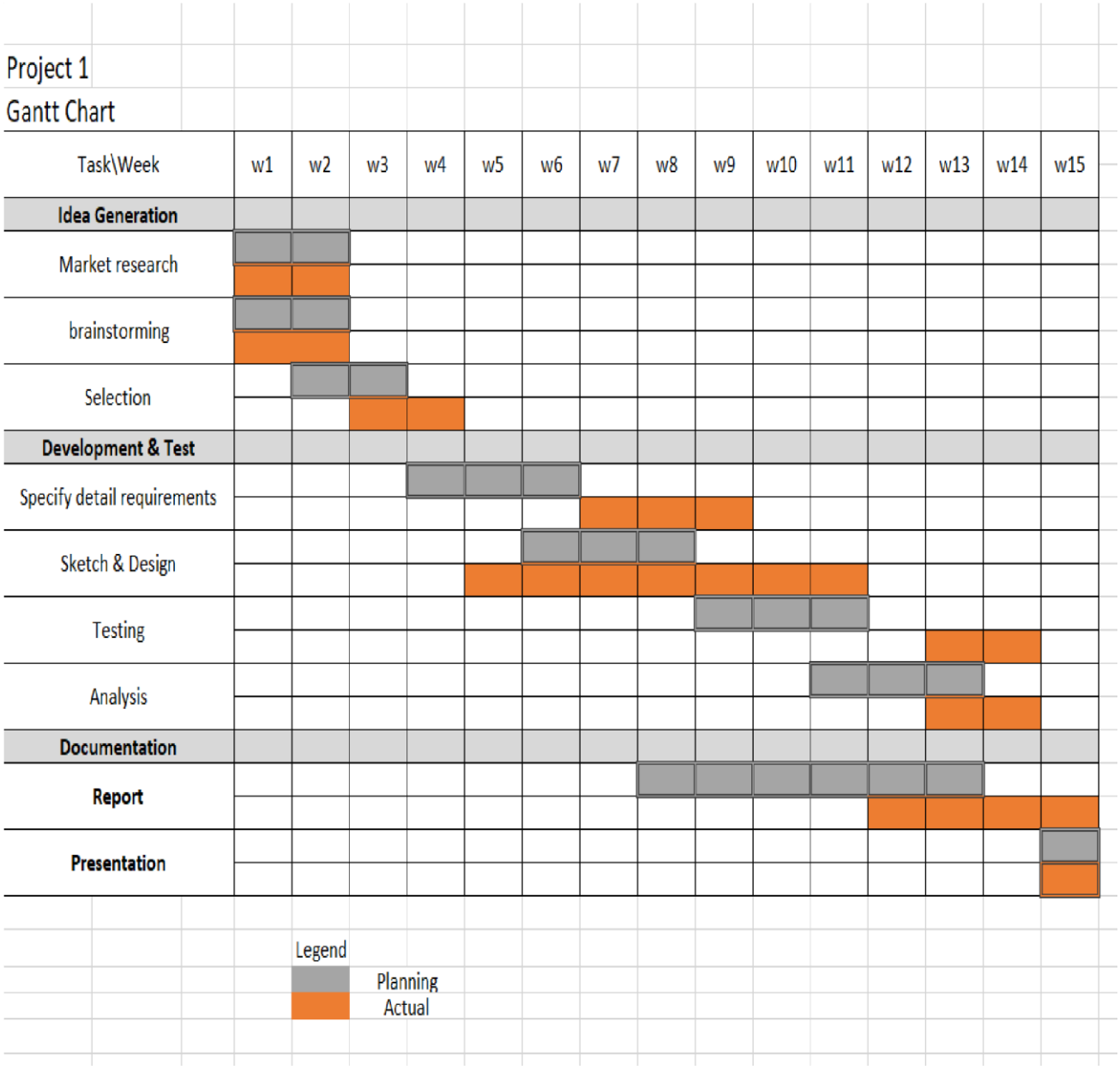


Table 3.2.2: Gantt Chart for Project 1

Week / Project Activities	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Market Research														
Brainstorming														
Specify Detail Requirements														
Sketch & Design														
Material Selection														
Fabrication														
Testing														
Analysis														
Report														
Presentation														


Planning


Implementation

Table 3.2.3: Gantt Chart for Project 2

3.3 MARKET SURVEY

The size of the global wheelchair market was estimated at USD 4.50 billion in 2021, and it is projected to increase at a CAGR of 7.2% from 2022 to 2030. Due to the disruption of the supply chain and business operations across several locations in 2020 during the COVID-19 pandemic, the market saw a drop. The growing elderly population and the rise in spinal cord injuries requiring assistance with mobility are a few of the key drivers fueling the market's expansion. Around 17,730 new spinal cord injuries occur in the United States each year, with auto accidents being the main cause of injury, according to the National Spinal Cord Injury Statistical Centre. As a result, the United States is a significant market for wheelchairs. The transport and mobility sector had been severely impacted by the COVID-19 pandemic. It had significantly impacted the wheelchair's supply chain. Due to the severe lockdowns put in place, wheelchair operations were stopped in various nations. Due to an increase in the number of elderly patients being admitted as a result of the COVID-19 infection, hospitals have seen constant demand. Businesses are anticipated to restart operations with the updated COVID-19 restrictions. The prevalence of chronic disease, growing senior population, and increasing risk of lifestyle-associated ailments among a large population as a result of rising obesity and sedentary lifestyles are all projected to contribute to an increase in the need for wheelchairs.

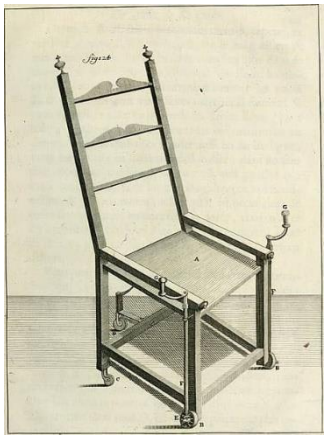
3.4 IDEA GENERATION

The earliest examples of wheeled furniture can be found in an inscription discovered on a stone slate in China and a frieze on a Greek vase, both from about the sixth and fifth centuries BCE. Three centuries after the invention of wheeled seats for the transportation of the disabled, the Chinese began using early wheelbarrows to move both people and heavy things. It wasn't until several hundred years later, around 525 CE, when depictions of wheeled chairs constructed expressly to transport people start to appear in Chinese art, that the two uses were separated.

Although comparable designs were ultimately created by Europeans, this mode of transportation did not exist until 1595, when an unidentified Spanish inventor created one for King Phillip II. Even though it was a complex chair with armrests and leg rests, the design was still flawed because it lacked a reliable propulsion system and needed assistance to

move. Because of this, the design is more like a contemporary highchair or portable throne for the wealthy than a contemporary wheelchair for the crippled.

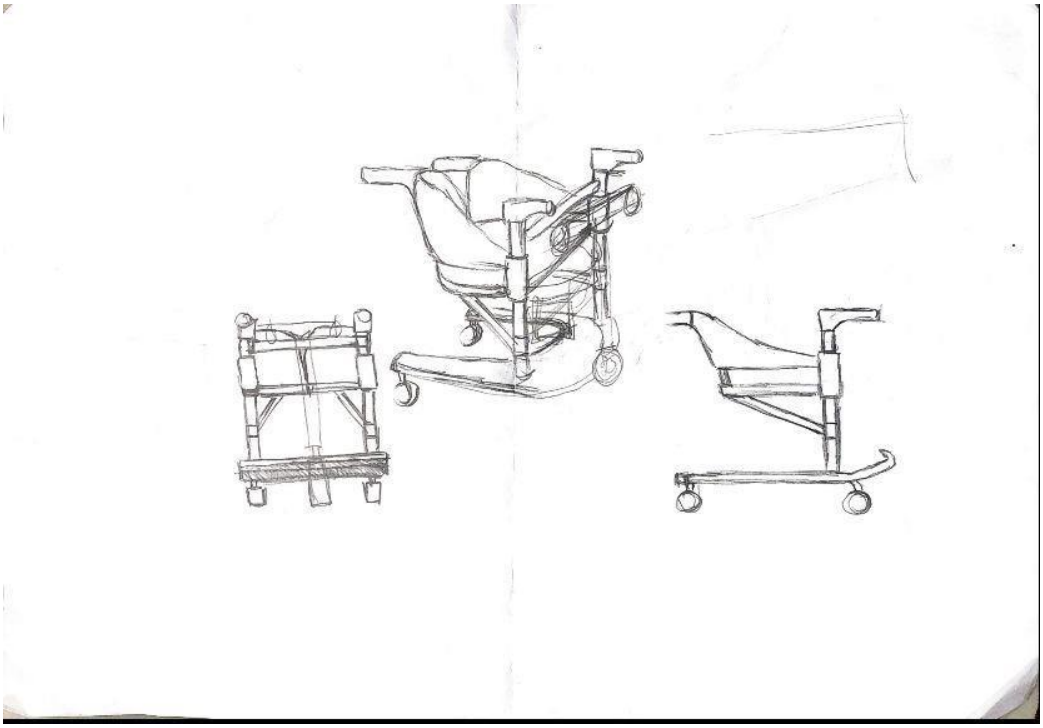
The first self-propelled chair was created in 1655 by watchmaker Stephan Farffler, a 22-year-old paraplegic. It was built on a three-wheel base utilising a crank and cogwheel mechanism. But because it had hand cranks installed at the front wheel, the machine looked more like a hand bike than a wheelchair. Around 1760, the Bath chair or invalid carriage made the technology more widely used.



