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## SECONDARY DEVICES

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SECP1513

TECHNOLOGY INFORMATION SYSTEM

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SECTION : 08 - 1SECR

COURSE : BACHELOR OF COMPUTER SCIENCE - COMPUTER NETWORKS  
AND SECURITY

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## INTRODUCTION

A secondary storage device refers to any non-volatile storage device that is internal or external to the computer. It can be any storage device beyond the primary storage that enables permanent data storage. There are three types of secondary storage devices: magnetic storage, optical storage, and solid state storage. The examples of these are hard drives, CDs and DVDs, and flash drives. A secondary storage device is also known as an auxiliary storage device or external storage. Secondary storage is generally larger, slower, less expensive per gigabyte, and not directly accessible by the CPU. It is usually used as a backup for primary storage using the data transfer and also data backup methods. In addition, it is also used to lessen the primary storage which is the device can be the secondary storage. We had done some discussion and come out with some ideas when we are using the design thinking method to invent the new device. The design thinking skills that consist of some phases which are empathy, define, ideate, design, prototype and test. It helps us a lot when we want to examine the device whether it can be used or not.

## 2. DETAILS STEP AND DESCRIPTION

There are five steps of design thinking which are empathize, define, ideate, prototype and test. The first step is empathize. We interviewed two people regarding our topic and found that their problem was to store their data in large quantities in a laptop. It will take a lot of cost to buy a new laptop. Then, the define phase where we made some research and the suitable features for the device. The next one is the ideate part. From this issue, we came up with an idea for innovation in secondary storage. We started off with some suggestions which are CD, DVD, hard disk and flash drive. After discussing with the members in detail about pros and cons of each device, we made a decision to choose a portable hard disk. This is because a portable hard disk can load up to 1 terabyte than other secondary storage. Then, the prototype part. The prototype is made of an unused box and polystyrene. After finishing up our prototypes, we tested it and found it is suitable to be used. It is really functional and easy to use for all. For transferring data from a laptop to a hard disk is also faster. It will be worth it as a device for purchase.

## 3. DETAILS DESCRIPTION

### I. Problem

The problem that we found during our interview session with some of the respondents is the capability to store memories in big capacity. It is hard for the users to store their files, the operating system and also software that used a big capacity. The reason why they want a device that has storage in big capacity is to avoid the PC hanging and running low. Also, the respondent wants a device that is portable and easy to carry which can make their work easier. In addition, the problem that the respondent had is the PC

is running low when opening the files or applications that required a big capacity of storage.

## II. Solution

Our group has invent a device that is called as secondary device. This device functioning as a storage that can store files and software. The device must long-term retention of data in a computer system. It is also a non-volatile which means the data transferred to storage is not be vanished even when the computer is powered off. The device also must cheaper than the primary storage as it does not connected to the computer.

## III. Team Working

Our team that consist of four group members has applied a design thinking flow in order to get the ideas of design and choosing the best one for the device. We also interviewed some of the respondent in order to create the new device. Also, we had the video as the proof of our working team. In addition, our group had make a few design each one and we discuss to choose the best one that are suitable for the user.

## 4. DESIGN THINKING ASSESMENT

### a) During the end of the project

We had made some assessment during the end of the project by testing the prototype for some users. The users has agree that the device that we invented is more useful and easier to bring everywhere. The assessment is made during the end of the project by us and also by the respondents. They said that our

project will be a good things to be produce as it can help many people that have problems with their storage.

b) During the transition process

The assessment that we made during the transition process is by our group members. The first one is when we interviewed the respondents. We had finalized some of the problems that the users happened to be found during their computers working. The second assessment is when we try to choose the best prototype and design that satisfied the respondent desire.

## 5. DESIGN THINKING EVIDENCE

a. Design thinking process consist of 5 steps which are empathy, define, ideate, prototype and testing. The record and description of each and every step that we did are shown below.

b. Record for each phase

I. Empathy.





A middle-aged teacher that has problem when there is not enough space in his pc.

