

# Hwa Chong Institution

## Project Work

### Category 3 Inventions Log Book

Title of Project:
Group Name: 3-16
Group Members: 1) Euan Koh (Leader) 2) Timothy Chan 3) Anderton Lim 4) Elkan Ho

#### Problem Finding

(The beginning...)

Identify a problem you would like to solve. You may want to brainstorm for problems using different approaches e.g. thematic, survey or general brainstorming etc.

**1 A Document a list of problems you have identified. Your documentation should show clearly how your group came up with the problems.**

We want to be able to benefit people with issues in their daily lives, and to help people with disabilities. Thus, we have decided on these 3 problems.

- 1) Colour deficiency
- 2) Dementia
- 3) Visually impaired

Colour Deficiency - The problem people with colour deficiency face is that they are unable to see certain colours, which will impact their daily lives. For example, some have red-green colour deficiency and cannot see the colours on traffic lights. This causes problems for these people.

Dementia - Another one of the groups of people who face issues in daily life due to their condition are people with dementia. The people who usually get this condition are the elderly. The people with dementia are often stigmatised, and thus we have come up with a solution for them.

Visually impaired- People with permanent or temporary blindness face many problems in their daily life. For example, people who are blind cannot cross the road safely, cannot climb stairs safely, cannot work properly et cetera. Thus, we have developed a solution for these people, so they can live a better life.

**1 B You should have selected a problem based on some considerations. Identify and justify these considerations.**

- Is it feasible to solve this problem?
- Is there a large enough target audience for this problem?
- Are there already many existing solutions?
- How cost-efficient is the solution?

**C. List some problems your group would like to solve. List also the considerations for selection of problem in the evaluation grid below. Score the considerations, against the problems, with points 1 (least significant) to 4 (most significant). Sum up the total points for each problem. Identify that problem you would like to solve.**

Problem Evaluation Grid

Considerations for Selection	Problems		
	Colour deficiency	Dementia	Visually impaired
Is it feasible to solve this problem?	<b>2</b>	<b>4</b>	<b>3</b>
Is there a large enough target audience for this problem?	<b>4</b>	<b>4</b>	<b>2</b>
Are there already many existing solutions? ( 1 for many, 4 for little to none)	<b>2</b>	<b>2</b>	<b>3</b>
How cost-efficient is the solution?	<b>4</b>	<b>3</b>	<b>2</b>

Total score	<b>12</b>	<b>13</b>	<b>10</b>
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## Define the Problem

(This is one...)

Now that the problem has been identified. It is important to gather information on the extent of the problem and/or evaluate the usefulness of existing solutions based on *some criteria*. You may need to conduct surveys and research on existing solutions.

### **2 A**    **Extent of problem (Research and discuss the problem and write down the problem statement)**

1 in 10 people above 60 years old in Singapore have dementia. With a hyper-ageing society predicted in the near future in Singapore (where over 20% of the society is above 54 years old), the rate of dementia will naturally increase. As such, the amount of people affected by dementia is increased.

### **2 B**    **Compare and contrast the existing or similar solutions.**

Existing:

Location-tracking apps are apps which allow users to track the location of their loved ones who are suffering from dementia, and notify them when patients have left a certain area. An example is SpyZie, a real-time location tracking app.

Caretakers can give patients medication boxes labelled with days of the week, and put the pills accordingly into each of the 7 slots. Thus, a patient will know which medicine to take.

Medications like Donepezil and Rivastigmine help to boost levels of a chemical messenger involved in memory and judgement.

## Your BIG IDEA

(Developing the idea....)

Write down your proposed invention and why you want to do it. State also how you think your proposed invention is better.

### **3 A**    **Describe your proposed invention.**

Our proposed invention is an item finder device for the people with dementia to be able to find their items quickly.

### **3 B**    **Explain the purpose of your proposed invention and the potential benefits to users.**

The purpose would be to benefit the elderly as this would allow them to be able to find their necessary things, for example their medication or their house keys

**3 C In what ways would your proposed invention be different and/or better than existing solutions, if any?**

It could be done through a coded app or could be done using micro:bit. This could also be done with a sensor to scan the room and then tell you its location. Smart CCTVs could possibly scan a room and identify what item one is looking for, before giving the person directions on how to get to the item.