3.4.1 CONCEPTUAL DESIGN IDEA

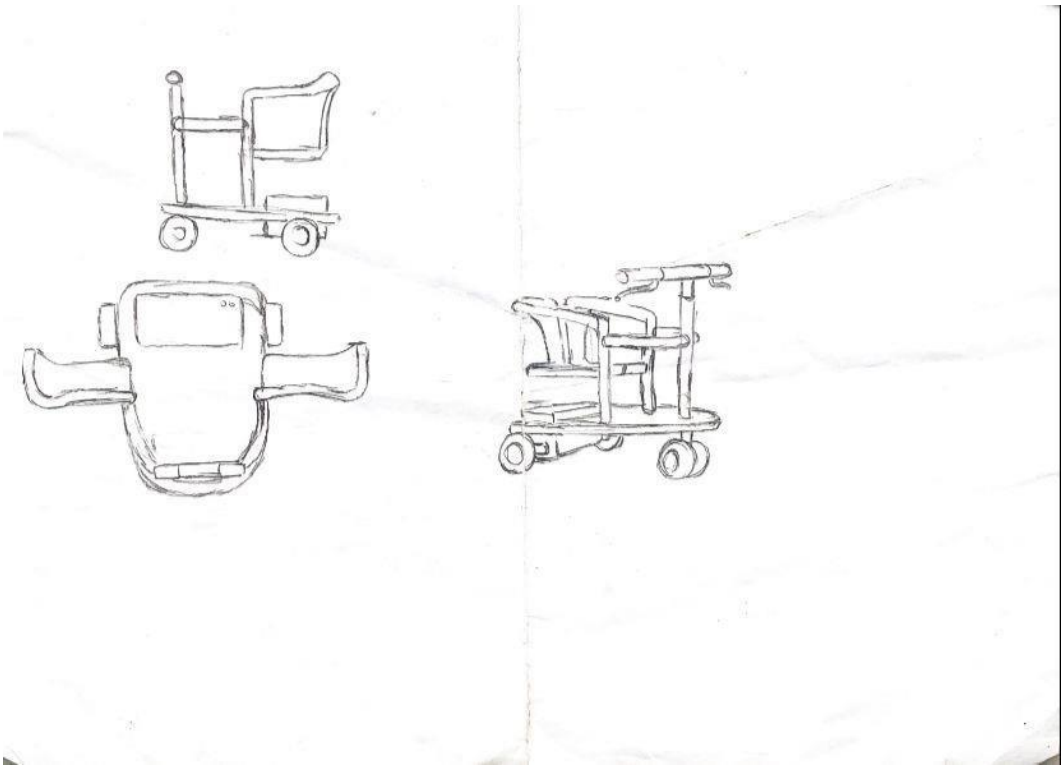
The initial or very first stage of the design process is conceptual design, which gives an idea a visual form. Making a variety of solutions is part of the project development process so that the design's course can be gradually narrowed down.

IDEA 1

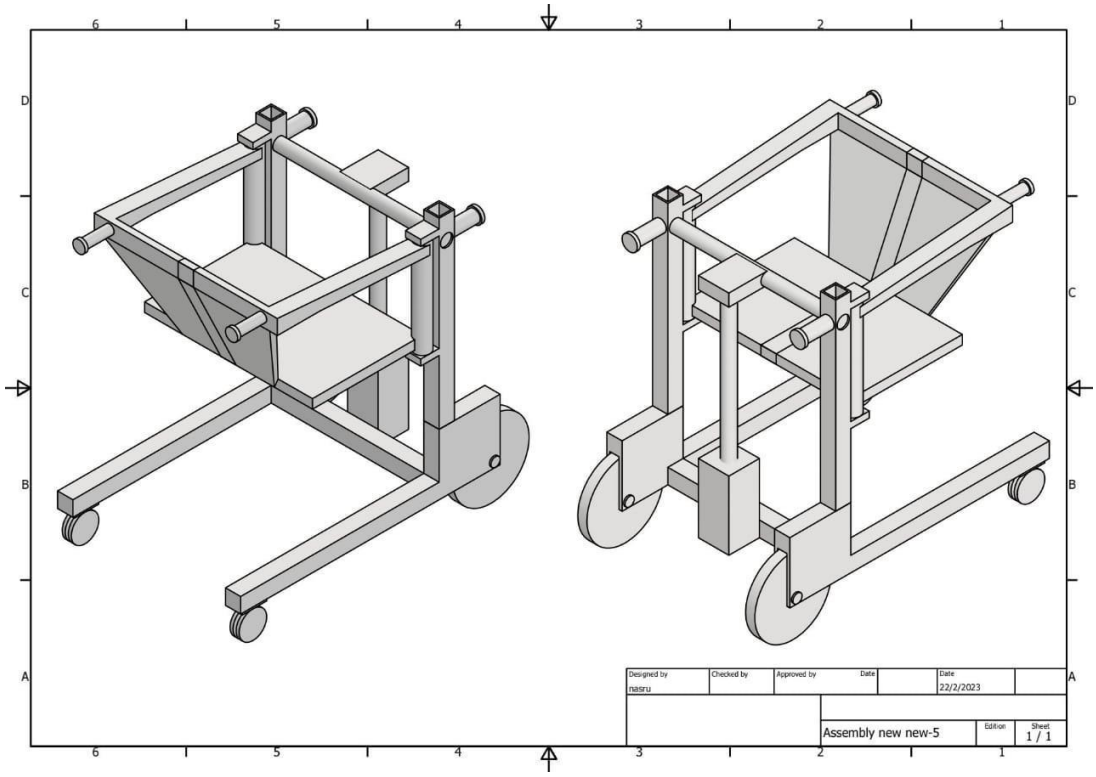


AC Power Supply

IDEA 2



IDEA 3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nasru
Checked by
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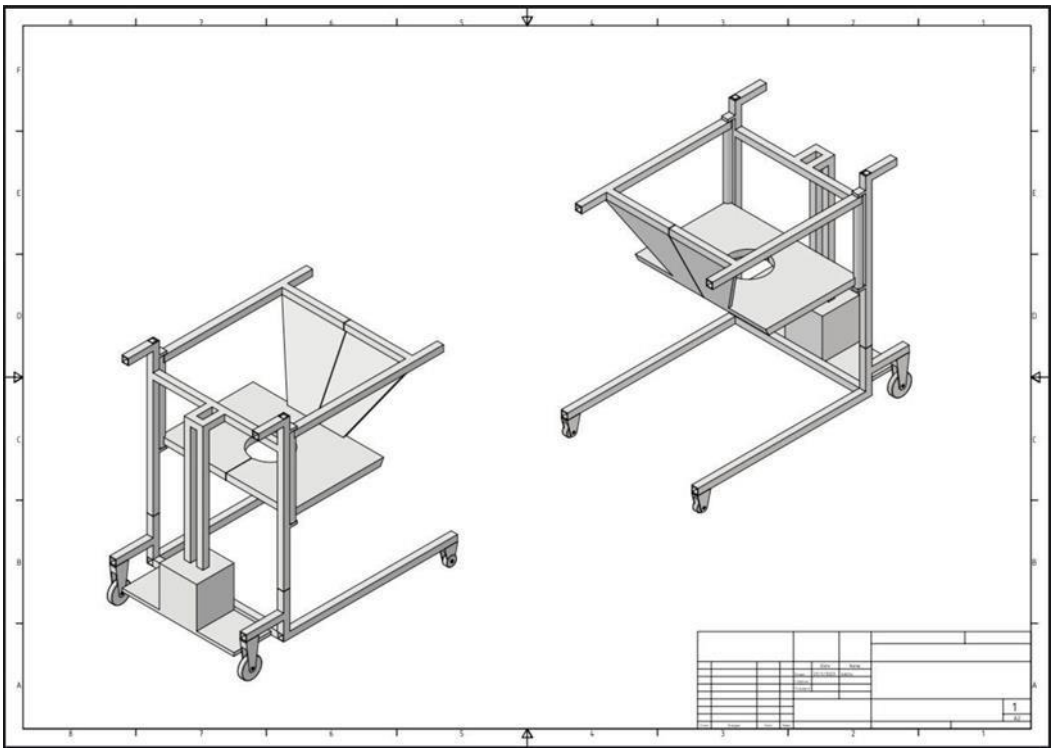
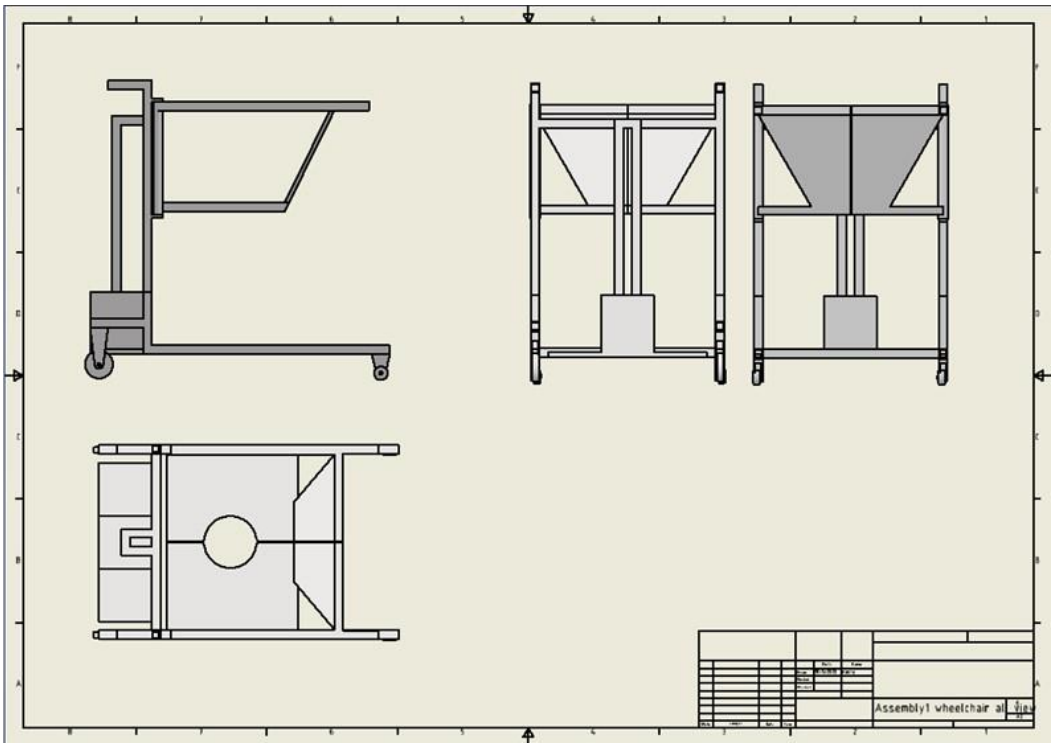
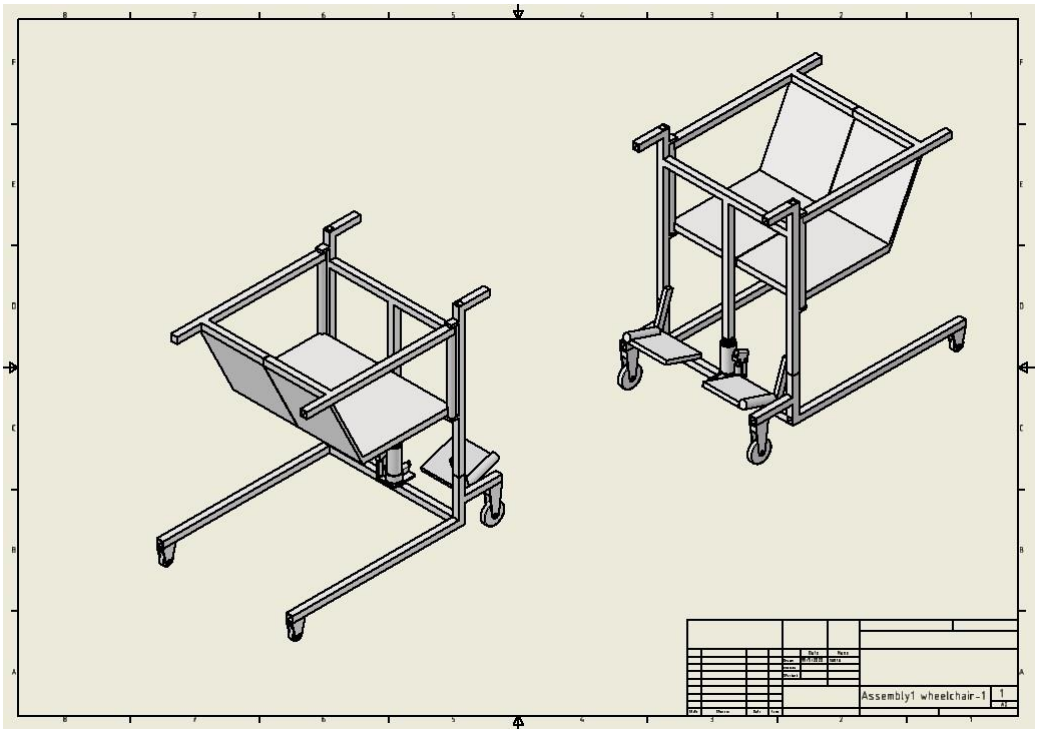
Date
Date
22/2/2023
Assembly new new-5
Edition
Sheet
1 / 1

