PHSS Hackathon Training 2025

Preface

This training programme is to guide learners to be ready participants of a Hackathon, to pick up UniHiker K10 coding skills & develop innovation by integrating sensors into the UniHiker K10, to put into practice problem-solving skills in a real-world context following the theme of "Innovative Solution to Tomorrow's Problem"

Trainer Guide

Version 1.1

Last updated on 21st March 2025

1.1.1 What are Hackathons?

Hackathon, a mesh up of "hack" and "marathon," put them together and it is used to describe one of the most popular and powerful problem-solving techniques.

**to hack \ ˈhak **
transitive verb
1: to cut or sever with repeated irregular or unskillful blows
2: to gain illegal access to (a computer network, system, etc.)

**marathon \ ˈmer-ə-ˌthän **
noun
1: a footrace run on an open course usually of 26 miles / 42.2 kilometers
broadly: a long-distance race
2: a: an endurance contest
   b: something (such as an event, activity, or session) characterized by great
     length or concentrated effort

Source: Merriam-Webster

A hackathon a physical or digital event where participants get together for a short period of time to collaborate and generate some form of innovation such as a functioning software or a hardware prototype.

1.1.2 How to prepare a Hackathon

These are some of the things you should do the prepare for a hackathon:

Do your research

Research about the theme in advance so that you are prepared. Knowing the theme before going through the video training will help you appreciate the training more and allow you to be more focused on the parts that can help you with the final prototype.

Know your teammates

Appoint a team leader and get to know each other's strength and weaknesses. If someone is better at coding, let them work on the codes. If someone is better at the presentation, let them do the presentation preparation. Nothing will make a team more disorganised than having teammates who are doing things that they are not good at.

Understand the rules and ask questions

Not only should you research the theme ahead of time, make sure you know the hackathon rules and regulations. If something is unclear, ask the organizers. A lot of times there will be FAQ of the hackathon to make sure everyone is on the same page. Do not be the team that breaks the rules and gets disqualified.

Set your prototype baseline

Work with your team to determine your prototype baseline. Once you achieve your baseline, you can go and add all the enhancements you want, but the baseline ensures that you have met the minimum hackathon requirements.

Be sure to set realistic goals

Make sure that you set a goal that can be accomplished. You may not have the winning prototype at every hackathon, but it is nice to be able to present something you can be proud of for judging.

Do not stress

Hackathons are for fun and learning. If you finish your hack and prototype, great! If not, it is not the end of the world. You still accomplished something. Celebrate your wins!

1.1.3 Example of previous Hackathons

Commercial: Razer Fintech's Digital Hackathon

The Razer Fintech Digital Hackathon will encourage Singapore tertiary students, young professionals and the start-up community to think outside the box and address critical financial challenges that have been exacerbated by COVID-19. Winning participants will have the opportunity to implement and operationalize their original banking solutions within Razer Fintech's financial services ecosystem or with its partners, through securing full-time employment, internships, investments or commercial partnerships.
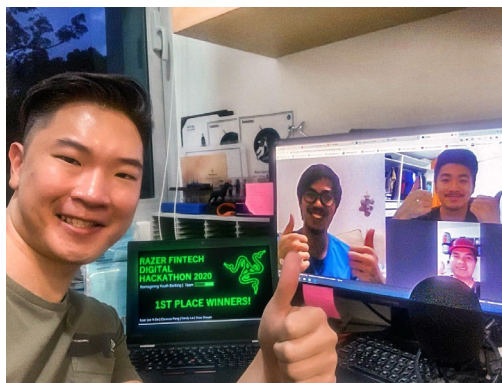
Team Razer Blazers, comprising of Clarence Pang, Randy Lai and Shao Shxuan from the School of Information Systems, and Isaac Lee Yi De from Lee Kong Chian School of Business SMU, have emerged as one of two winners at the inaugural Razer Fintech Digital Hackathon held from 15 to 17 May 2020 in Singapore.

https://press.razer.com/company-news/razer-fintech-launches-digital-hackathon-empowering-singapore-youth-to-create-and-implement-original-banking-solutions-amidst-covid-19-circuit-breaker/

https://news.smu.edu.sg/news/2020/05/20/smu-team-wins-razer-fintechs-inaugural-hackathon-singapore

Commercial: JunctionX Singapore 2019

Organized for developers by developers, JunctionX Singapore 2019 was the first hackathon of JunctionX Singapore team, and it was a massive success. The 48-hour hackathon was organized at the beautiful office of Rakuten Singapore in CBD. Participants came from a diverse range of backgrounds with more than half being international participants (from Algeria, Japan, etc.) who came to Singapore just to attend this hackathon.

JunctionX Asia 2020

JunctionX Asia is an online hackathon targeted at solving problems the global community is facing during this ongoing pandemic. Our goal lies in bringing developers, designers and other tech-minded individuals together to create exciting projects and solve intriguing challenges. You will work in a team within 4 days to build a project, realizing it from just an idea to an actual product.

Green Scanner

A gamified mobile application that encourages consumers and merchants to adopt conservative measures towards carbon emissions.