**3 D What are some problems you expect in the course of your proposed invention?**

One problem might be that it would be hard for us to be able to code the camera or micro:bit to detect the various items.

**3 E What and when are the major milestones (project timeline) in your invention?  
Construction of Prototype by early June, Modification & Evaluation by mid June**

*#must be able to be constructed based on current / emerging technologies, must not violate the laws of Science or go against the laws of nature.*

## **Construction or Modelling Process\***

(This first... then that...)

You are now onto the fabrication of your prototype/ product. You need to select material and understand how to put them together so that your prototype/ product can perform its function.

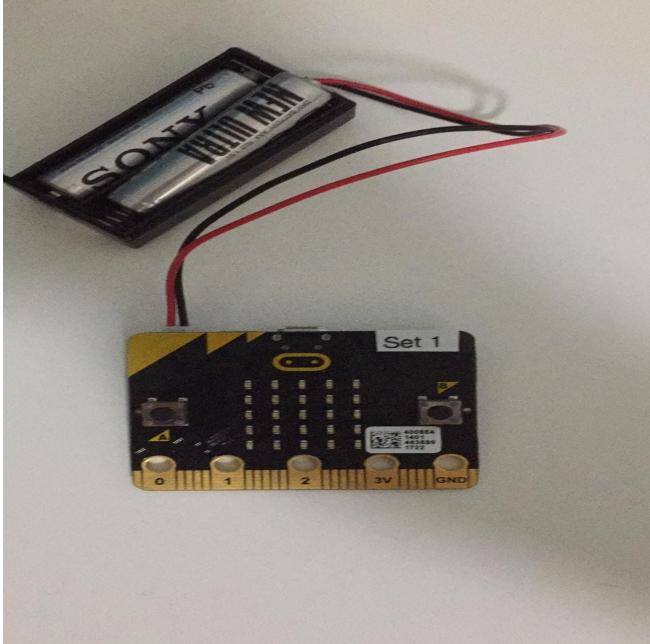
**4 A Explain how and why the materials were chosen for the prototype/ product of your invention**

We chose to use a simple micro:bit which can be easily attached to most items, using adhesives like tape or glue. The micro:bit is plastic, allowing superglue to work with it. This makes it more convenient for people to put it on the items, and less likely for it to fall off the item.

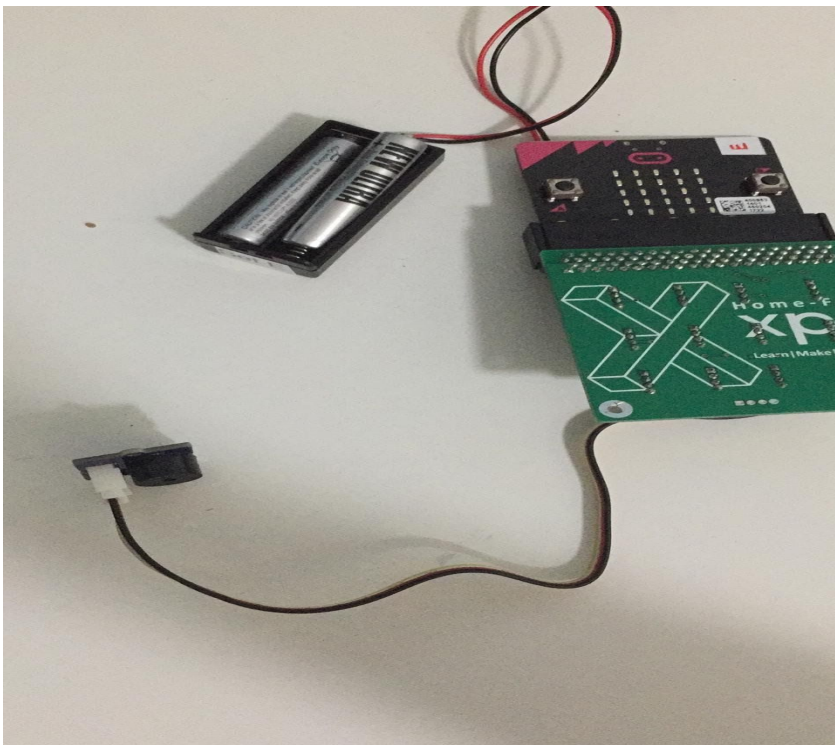
**4 B Explore these considerations that may guide the construction of your prototype/ product.**