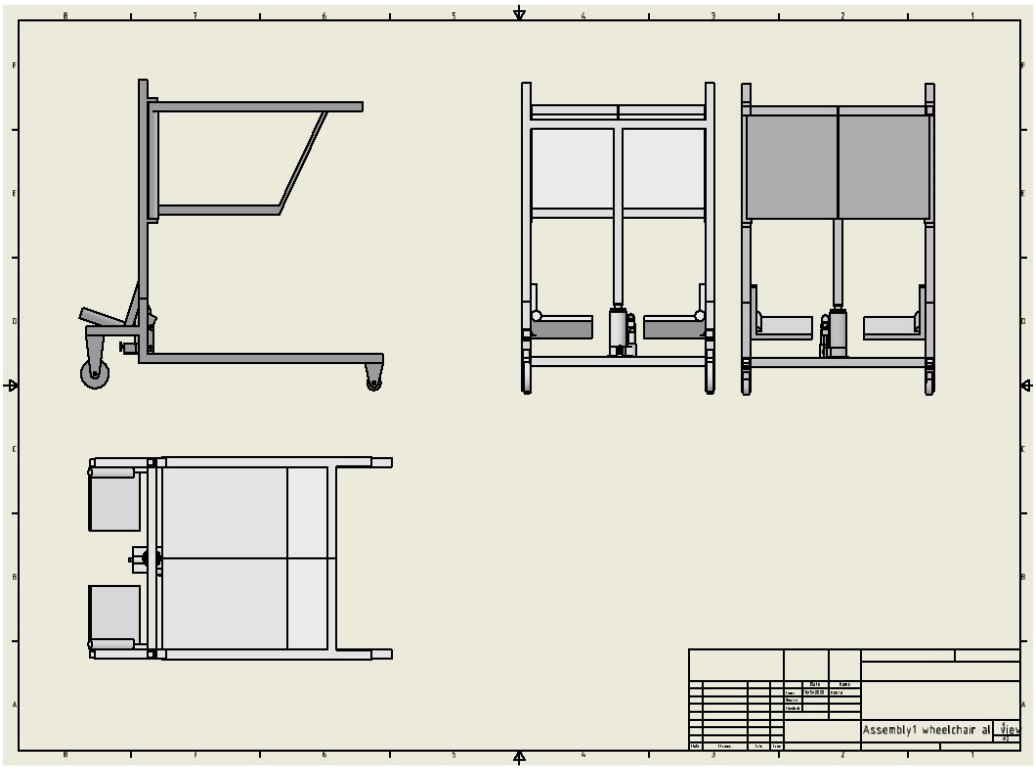
IDEA 4





IDEA 5





3.5 WORK MATERIAL/MACHINE/EQUIPMENT

To start a project, the first step needs to consider is the materials, machines and equipment's needed in this project. The explanation of materials, machines and equipment used are as below.

3.5.1 WORK MATERIAL

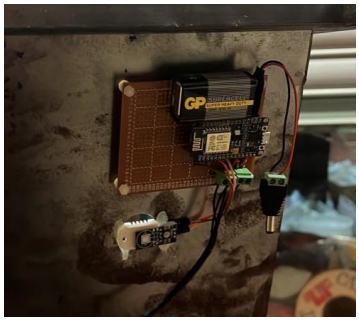
After made some discussion and survey, these are the raw materials that need to build up this project as shown in Table 3.5.1.

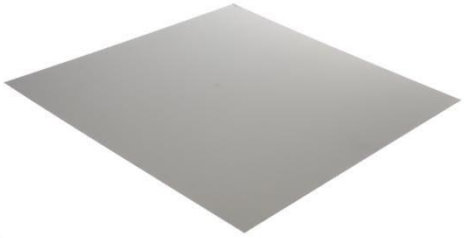
Table 3.5.1: Raw materials used in this project.

NO	PICTURE	DESCRIPTION
1	DOOR HINGE 	The door hinge allows the seat of the wheelchair to open and close.
2	SQUARE HOLLOW 0.6X0.6 	Square hollow 0.6x0.6 used as the insole of square hollow 1x1.
3	SQUARE HOLLOW 1X1 	Square hollow 1x1 used to make a frame of the wheelchair.

4	HANDLE GRIP 	Handle grips provide a secure and comfortable grip on the wheelchair.
5	HYDRAULIC JACK 	The wheelchair is raised by a hydraulic jack using hydraulic pressure.
6	DENSITY SEAT FOAM 	The density seat foam used to give comfort and support.
7	SAFETY BELT 	Safety belt used to secure occupants in their seats.

8	FOAM ARMREST 	A foam armrest is a padded support structure to provide comfort and support to the arms while seated.

9	WHEELCHAIR FOOTPLATE 	A wheelchair footplate is an integral component of a wheelchair that provides support and a stable platform for the user's feet.
10	CASTER WHEELS 	Caster wheels are an essential part of a wheelchair's mobility system. They are small, swivelling wheels mounted at the wheelchair.
11	IOT HARDWARE 	IoT (Internet of Things) hardware refers to the physical devices and components that enable connectivity and data collection within an IoT system.

12	STEEL PLATE 	A steel plate, piece of metal that is rectangular or square in shape used for a place to lean on.
13	EDGE PROTECTOR STRIP 	An edge protector strip is a protective device we used to protect the edges from hitting the user.
14	BACKREST 	A backrest used to provide comfort and ergonomic support to the back while sitting.

3.5.2 WORK MACHINES

Table 3.5.2: Work machines

NO	PICTURE	DESCRIPTION
1	CUT OFF MACHINE 	A cut-off machine, also known as a cutoff, saw or abrasive saw, is a power tool used to cutting the mild steel,
2	 WELDING MACHINE	A welding machine, is a device used to join or fuse two or more pieces of metal together by melting and fusing the materials at the joint.
3	GRINDER 	A grinder, is a handheld power tool used for various grinding, cutting, and polishing tasks.

3.5.3 EQUIPMENT

Table 3.5.3: Equipment

NO	PICTURE	DESCRIPTION
1	MEASURING TAPE 	Used to measure the length of material before cutting process.
2	L-SHAPE RULER 	Used to create the perpendicular lines and to measure off parallel line with 90 degrees.
3	SCREWDRIVER 	A hand instrument called a screwdriver is used to tighten or loosen screws by imparting torque to the screw head.
4	WIRE CUTTER 	Wire cutter is used for cutting and trimming the wires.

5	MARKER PEN 	Marker pen is used to mark line on steel for cutting.
6	SPRAY PAINT 	We used a spray paint to paint our product.
7	SCISSORS 	Scissors are a handheld cutting tool we used to cutting tape and seat foam.
8	DOUBLE TAPE 	Double tape used to stick between seat foam and steel plate.

3.5.4 SAFETY EQUIPMENT

Table 3.5.4: Safety equipment

NO	PICTURE	DESCRIPTION
1	SAFETY GOGGLES 	To protect the eyes when doing cutting and grinding are being done.
2	SAFETY BOOTS 	To protect our foot when doing work in workshop.
3	SAFETY JACKET 	Protect our body when doing cutting and grinding.
4	GLOVES 	To shield our bodies from arc rays, fires, hot components, sharp or flying metal, and electric shock. The first line of defence against the hand risks of cutting is a good pair of gloves.

3.6 PROJECT COST

Table below shows the materials used and cost estimation for the invention. These are main components used for the project. This cost estimation made from the survey done by using an estimate of the highest and lowest cost possible to fabricate the project.

Table 3.6: Project cost

NO.	MATERIAL	COST OF PRICE (RM)
1	SQUARE HOLLOW 1X1 (6 METER)	102
2	2.0MM HINGES / ENSIL	5
3	SQUARE HOLLOW 0.6X0.6 (6 METER)	40
4	SAFETY LOCK 2 (2 PIECES)	5
5	HANDLE GRIP (2 PIECES)	10
6	HYDRAULIC JACK HEAVY DUTY	25
7	BACKREST	25
8	DENSITY SEAT FOAM	30
9	WHEELCHAIR FOOT PLATE	75
10	SAFETY BELT	15
11	FOAM ARMREST	41
12	IOT HARDWARE	170
13	IOT WIRING	200
14	SOFTWARE	300
15	ASSSEMBLY	320
16	CASTER WHEELS	40
17	SIDE RELEASE BUCKLE	7
18	EDGE PROTECTOR STRIP	10
19	DOUBLE TAPE	3
20	SPRAY PAINT	9
TOTAL: RM1432		

3.7 PROJECT DESIGN AND SKETCH

Product Modelling (Isometric & explode diagram)

Before a physical version of the product is ever constructed, users can test its shape, fit, and function using Inventor's ability to integrate 2D and 3D data in a unified environment. Powerful parametric, direct edit, and freeform modelling tools are available in Autodesk Inventor, along with multi-CAD translation capabilities and standard DWGTM drawings. ShapeManager, a proprietary geometric modelling kernel from Autodesk, is used in Inventor. Direct rivals of SolidWorks, Solid Edge, and Creo are Autodesk Inventor.