Green Scanner aims to solve the carbon emission problem through a gamified platform. Users of Green Scanner mobile application can accumulate reward points as they purchase items of low carbon emission. Green Scanner also helps to track the carbon emission produced through the user's consumption. Green Scanner aims to educate users on the importance of minimising carbon footprints while motivating merchants to play their part through corporate social responsibility by having operations that is minimal in carbon emissions. Green Scanner is developed in Flutter, hence available on android and iOS devices. Green Scanner leverages on Azure services for its back-end and REST APIs are hosted on Azure App Service. In the long run, Green Scanner aims to incorporate Data Analytics for its large data sets gathered from users' consumption of carbon emission products that can be used by corporates to improve their product standing.
This is our pitch deck: https://docs.google.com/presentation/d/1VBipHGvXUma2zHcfQqHGtp5HLkQIOgnr6RmbSNqz6U4/edit?usp=sharing

VIDEO
No video available

DEMO
https://www.youtube.com/watch?v=ZxUzI3PpCks

SOURCE CODE
https://github.com/geraldspacelim/green_scanner_flutter

CHALLENGES
Develop for Social Good (Microsoft)

https://singapore.hackjunction.com/JunctionxSingapore2019

https://asia.hackjunction.com/

Education: Hack&Roll 2021

Hack&Roll is a hackathon organized by NUS. Build whatever you want! You can even choose to build something absolutely useless, just for fun! Build something new. You may reuse code for specific components, but recycling an entire project is not okay. Projects will be judged on awesomeness. Decisions made by the judges are final.

https://hacknroll.nushackers.org/

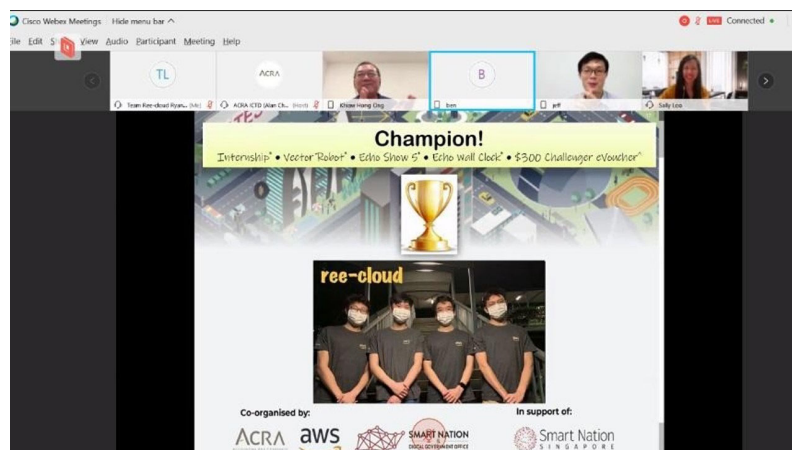## Government: Live Smart Singapore Hackathon (ACRA)

The Accounting and Corporate Regulatory Authority (ACRA), Amazon Web Services (AWS) and Smart Nation and Digital Government Office (SNDGO) invite all polytechnic students to participate in the Live Smart Singapore Hackathon (ACRA). Showcase your tech ideas to develop innovative digital solutions to help make Singapore the best place for business.

Team of 4 students consisting of 3 SIT students and graduating student awaiting his NS. Won 1st prize and ACRA's Popular Choice Award in the inaugural Live Smart Singapore Hackathon (ACRA), held virtually on 6 Aug 2020. Competition jointly organized by ACRA, Amazon Web Services (AWS) and Singapore National Digital Government Office (SNDGO) from Jun - Aug 2020.The hackathon was aimed at harnessing tech ideas from polytechnic students to develop innovative digital solutions to help to solve real business challenges. The team created a solution to automate ACRA's appeal for waiver process using a suite of AWS technology to boost productivity and improve customer satisfaction.
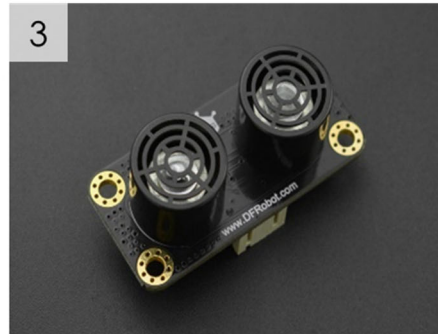

https://aws-educate.wixsite.com/smartnationhackathon

https://www.nyp.edu.sg/schools/sit/achievements-and-awards/2020/live-smart-singapore-hackathon-2020.html

1.1.4 Tools and materials used in the Hackathon

1. UNIHIKER K10 microcontroller
2. Servo Motor
3. Ultrasonic Sensor


1.2.1 What Is the UniHiker K10?

UNIHIKER K10 is a development and learning board designed for rapid experience and learning of artificial intelligence, which meets the learning needs of programming, IoT and AI. The board integrates LCD colour screen, WiFi Bluetooth, camera, microphone, speaker, RGB indicator, multiple sensors and rich expansion interfaces. With the highly integrated on-board resources, sensor control, IoT applications, and artificial intelligence projects such as face recognition, voice recognition, and speech synthesis can be easily realized without the need to connect additional devices during the teaching process.

1.2.2 Features – Hardware

- Integrated camera & built-in algorithms for offline image detection
- Integrated microphone & built-in algorithm for offline speech recognition
- Integrated speaker & built-in algorithm for offline speech synthesis
- 2.8-inch colour screen for clearer data presentation
- Rich interface, compatible with multiple programming software, good scalability