A : Hi , I'm \_\_\_\_\_ from Group 4 TIS SECTON 8 . My group would like to have an interview with you regarding our project , the secondary storage. Would you mind to spend your time a little bit , Mr/Ms \_\_\_\_\_?

B: Hi, sure I can.

A: So , what is your job ?

B: I'm a full time teacher and part time novelist.

A: Do you facing any problem with your Pc when you want to store your work files or any application that connected to your works?

B: Yes. I did facing many problems due to my Pc always out of storage.

A: Is there any problems that you faced when you want to open your files in your PC or did you got any other problems too due to your storage?

B: My Pc always hanged when I try to open a big files or big application. Also, I need to bring my works everywhere but I don't have any device that is portable to do so.

A: Oh! I see. I hope we can invent the new device that can fulfil your desire. Thanks for your cooperation .

B : Welcome.

This is a sample of questions and answers happened during the interviewing session.

A photographer that want portable large storage.

A : Hi , I'm \_\_\_\_\_ from Group 4 TIS SECTON 8 . My group and I would like to ask some questions regarding our new project, the secondary storage. So, I heard that you are a photographer?

B: Hi, I'm \_\_\_\_ and yes. I do a photographer as my full time job.

A: So, here's my first question. Do you feel any problems to store your pictures and videos in big capacity?

B: Yes. It quite hard for me because I need one device that I can easily store my camera's memory and also the software that I used to edit my client's pictures and videos.

A: is there any more things that you feel frustrated when you want to store your pictures and videos?

B: I usually store it in my PC but the capacity of my computer is quite small that always make my computer hanged. But at the same time, I want the devices can be easily to bring anywhere so I can just edit my works either in my computer or my laptop.

A: Oh! I see. I hope we can invent the new device that can fulfil your desire. Thanks for your cooperation.

B : Welcome.

This is the questions and answers that happened in the interview.

## II. Define

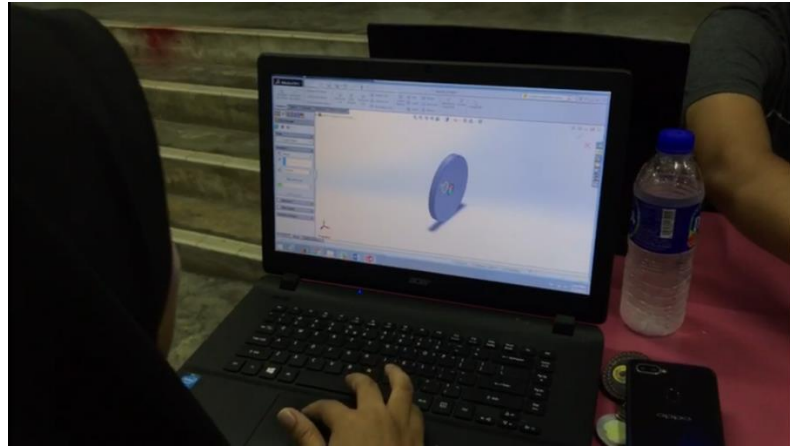


We meet up to define the problems that is issued from the user and try to determine what our current technology is lacking. From this, we can have an idea to solve the solution which bring us to the next stage of design thinking.

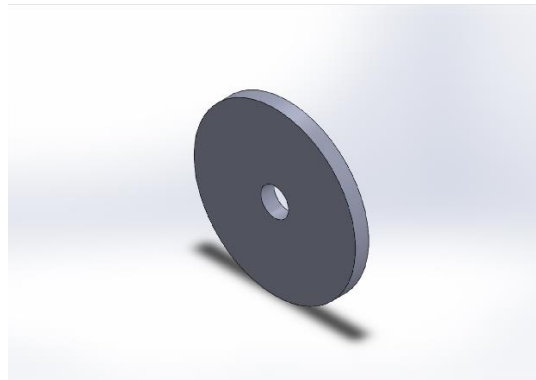
## III. Ideate

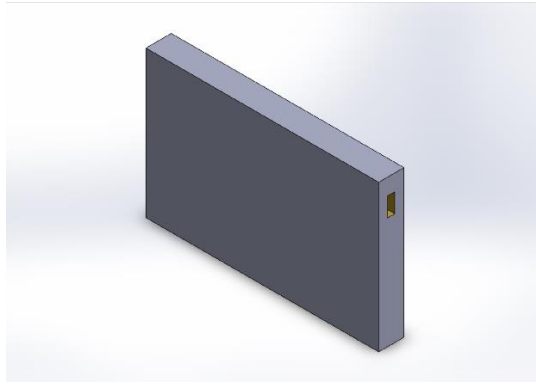


Now we start to think how to counter the problems given by the users. This process is important for us to check each and every problem and give a proper solution.