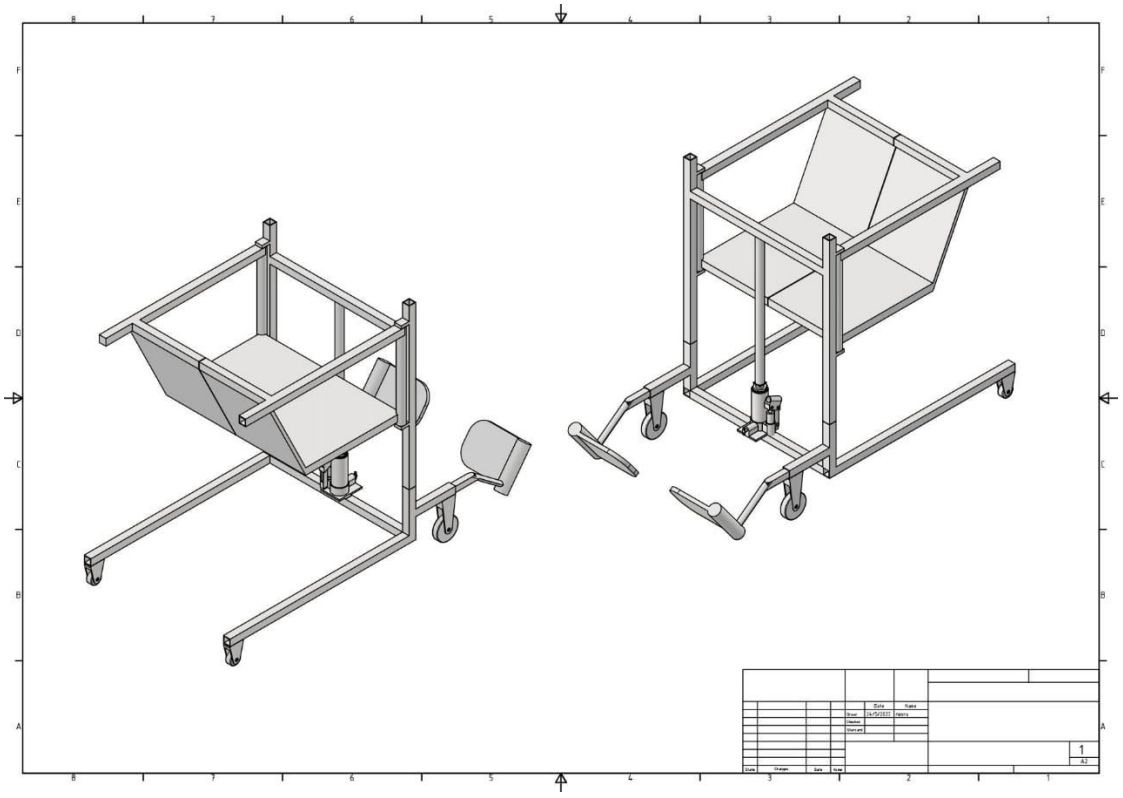


Figure 3.7.1: ISOMETRIC DIAGRAM OF THE PROJECT USING AUTODESK INVENTOR

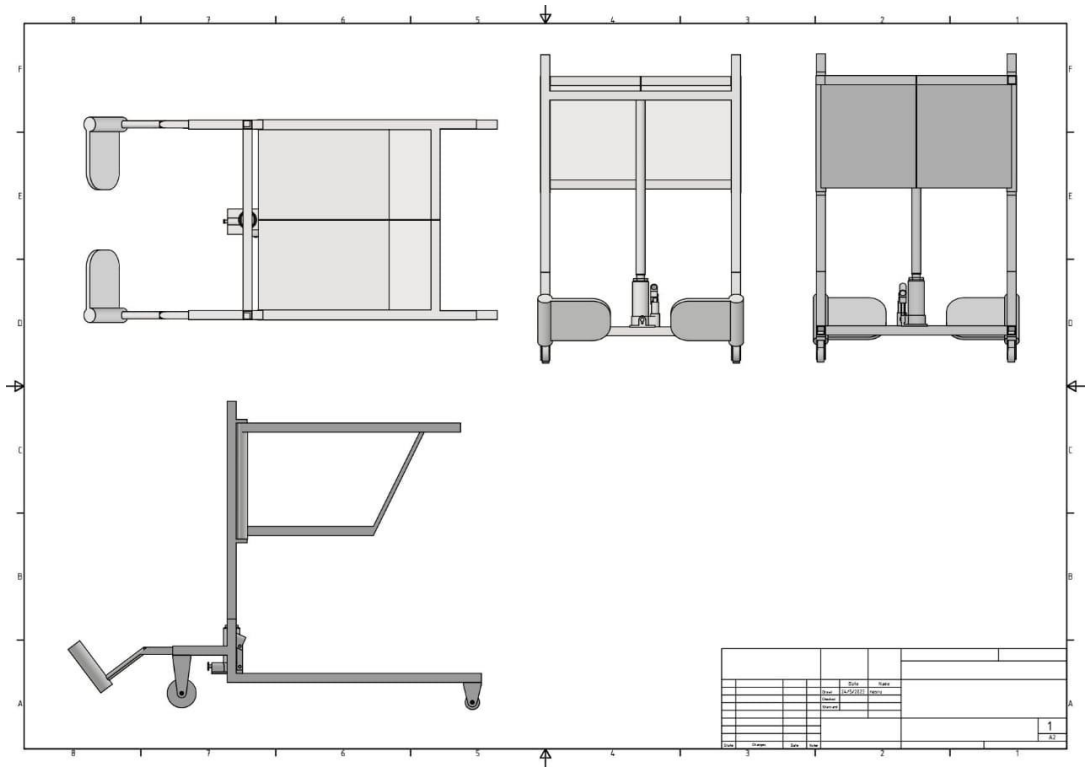


Figure 3.7.2: TOP VIEW, FRONT VIEW, SIDE VIEW DIAGRAM USING AUTODESK INVENTOR

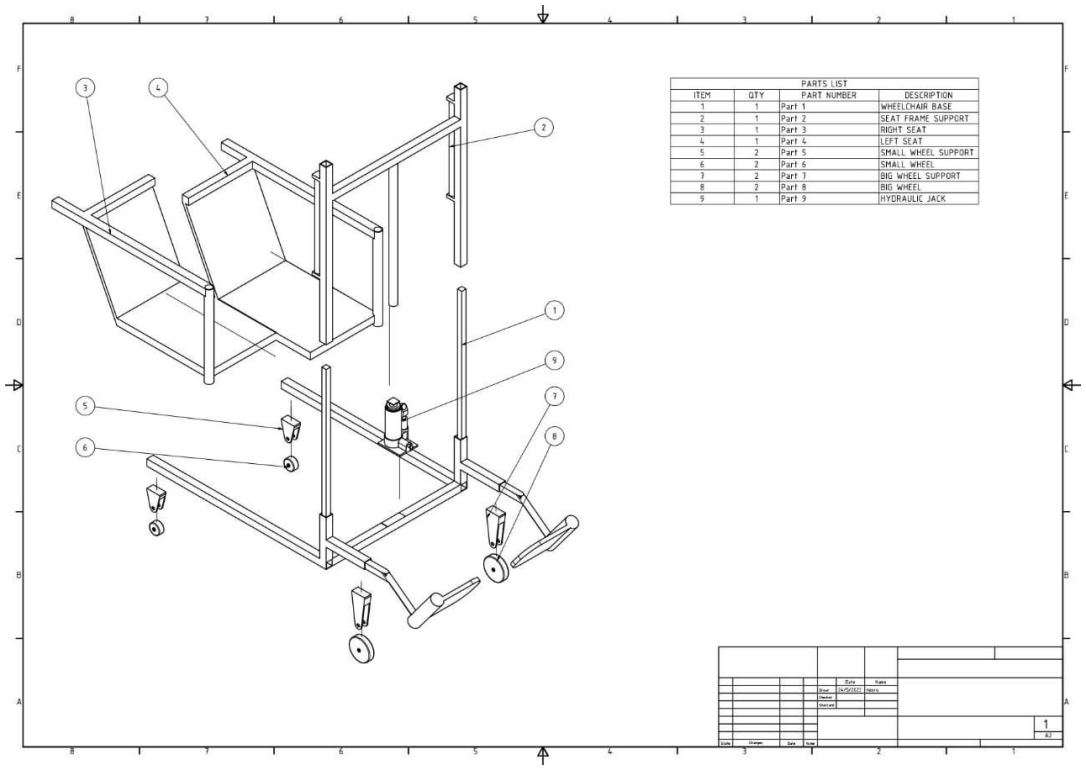


Figure 3.7.3: EXPLODED VIEW DIAGRAM USING AUTODESK INVENTOR

3.8 PROCEDURE

The following table are the step and the procedure in detail. We achieve our goal in the time taken to do so. We also prepared the design and material beforehand and built it. It explains the experiment techniques through our project by surveying, inspection, and ways to carry out the project.

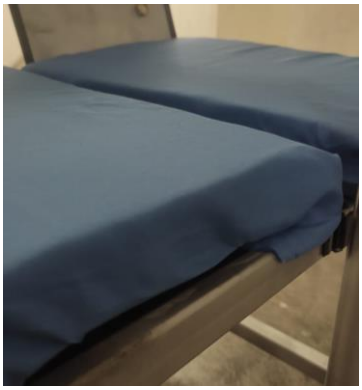
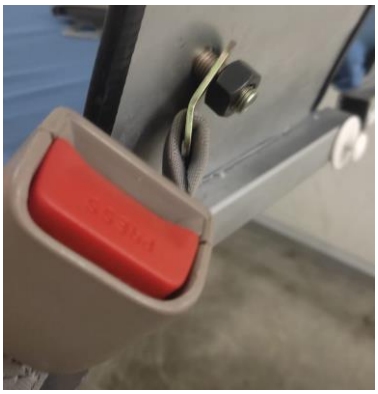
Table 3.8: Procedure

OBSERVATION	PROCEDURE
	Firstly, we prepared the items, work machines and equipment's needed to fabricate our project. We wore our safety jackets and safety boots throughout the fabrication process.
	We are using cutting machine to cut our raw material into the size according to our design.
	After cutting, we measure the length of the raw material to make sure any size of raw material is correct.