Onboard Functions

The UNIHIKER K10 integrates commonly used components and offers a variety of external interfaces, providing users with high convenience and unlimited possibilities for expansion.
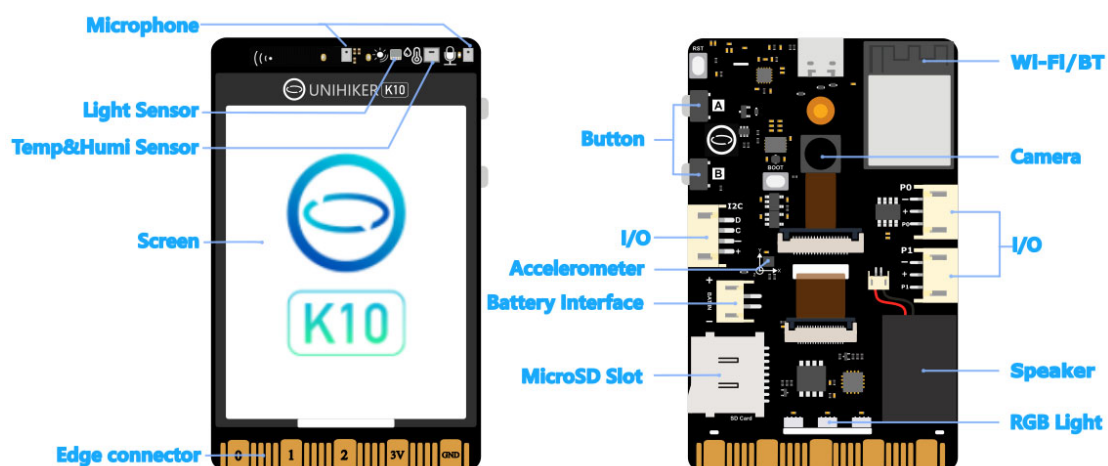
Camera

A camera onboard the UniHiker K10 allows you do face detection, recognition and other AI functions.

Accelerometer

An accelerometer is a motion sensor that measures movement. The accelerometer in your UniHiker K10 detects when you tilt it left to right, backwards and forwards and up and down.

Temperature & Humidity Sensor

A temperature sensor is an input device that measures temperature. Your UniHiker K10 has a temperature & humidity sensor onboard which can give you an approximation of the air temperature and humidity level.

Light sensor

A light sensor is an input device that measures light levels. Your UniHiker K10 uses the sensor sense the levels of light in Lux.

Speaker

The UniHiker K10 has built-in speaker, which makes it easy to add music/tunes to your projects. You can use the built-in tunes as well as play music loaded on the microSD/TF memory card.

Microphone

The UniHiker K10 has a built-in microphone. You can use it as a simple input for AI Speech Recognition or to record

Pins

On the bottom edge of the UniHiker K10 there are 25 edge connectors, called pins. These pins allow you to really get creative. You can create circuits, connect external components to make your own fun projects.

## 1.3.1 Using MindPlus (Mind+) Coding Software

Mind+ is a software designed for teenagers that supports AI and IoT functions by integrating with popular mainboards and open-source hardware. It offers an easy programming experience through graphical building blocks and advanced languages like Python, C, and C++.
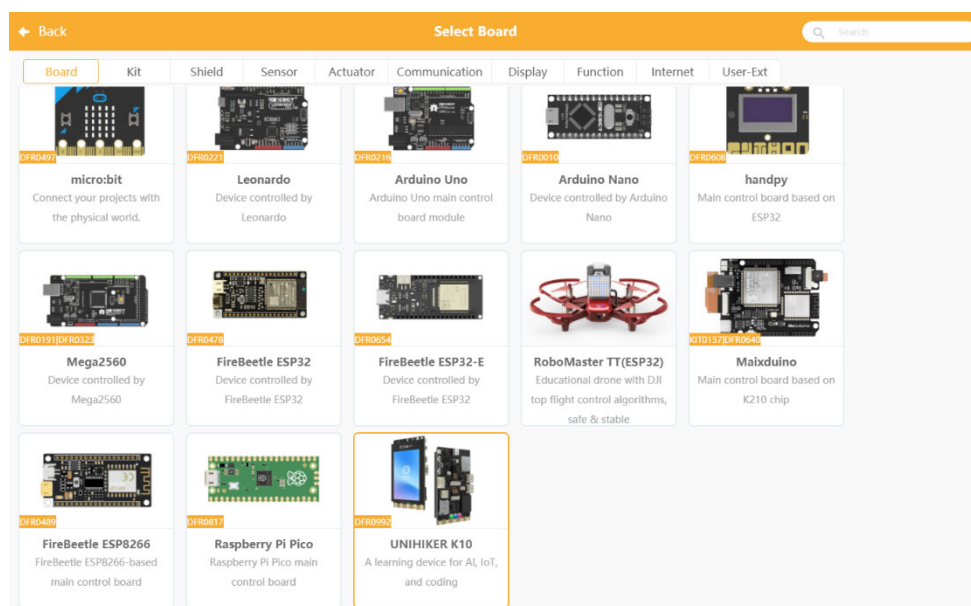
Download:

Download Source	Download Link
Download from Mind+:	https://mindplus.cc/download-en.html
Download from EPC website:	https://epc-education.com/software/mindplus-win.exe

Test Code:

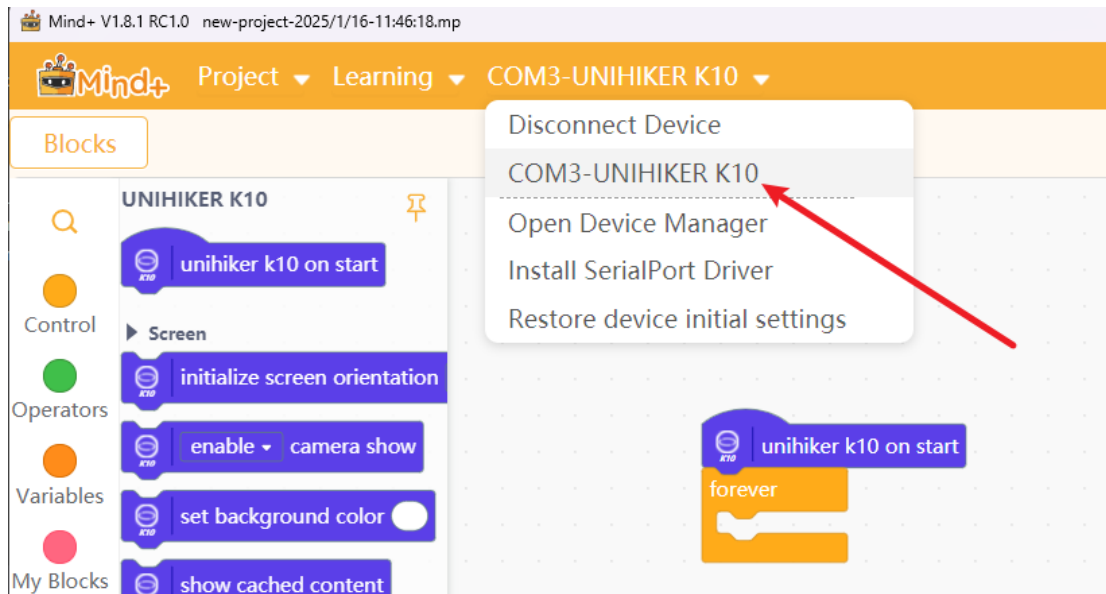▪ Open Mind+ and switch to "Offline" mode.
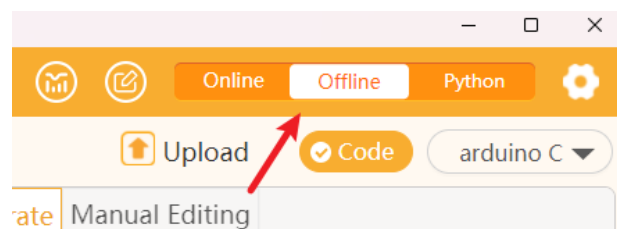
▪ Click "Extension", in the extension page, click "Board", select "UNIHIKER K10", click "Back". Click "Back" to finish loading.
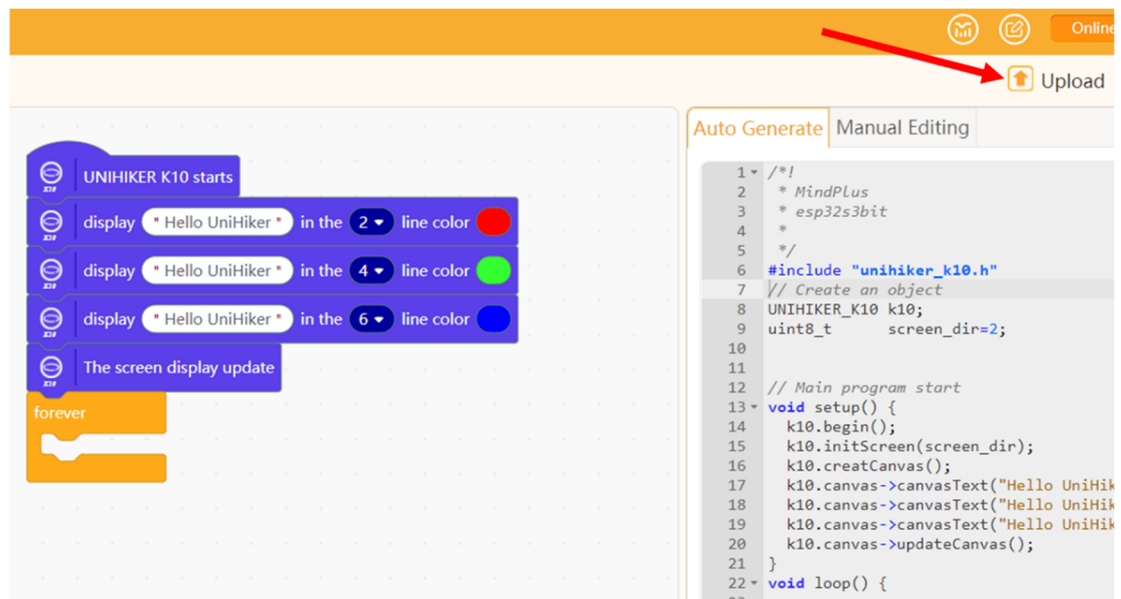
- Connect the USB-C port of K10 to the USB port of your computer, click "Connect Device" in Mind+, find the corresponding K10 device and click it to complete the device connection.