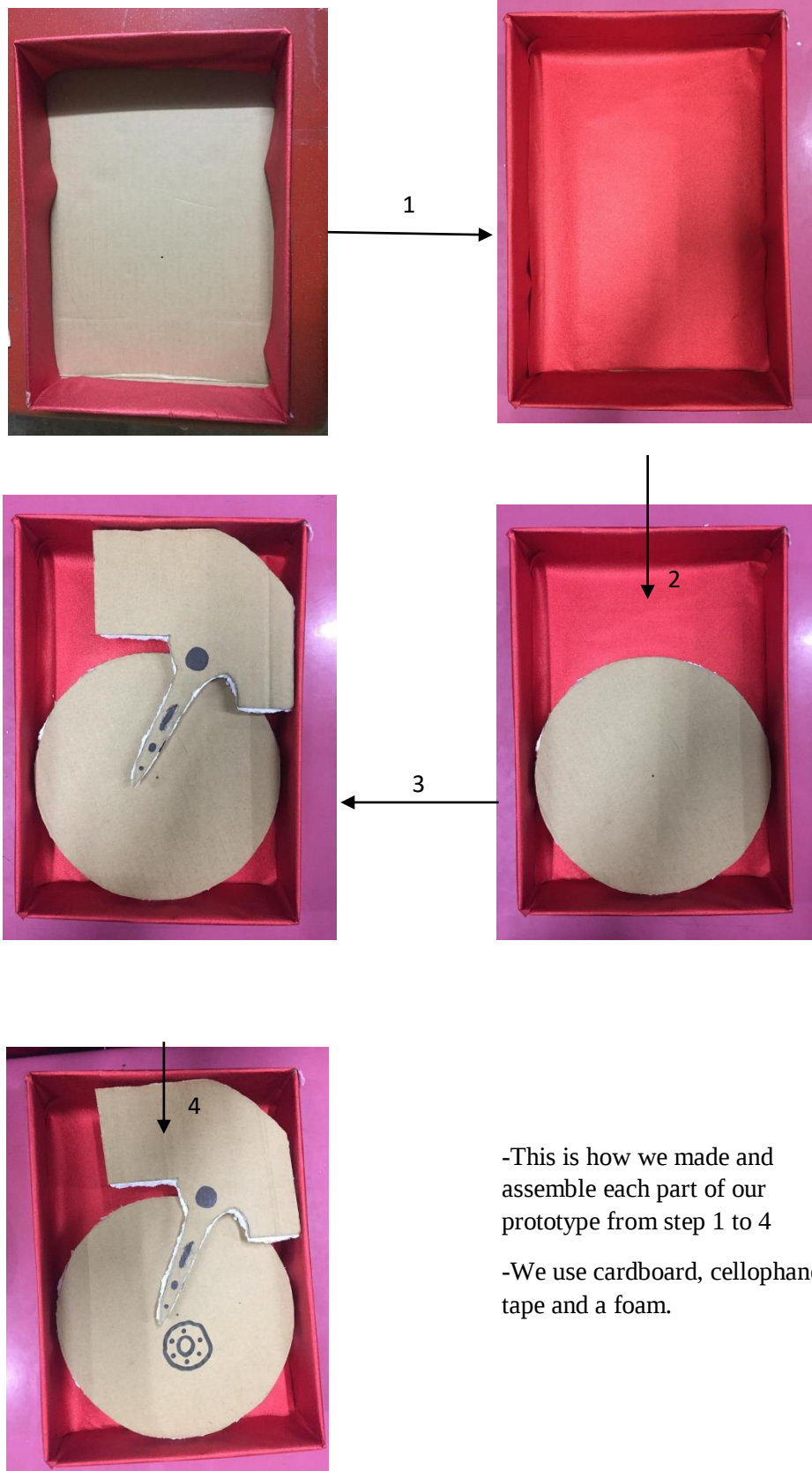
Then, we start to design our product so that all of our solution can put into one device. This picture is actually anis designing a component for the end product.