We will have to make sure that the adhesive does not affect the mechanism, as well as make it sufficiently small so that it can stick to small items like keys.

**4 C Document the prototype/ product development stages. You may use drawings, photographs or videos.**



This is Main Controller of Prototype



This is Receiver

```

on start
  radio set group 99
  radio set transmit power 7
  show leds
  [4x4 grid with 4 LEDs lit]

on radio received receivedNumber
  radio send number 0

on radio received receivedString
  while not button A+B is pressed
  do
    show leds
    [4x4 grid with 4 LEDs lit]
    play tone High C for 1/8 beat
    show leds
    [4x4 grid with 4 LEDs lit]
    pause (ms) 100
  
```

```

on start
  radio set group 99
  radio set transmit power 7
  show string "Phone, press A. Water Bottle, press B."

on button A pressed
  radio send number 1
  show icon [Water Bottle]

on button B pressed
  radio send string "water bottle"
  show icon [Water Bottle]
  
```

Parts of code

**OR**

If construction of the prototype is not possible, then you have to create an animation / as a proof of concept that it can be applied on a bigger scale.

**4A Explain why construction of a prototype is not possible and the proof of concept is needed in your case.**

Not Applicable; we made a prototype

**4B Briefly explain how the video / animation can effectively show how your invention will work and the different considerations.**

Not Applicable; we made a prototype

**Warning:**

*Video / animated simulation only if prototyping is absolutely not possible.  
Video / animated simulation must be logical and convincing that the invention works.  
Constraints must be clearly included in the logbook or the project will be heavily penalized.*

**Modification and Evaluation**

Upon the completion of your prototype/ product, you would need to see if it is working the way you want it to work. Check if your product has met the identified purpose and the user’s need; and implement necessary modifications and improvements. This process may take several rounds.

**5 A Write down your prototype/ product test criteria and check against it if it works. Identify areas of weakness for modification. Indicate the test iteration and date of test.**

Test Iteration: Test Date:3/8/2020	Tick			Remarks
	Pass	Fail	Potential Failure	
Are the prototype’s buzzing & lights noticeable?	√			Buzzer was a bit soft and might not be heard if there was other noise.
Can the prototype be easily fitted onto items?			√	Works for most items except small items eg. keys
Is the prototype able to send signals within the house?			√	Has range of 70m but range may be affected by other electronic devices

\*Add more rows for more criteria  
\*\* Repeat table for next test iteration

**OR** if you are creating an animation / video to show how your invention will work, write down the different possibilities / outcomes [success or failure) if a full-scale prototype is to be constructed.

**References**

Read <http://www.bibme.org/citation-guide/apa/> on how to cite references.

**6 A Cite the references you have used for your project work. Your source of reference should come from different types (eg books, magazine, websites, journal articles, interview, photographs, product brochure, reviews etc.)**

[Range extender. \(n.d.\). Retrieved August 12, 2020, from https://makecode.microbit.org/\\_e535TmFqH5Rr](https://makecode.microbit.org/_e535TmFqH5Rr)

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[7 Technological Innovations for Those With Dementia. \(2019, July 22\). Retrieved August 15, 2020, from https://www.alzheimers.net/9-22-14-technology-for-dementia/](https://www.alzheimers.net/9-22-14-technology-for-dementia/)

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[Dementia. \(n.d.\). Retrieved August 15, 2020, from https://www.who.int/news-room/fact-sheets/detail/dementia](https://www.who.int/news-room/fact-sheets/detail/dementia)