- Cache text "Hello UNIHIKER K10" in different colours on line 2, line 4 and line 6 of K10 respectively. Then show cached content.
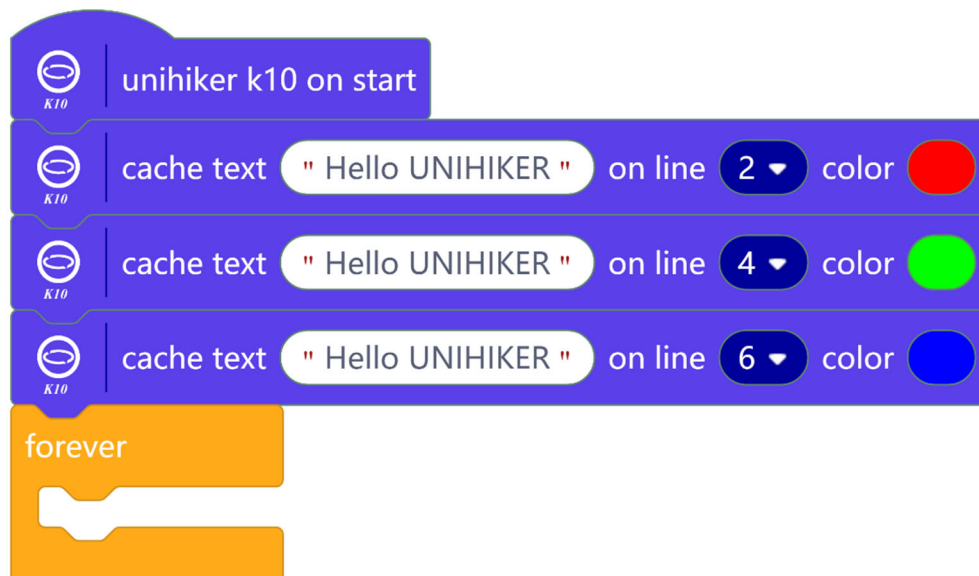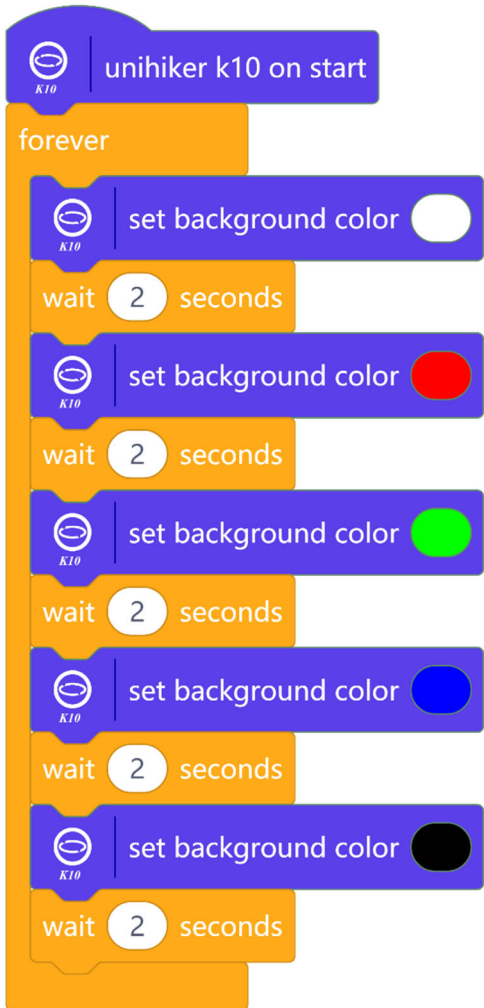

- Click "Upload" and wait for the program to finish uploading.

- After the program is successfully uploaded, the K10 screen displays the text "Hello, UNIHIKER" in 3 different colours.
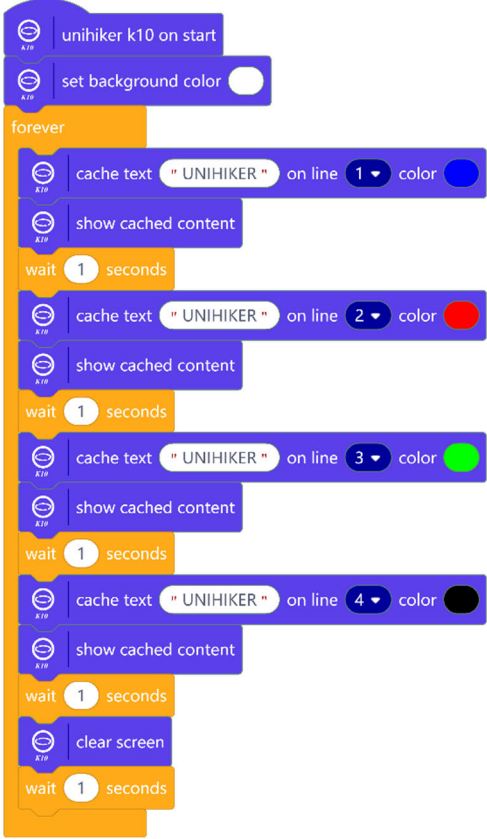
1.3.2 Sample Codes (Display)

a)   Display – Set Screen Background Colour

Code	Output
unihiker k10 on start forever set background color (white) wait 2 seconds set background color (red) wait 2 seconds set background color (green) wait 2 seconds set background color (blue) wait 2 seconds set background color (black) wait 2 seconds	