	When there is incorrect size for the workpiece, we use grinder to do correction size for the workpiece.
	When any workpiece is done, we starting to weld the wheelchair's base chassis.
	After finish wheelchair chassis, we are starting weld base site and site support frame for the wheelchair.
	Next, we weld on all wheels at the wheelchair.

	After that, we chop site base into half and modified it to make it stronger according to our design.
	We built arm rest for both side of the wheelchair.
	After arm rest and site base is finish. We combine it to become the site for the wheelchair.
	We add metal plate to our wheelchair to make it comfortable for siting.

	After all mechanical assembly, this is out result. And then, we are getting ready for adding technology components.
	After programming, we insert an IOT system to the wheelchair for temperature, Heart rate and oxygen saturation checking.
	Weld the hydraulic jack to the wheelchair.
	Spray paints the wheelchair after completing the welding work.

	Wrapping the holder using hand grip.
	Putting on the edge protector strip used to protect the edges.
	Stick the seat foam to the steel plate using double tape.
	Drill a hole to the steel plate to put on the safety belt.

	Tie up the arm rest on both sides.
	We make a hanger to put on the hydraulic jack stick.
	Stick the safety lock the back side of the wheelchair.
	The look of our complete project.

3.9 DATA GATHERING METHOD

We gather information for a patient transfer wheelchair through online surveys, and in-person interviews. First, an online survey. To create an online survey, we employ a platform like Google Forms. To acquire information about the usage, preferences, and experiences of patient transfer wheelchair users, a survey was created. Take notes and record any enlightening or fascinating comments. The sample question for our Google Form survey is depicted in the picture below.