These are the 2 of the sample of design that we come out with.

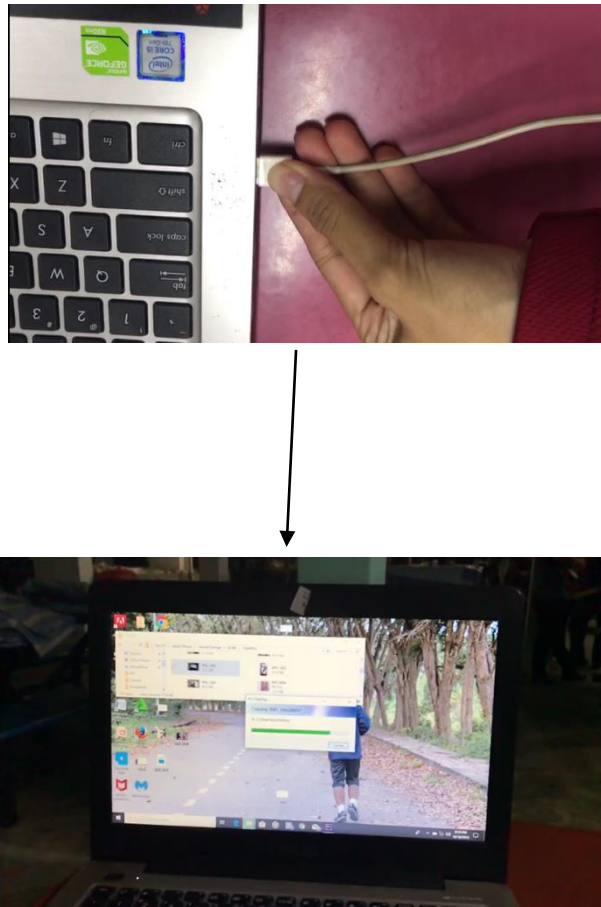
#### IV. Prototype



-This is how we made and assemble each part of our prototype from step 1 to 4

-We use cardboard, cellophane tape and a foam.

## V. Test



We tested our product and got a very positive feedback from the user. This image is a process of transferring a large file into our product to clear up storage in the pc.

## 6. REFLECTION

### **What is your goal/dream with regard to your courses/program?**

Regarding our courses are studying which is network and security, our goal are to become a capable network engineer. I want to be an employee with the ability to protect against all threats such as malware and viruses which allows programs to run quicker and smoother and also can prevent unauthorized people from accessing network and devices connected to them. We look forward to providing a secure network of companies. Also, we want to contribute our efforts to develop our country to be more secure in keeping all data confidential. So that our country will be respect by other countries with our securities.

### **What is the action/improvement/plan necessary for your potential in the industry ?**

To improve our potential in industry, we should have studies and explore more about network and security. Read more journal, books and blog to get more information. We also can apply design thinking to invest new program or other devices based from the network or security issues. Besides, we plan to enhance our skill on various aspect such as coordinating, planning implementing network security measures and experience with Firewalls (functionality and maintenance). Lastly we need to be extraordinary to improving our skills and knowledge.

### **How does the design thinking impact on your goal/dream with regard to your program?**

After we got involved in this design thinking project, we seek to understand the user, challenge assumptions, and redefine problems in an attempt to identify alternative strategies and solutions that might not have clear understanding at the beginning. The more we use design thinking technique, the more we are learnt to think and work faster for an idea. This is also encourage to focus on the project for which leads to better products services and internal processes.

Moreover it will train our ways of thinking to apply to anything system, procedures and experiences to create a better skills for the world.