b)   Display – Show Local Picture

Code	Output
Note: 1. Screen size is W:240 x H:320	

c) Display – Show Text

Code	Output

d) Display – Show Text on Image

Code
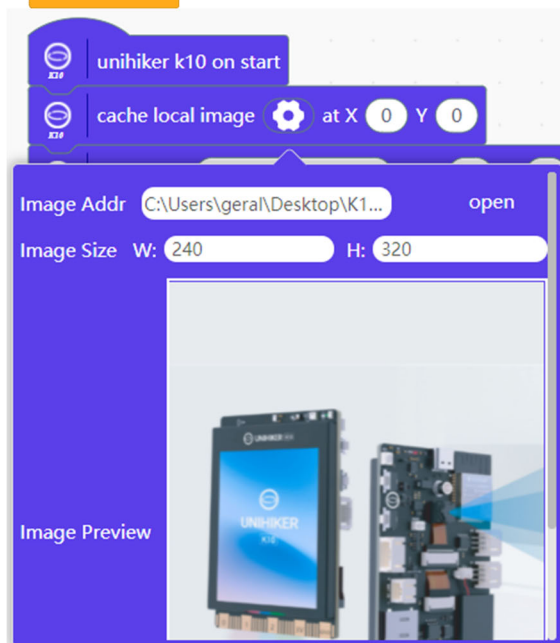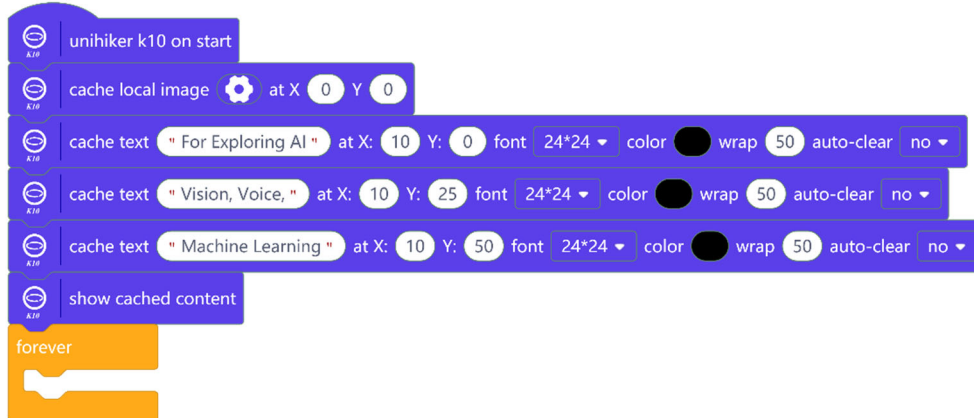
Code
Output Note: 1. Font size can be either 24x24 or 16x16 2. When displaying text over an image, turn auto-clear off	

e) Display – Draw Point

Code
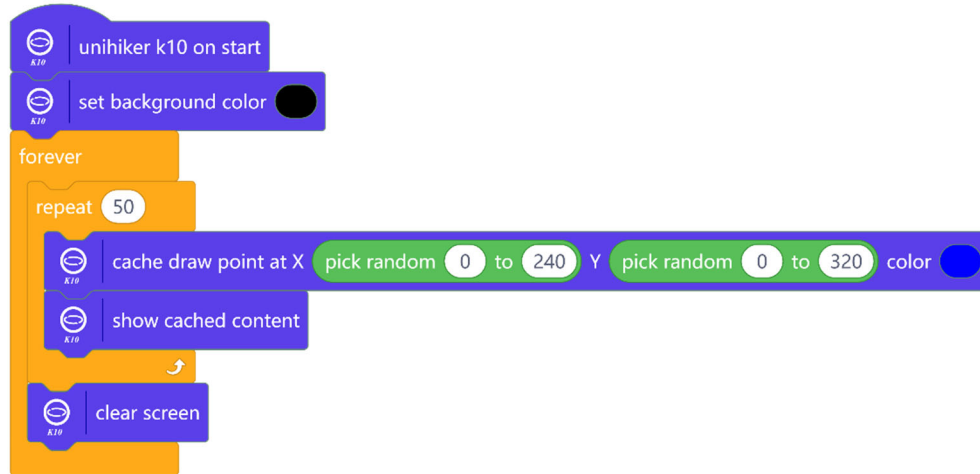
| Output

Note:
1.   Screen size is W:240 x H:320 | |

f)   Display – Draw Line

Code

Output	
Output Note: 1. Screen size is W:240 x H:320	

Code

```
unihiker k10 on start
set background color ●
set line width  pick random 2 to 5
forever
  repeat 15
    set length ▼ to  pick random 10 to 40
    set startX ▼ to  pick random 0 to 200
    set endX ▼ to  startX + length
    set startY ▼ to  pick random 0 to 280
    set endY ▼ to  startY + length
    cache draw line from X1 startX Y1 startY to X2 endX Y2 endY color ●
  show cached content
  wait 0.5 seconds
  clear screen
```