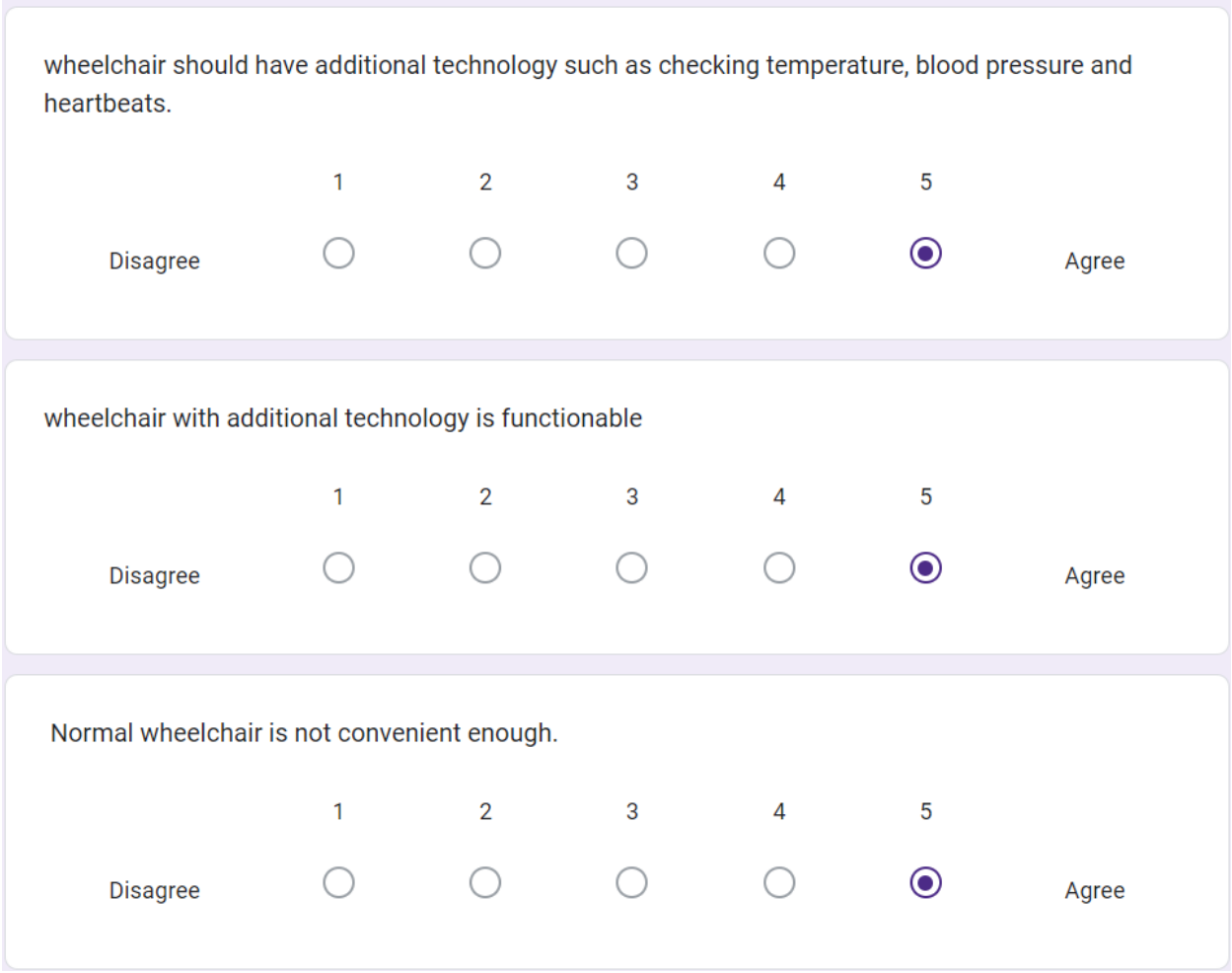


FIGURE 3.9.1

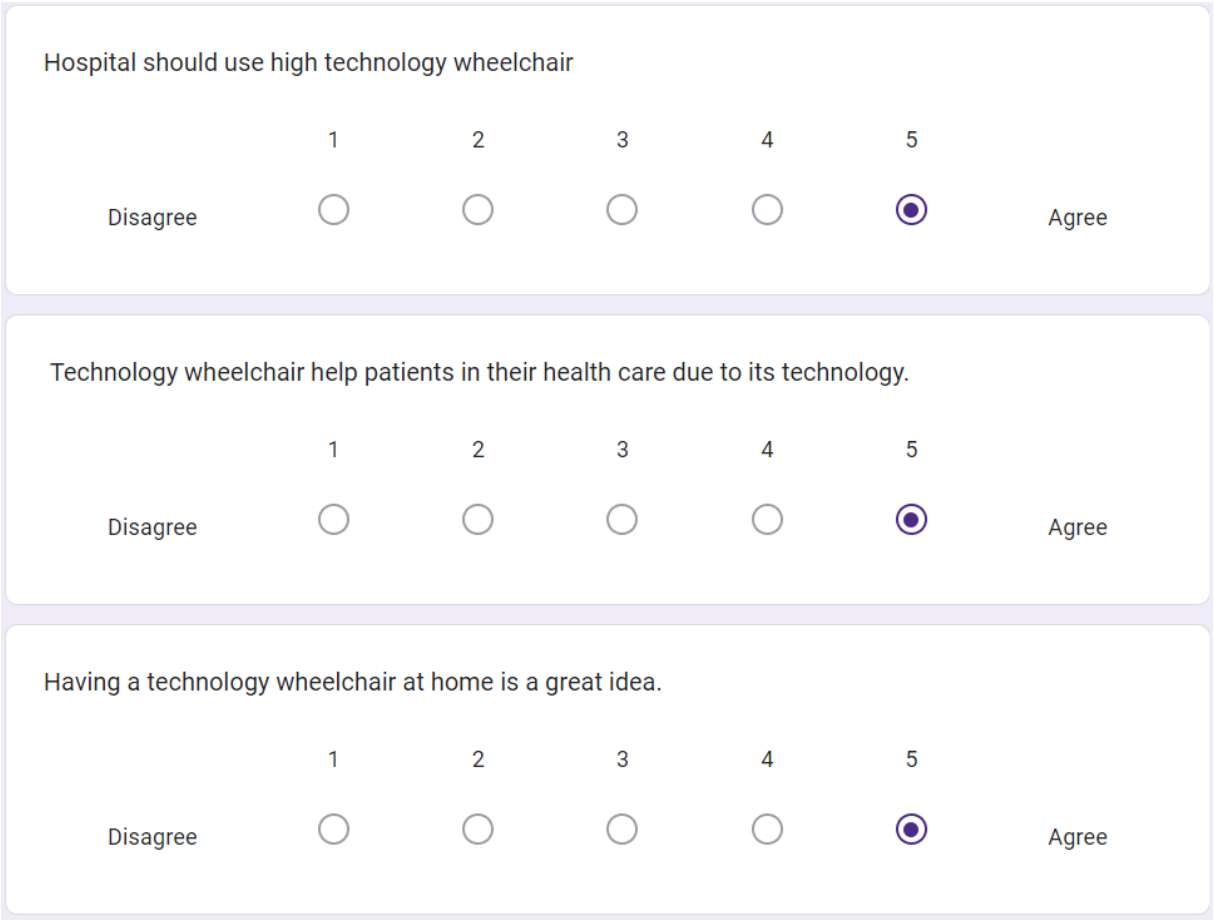


FIGURE 3.9.2

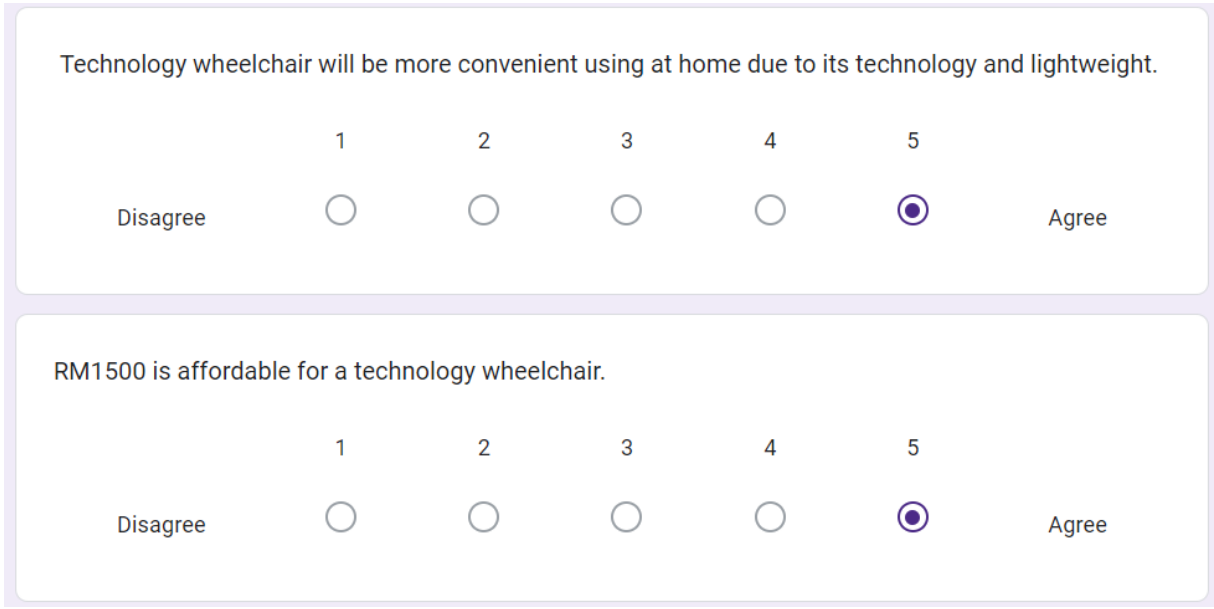


FIGURE 3.9.3

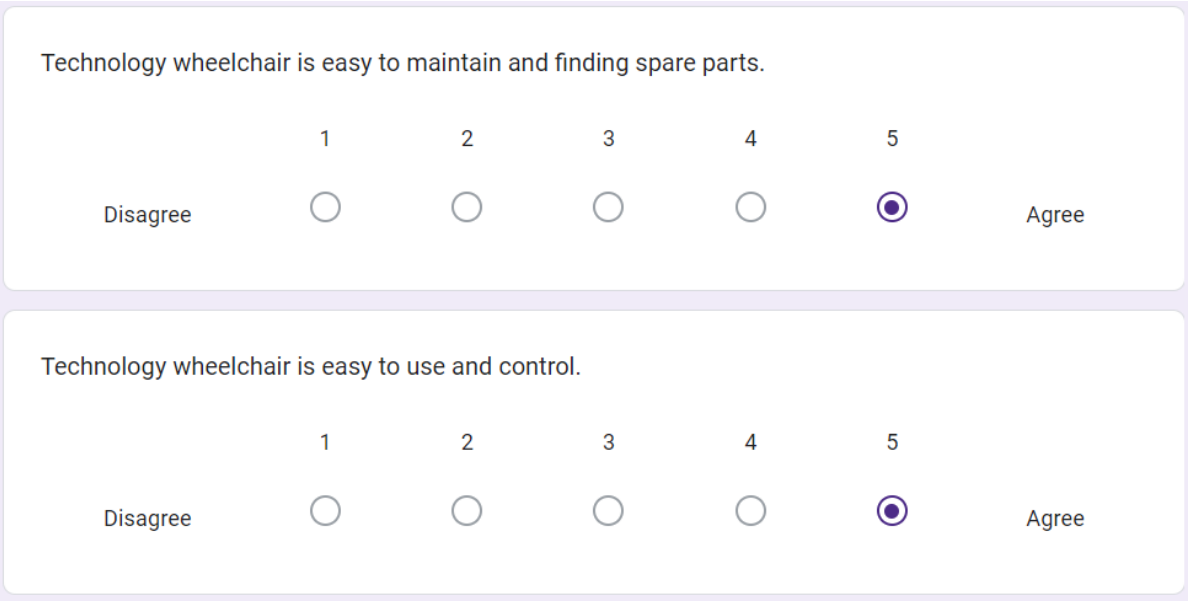


FIGURE 3.9.4

The summary for using Google Forms to gather data about patient transfer wheelchair is as follows. Create a survey using the Google Forms tool with the express purpose of gathering data on patient transfer wheelchair**.**

CHAPETER 4: RESULT, ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

Wheelchair with IOT system is a device that provides a great technology device to helping patient checking more convenient. The wheelchair with technology such as temperature, heart rate and oxygen saturation checking sensors can be able to let patient or user be more comfortable during checking process. They don't need to move while checking their condition. Moreover, the data condition from the patient can be transfer to our mobile device and let us know their condition. Additionally, this technology wheelchair is also built for home use. User can check their condition using this wheelchair without going to hospital or clinic. This can save money for checking and save time.

We performed the following test and results are being discussed about the analysis of checking temperature, heart rate and oxygen saturation using data and Wi-Fi module. We are tried to show our technology wheelchair with IOT system is more functionable than using a normal wheelchair.

4.2 RESULT OF THE PROJECT

Figure 4.2.1: Fabrication of the project

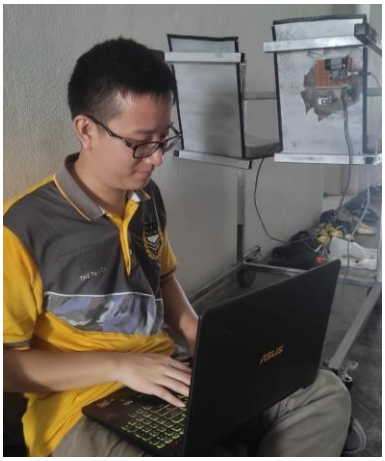


Figure 4.2.2: Coding

Figure 4.2.3: Complete project (front and back view)

Figure 4.2.4: Testing of the project

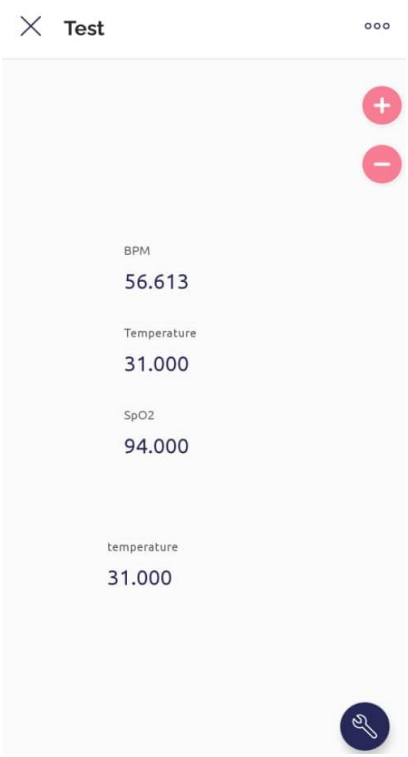
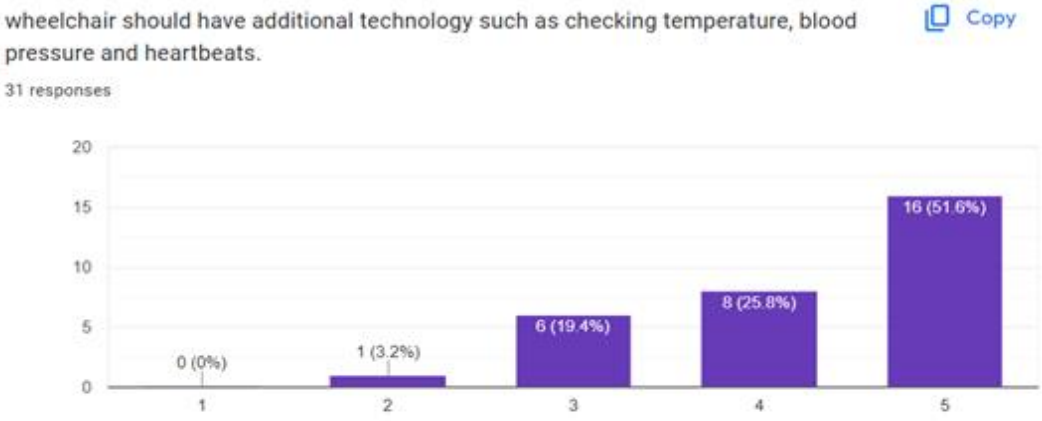


Figure 4.2.5: Display of temperature, heart rate and oxygen saturation

4.3 DATA ANALYSIS AND STATISTIC

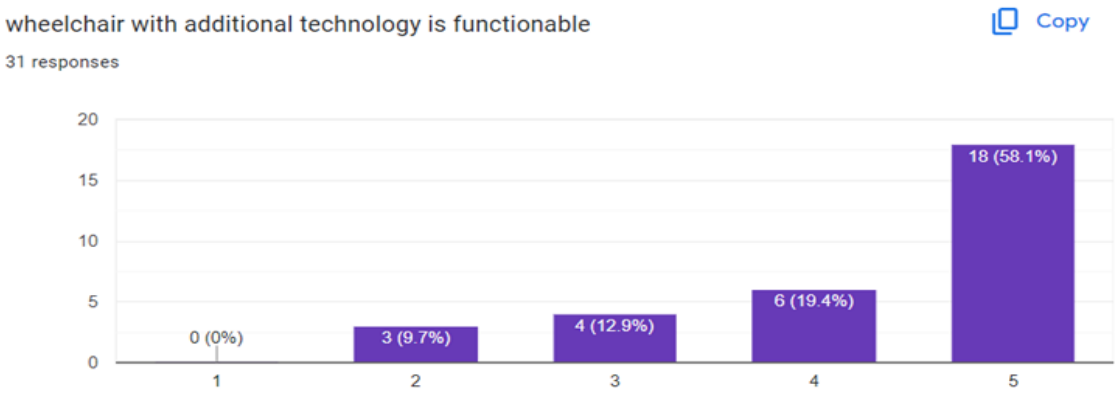
The statistics and data below are what we can get from users through the google form platform to identify the effectiveness of the “Patient Transfer Wheelchair” to all communities.



No one disagrees with the notion of integrating blood pressure, temperature, and heart rate monitoring into a wheelchair in this circumstance (0%).

Natural (19.4%) People who have a natural opinion on the proposal may not strongly lean in either direction. They might be aware of the potential advantages of a wheelchair that can monitor blood pressure, temperature, and heart rate, but they might also be hesitant or worried.

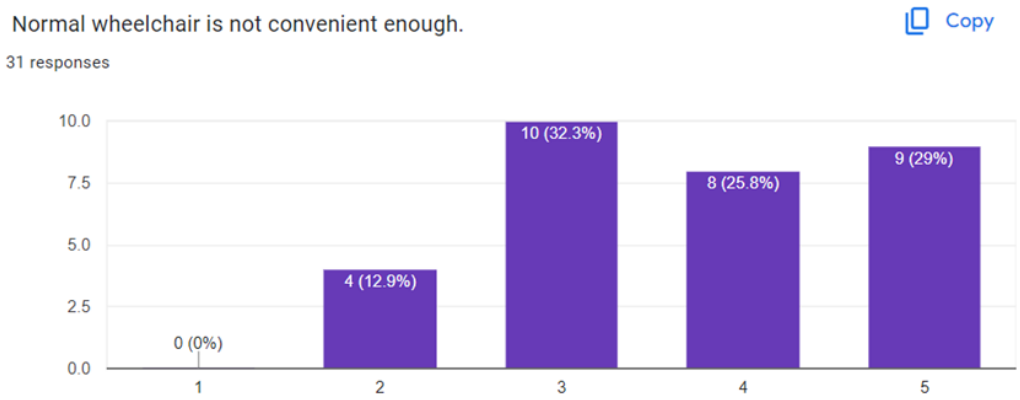
Very Agree (51.6%): Wheelchairs that include blood pressure, temperature, and heart rate monitoring are thought to be significantly more useful because of this improvement. They think that adding these monitoring elements to a wheelchair can have a significant positive impact on the health and wellbeing of wheelchair users.



There are no people who dispute that a wheelchair equipped with extra technology is practical (0% disagreement). This shows that everyone agrees that a wheelchair's functionality can be improved by using technology.

Natural (12.9%) People with a natural attitude towards the proposition can have a more circumspect or guarded viewpoint. They may be aware of the potential advantages of incorporating technology into a wheelchair, but they may also be hesitant or worried.

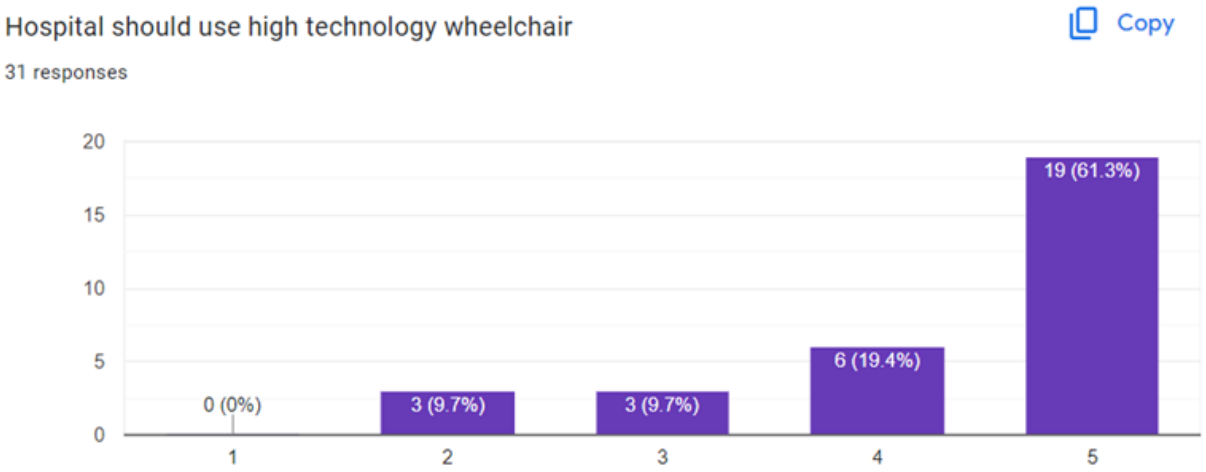
Very Agree (58.1%) Most respondents firmly concur that equipping a wheelchair with technology improves its usability. They think using technology can bring about several benefits, including increased mobility, convenience, and safety features.



There are no people who disagree with the statement that a regular wheelchair is insufficiently handy. This shows that everyone agrees that a standard wheelchair is practical enough for its intended use.

Natural (32.3%) People who take a natural position on the statement may have differing views or choose a neutral viewpoint. While they could admit that a typical wheelchair offers a certain degree of convenience, they might equally admit that there may be space for improvement.

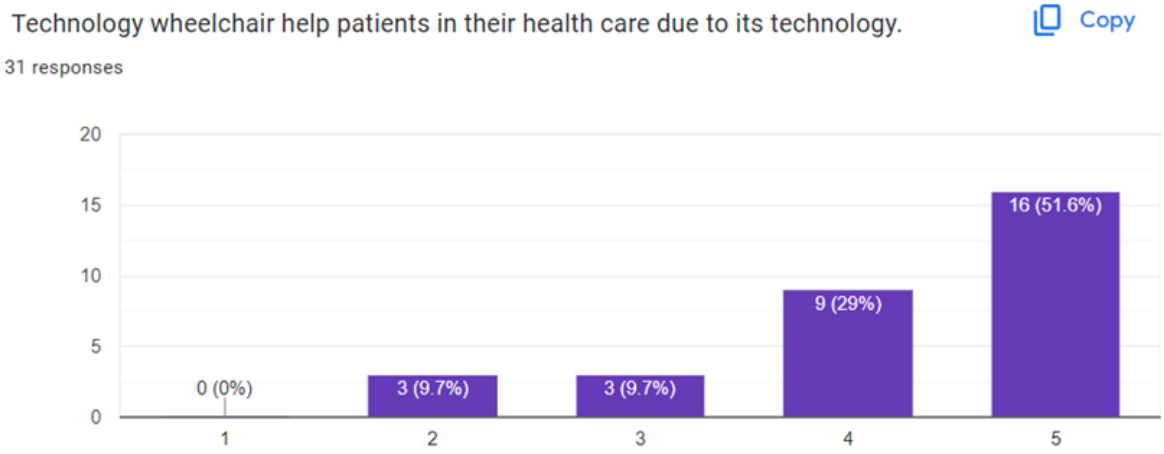
Very Agree (29%) People who firmly agree that a standard wheelchair is not convenient enough think that it has substantial drawbacks. They can claim that conventional wheelchairs are cumbersome, challenging to manoeuvre settings, or



None of the respondents disagree with the notion that hospitals ought to use cutting-edge wheelchairs. This shows that everyone agrees that hospitals should use cutting-edge wheelchairs.

Natural (9.7%): People with a natural position on the idea are more likely to hold a neutral or uncertain viewpoint. They might be aware of the benefits and potential risks associated with utilising high-tech wheelchairs in hospitals.

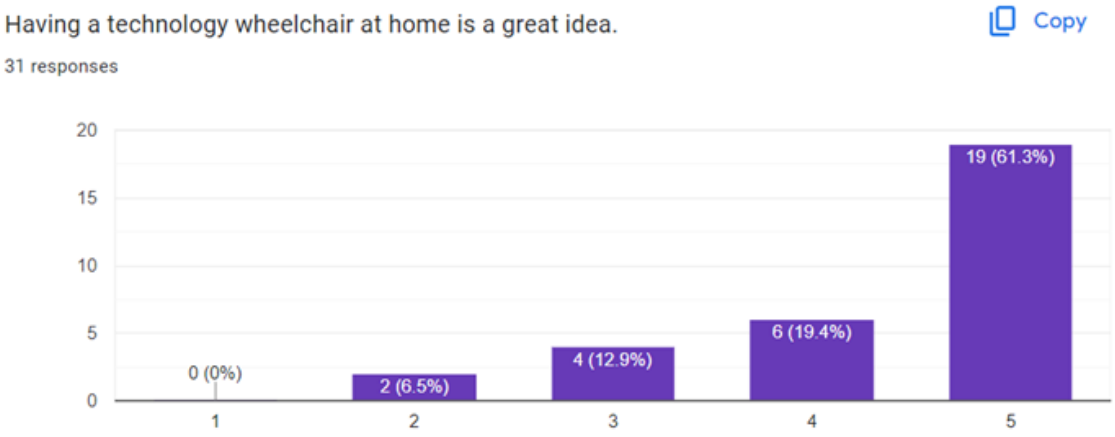
Most responders (61.3%) strongly concur that hospitals should make use of cutting-edge wheelchairs. They think that adding cutting-edge technology to hospital wheelchairs can provide a number of advantages. They may draw attention to attributes including the capacity to monitor patients, automated aid for medical personnel, greater manoeuvrability, improved patient safety features, and interaction with hospital systems.



No one disagrees with the notion that technology wheelchairs assist patients in receiving healthcare (0%). This implies that there is broad consensus that technology wheelchairs do help and benefit patients in their healthcare.

Natural (9.7%) Those with a natural position on the statement are more likely to hold a neutral or undecided viewpoint. Technology wheelchairs may be acknowledged as having the potential to help patients with their healthcare, but they may also consider other aspects that could limit their efficacy.

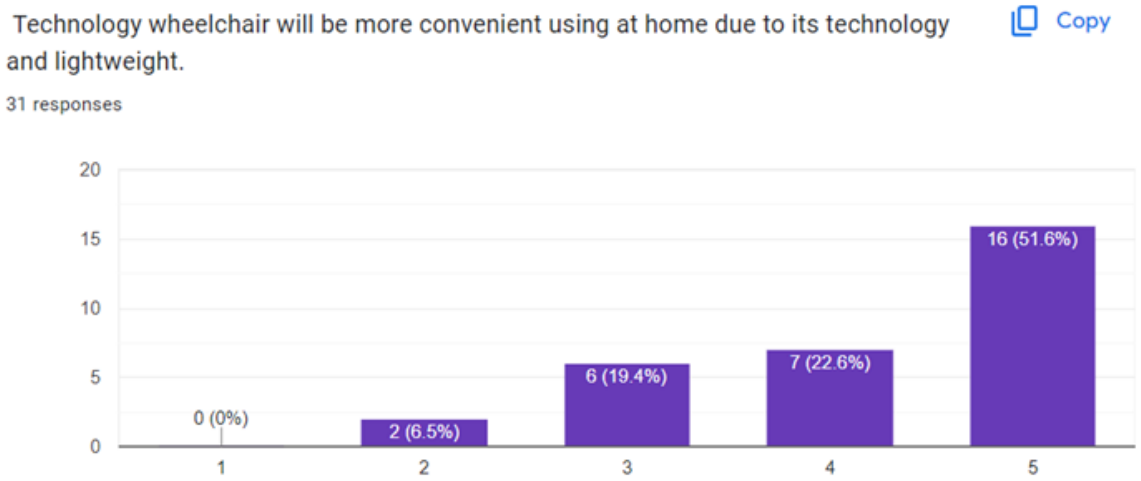
Very Agree (51.6%) Many survey participants firmly believe that technological wheelchairs considerably aid patients in receiving healthcare. They think that adding technology to wheelchairs offers worthwhile advantages like increased comfort, improved mobility, and cutting-edge capabilities that help with healthcare management.



There are no people who disagree that having a high-tech wheelchair at home is a good idea (0% disagreement). This implies there is broad consensus that owning a technologically advanced wheelchair at home is a good idea.