Output

Note:
1.   Screen size is W:240 x H:320

g) Display – Draw Circle

Code
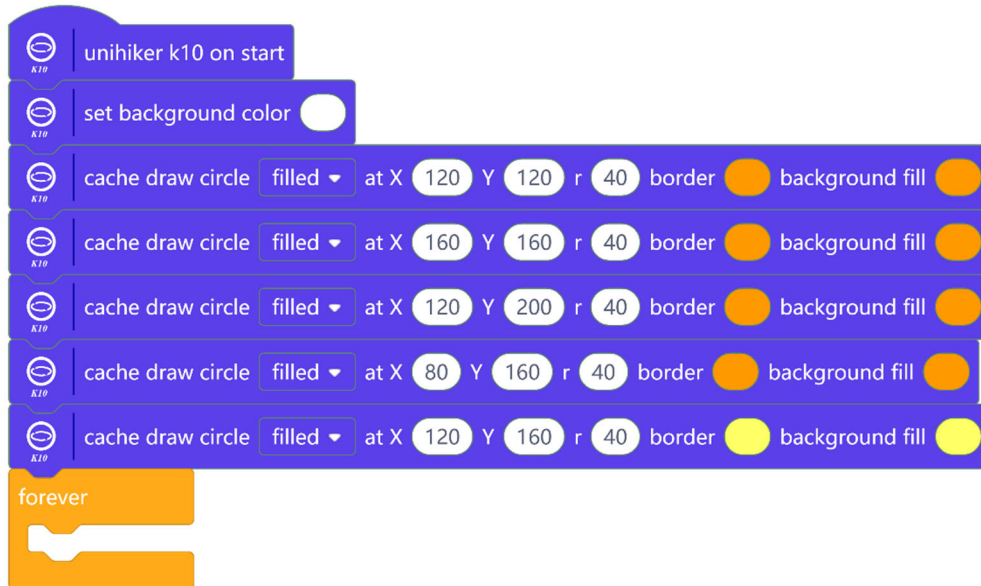
| Output

Note:
1.   Screen size is W:240 x H:320 | |
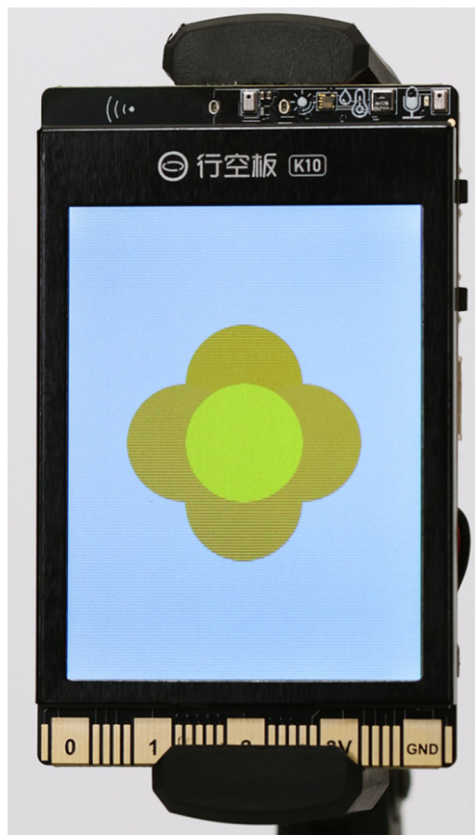
h) Display – Draw Rectangle

Code

``
unihiker k10 on start
set background color ●
forever
  set offset to 0
  repeat 8
    set x to 80 - offset / 2
    set y to 100 - offset / 2
    set color to (🌐 red pick random 50 to 255 green pick random 50 to 255 blue pick random 50 to 255)
    cache draw rectangle unfilled at X x Y y W 80 + offset H 100 + offset border color fill ●
    show cached content
    wait 0.1 seconds
    change offset by 20
  clear screen
``

Output	
Note: 1. Offset changes the sizes of the rectangle by 20 2. The rectangle drawing can be "filled" or "not filled"	

i) Display – QR Code

Code

Output	

1.3.3 Sample Codes (On Board Components)

a) Button

Code

Method 1:

```
unihiker k10 on start
forever
  if  Button [A ▼]  [pressed ▼]  ?  then
    cache draw rectangle [filled ▼] at X (10) Y (100) W (110) H (100) border (●) fill (●)
  else if  Button [B ▼]  [pressed ▼]  ?  then ⊖
    cache draw circle [filled ▼] at X (180) Y (150) r (50) border (●) background fill (●)
  else if  Button [A+B ▼]  [pressed ▼]  ?  then ⊖
    clear screen
  ⊕
  show cached content
```

Method 2:

```
unihiker k10 on start
forever
```

```
when button [A+B ▼]  [pressed ▼]
  clear screen
  show cached content
```

```
when button [A ▼]  [pressed ▼]
  cache draw rectangle [filled ▼] at X (10) Y (100) W (110) H (100) border (●) fill (●)
  show cached content
```

```
when button [B ▼]  [pressed ▼]
  cache draw circle [filled ▼] at X (180) Y (150) r (50) border (●) background fill (●)
  show cached content
```

Code
Output Note: 1. Both methods will give you the same results. However method 1 only allows for 1 button pressed each time while method 2 allows for button press anytime.	