Natural (12.9%) People with a natural position on the statement are more likely to have an undetermined or neutral viewpoint. While they might be aware of the advantages of having a technology wheelchair at home, they might also take other aspects into account that might affect its applicability or practicality.

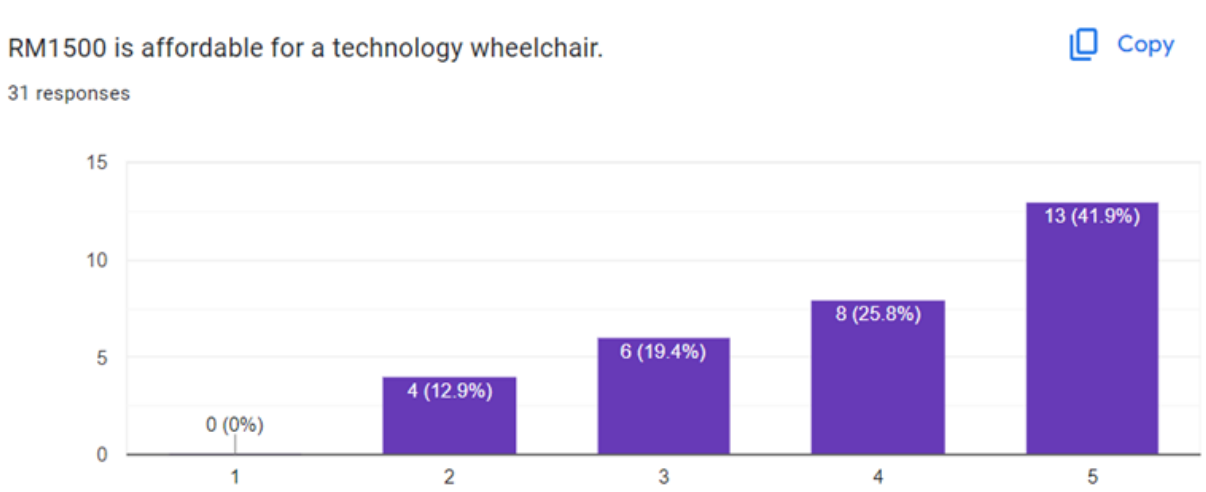
Very Agree (61.3%) Many survey participants firmly concur that keeping a high-tech wheelchair at home is an excellent idea. They think that such a wheelchair can significantly improve the daily lives of people who depend on wheelchairs for movement.



There are no people who disagree with the statement that a technology wheelchair is more practical to use at home (0% disagreement). This shows that everyone agrees that using a technology wheelchair at home is more practical than using another kind of wheelchair.

Natural (19.4%) People with a natural position on the statement are more likely to hold a neutral or undecided viewpoint. Even if they could be aware of the possible benefits of utilising a technology wheelchair at home, they might also consider other aspects that might affect their decision.

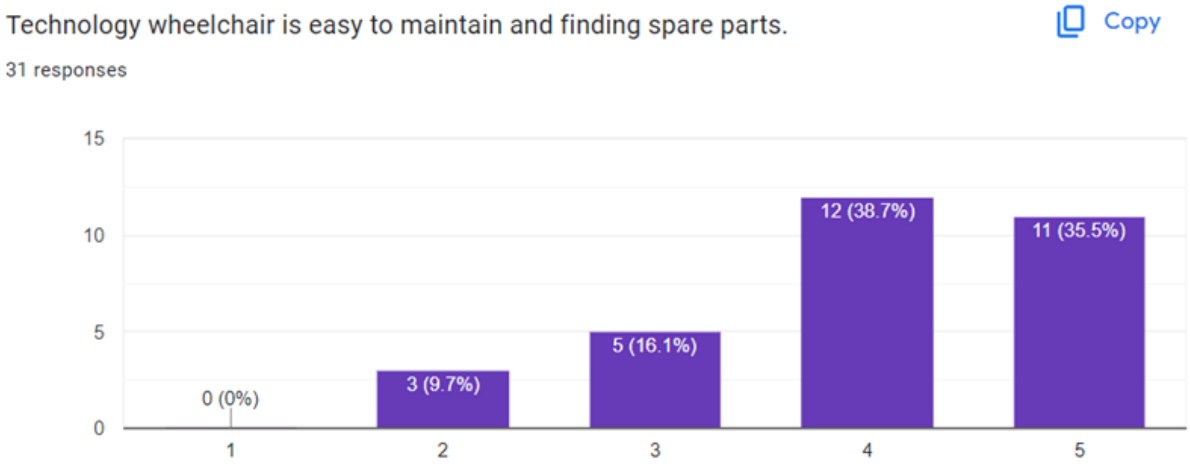
Most responders (51.6%, Very Agree) firmly concur that utilising a technological wheelchair at home is more practical. They think that the features and improvements offered by technological wheelchairs can greatly enhance the user experience.



0% of people disagree with the statement that RM1500 is an affordable price for a technology wheelchair. This implies that RM1500 is universally regarded as an affordable price for a technological wheelchair.

Natural (19.4%) People with a natural position on the statement are more likely to have an undetermined or neutral viewpoint. When considering the affordability of a technology wheelchair priced at RM1500, they may consider several things.

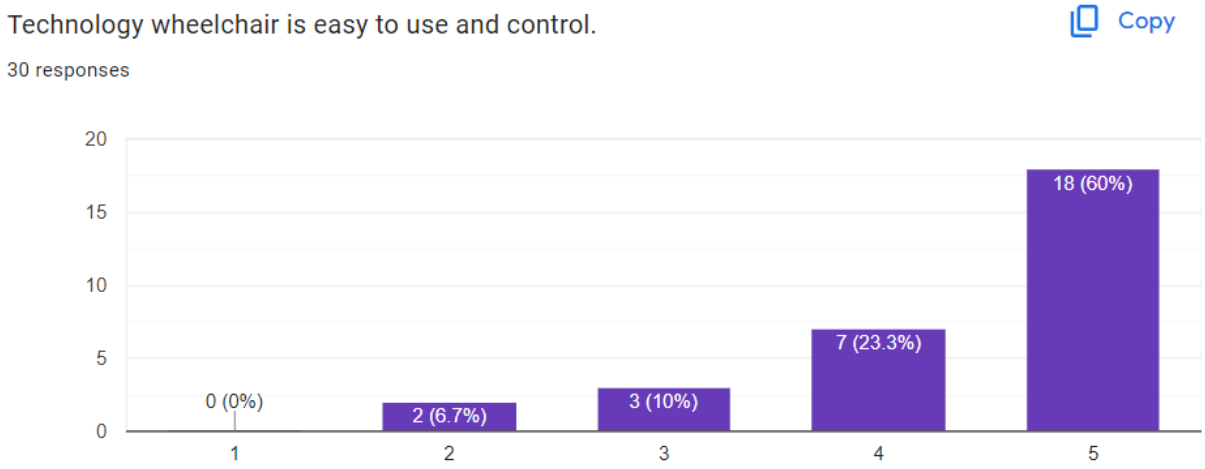
Most respondents (41.9%) firmly concur that RM1500 is an affordable price for a technological wheelchair. They think that this pricing is affordable and appropriate for people looking to buy a technological wheelchair.



Disagree (0% of people): No one disputes the idea that a technological wheelchair is simple to maintain and find replacement parts for. This indicates widespread agreement that modern wheelchairs are simple to maintain and have easy access to replacement parts.

Natural (16.1%) People with a natural position on the statement are more likely to have a neutral or undecided viewpoint. They may be aware of the possibility of technology wheelchairs having simple maintenance and parts availability, but they may also consider other aspects that might affect their judgement.

Very Agree (35.5%) A sizeable percentage of respondents firmly concur that technological wheelchairs are simple to maintain and have readily available replacement parts. According to them, technological wheelchairs are built with user-friendly features and come with detailed maintenance instructions.



There are no people who disagree with the statement that a technological wheelchair is simple to operate. This shows that everyone agrees that technological wheelchairs are made to be simple to operate and steer.

Natural (10%): People with a natural stance on the statement are more likely to have a neutral or undecided opinion. While they might be aware of the possible use and control of technological wheelchairs, they might also consider other aspects that might affect their decision.

Very Agree (60%): Most responders firmly concur that technological wheelchairs are simple to operate and steer. They think that because technological wheelchairs are made with user-friendly controls and interfaces, they can be used by a variety of users.

4.4 DISCUSSION

During the progression of the work. We had faced a few problems and we were able to overcome them. Frist, we have learnt that we need to complete our own tasks within the time frame given. If there any problems, we discussed it with everyone so that we can pitch in new idea and solution for the problems.

Second, even though the project might appear simple, we went above what was reasonable to make it more challenging. Since the laboratory does not have all of the necessary components, we were forced to complete this project by providing our own materials and components.

In addition, we've learned how to apply the concepts we've studied in class to a real-world project. The Internet of Things system and health rate monitoring were made more acquainted to us. We now understand the criticality of each component of the systems outlined. They are crucial, and if any one of them malfunctions, the system could collapse.

CHAPTER 5: CONCLUSION AND SUGGESTION

5.1 CONCLUSION

In this study, we show that technology wheelchair using IOT system is a great idea for hospital use and house use. This kind of technology may allow user to check their condition in short time. Moreover, it also easy and convenient to use, user don't need to learn much to use this kind of wheelchair because it has been programmed automatically. So, user only must sit on the wheelchair and then the data will automatically send to our mobile devices. Next, with IOT system we can know our patients condition even we are outside of the area. With using Wi-Fi, we can get the information from the wheelchair.

5.2 SUGGESTION

As a suggestion, is Use lighter materials to make wheelchairs. This will help reduce the weight of the wheelchair and make it easier for the user to handle it. Materials such as aluminium or carbon fibre are often used to produce lighter and more durable wheelchairs. In addition, electric actuators on wheelchairs can provide better ease of use, especially for users who lack energy or mobility. Electric motors allow users to move easily without relying entirely on their physical strength. Next, the continuous use of technology such as sensors and surveillance can improve the safety and quality of life of wheelchair users. For example, the use of sensors to detect obstacles or speed monitoring can help reduce the risk of accidents and provide greater freedom to users. Finally, installing a good suspension system on a wheelchair can help reduce the impact and vibration experienced by users when overcoming obstacles or uneven road surfaces. This will increase comfort and reduce stress on the user's body.

5.3 REFFERENCES

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https://www.mansstorehq.com/?gclid=CjwKCAjw67ajBhAVEiwA2g_jEJqDLxKtwGZNxEqS8UFbrkF62Q6ViQb3zDWliS1Cbwmi2h5ThMoyhRoCzAMQAvD_BwE

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