b) Temperature & Humidity

Code

Output	

TemPerature: 31.85
Humidity: 34.61
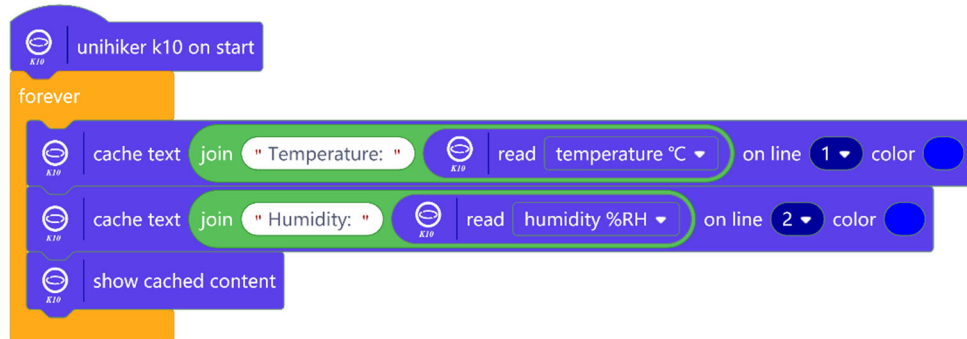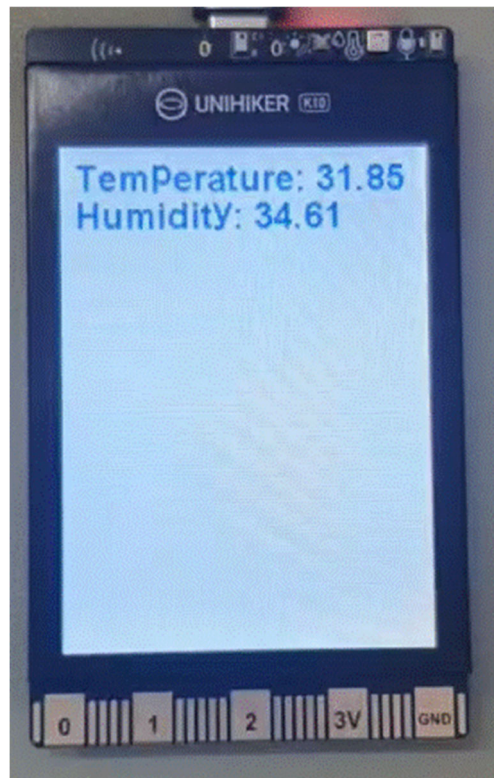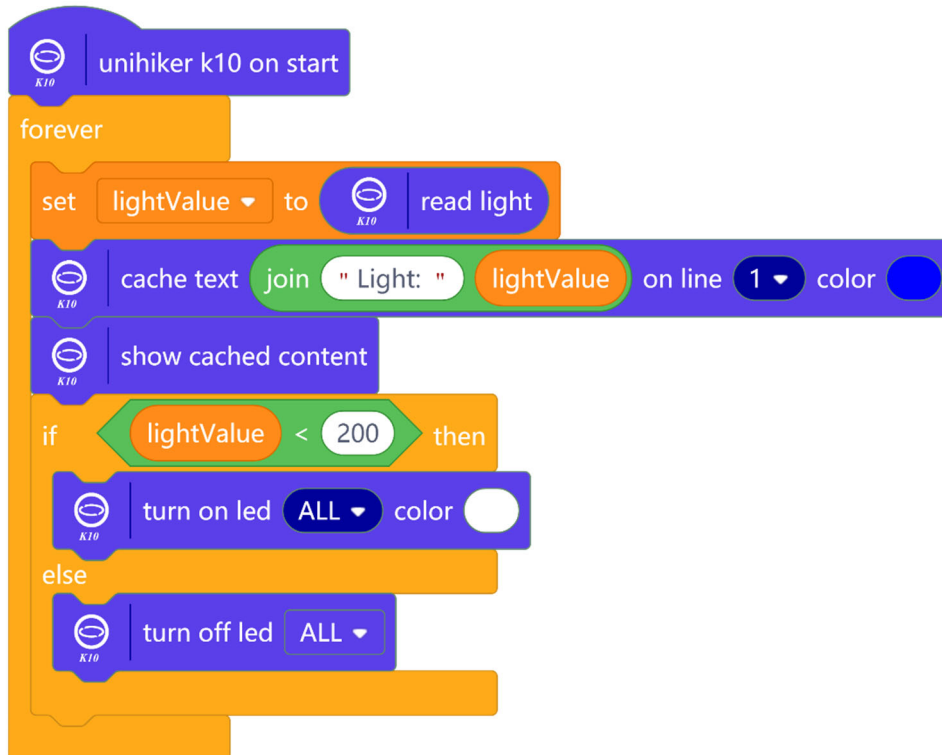
c) Light

Code

Output	
Note: 1. Light sensor values measure ambient light in Lux. The lower the value the darker the amblent environment is.	
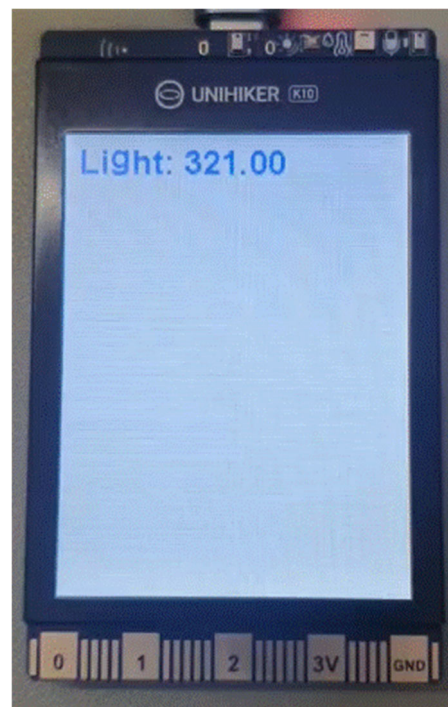
d) Accelerometer – Tilt

Code

```
unihiker k10 on start
set line width  10

forever
  if    Is  Forward tilt ▼  gesture?  then
    cache draw line from X1 120 Y1 100 to X2 120 Y2 220 color ⬤
    cache draw rectangle  filled ▼  at X 110 Y 100 W 20 H 20 border ⬤ fill ⬤
  else if    Is  Backward tilt ▼  gesture?  then ⊖
    cache draw line from X1 120 Y1 100 to X2 120 Y2 220 color ⬤
    cache draw rectangle  filled ▼  at X 110 Y 220 W 20 H 20 border ⬤ fill ⬤
  else if    Is  Left tilt ▼  gesture?  then ⊖
    cache draw line from X1 60 Y1 160 to X2 180 Y2 160 color ⬤
    cache draw rectangle  filled ▼  at X 40 Y 150 W 20 H 20 border ⬤ fill ⬤
  else if    Is  Right tilt ▼  gesture?  then ⊖
    cache draw line from X1 60 Y1 160 to X2 180 Y2 160 color ⬤
    cache draw rectangle  filled ▼  at X 180 Y 150 W 20 H 20 border ⬤ fill ⬤
  else ⊖
    clear screen
  ⊕
  show cached content
```

Code
Output

e) Accelerometer – Shaking

```
unihiker k10 on start
set  steps ▼  to  0
forever
    if ⟨ read acceleration (mg)  strength ▼  >  1020 ⟩ then
        change  steps ▼  by  1
        wait  1  seconds

    cache text  join  " Pedometer: "  steps  on line  1 ▼  color ⬤
    show cached content
```
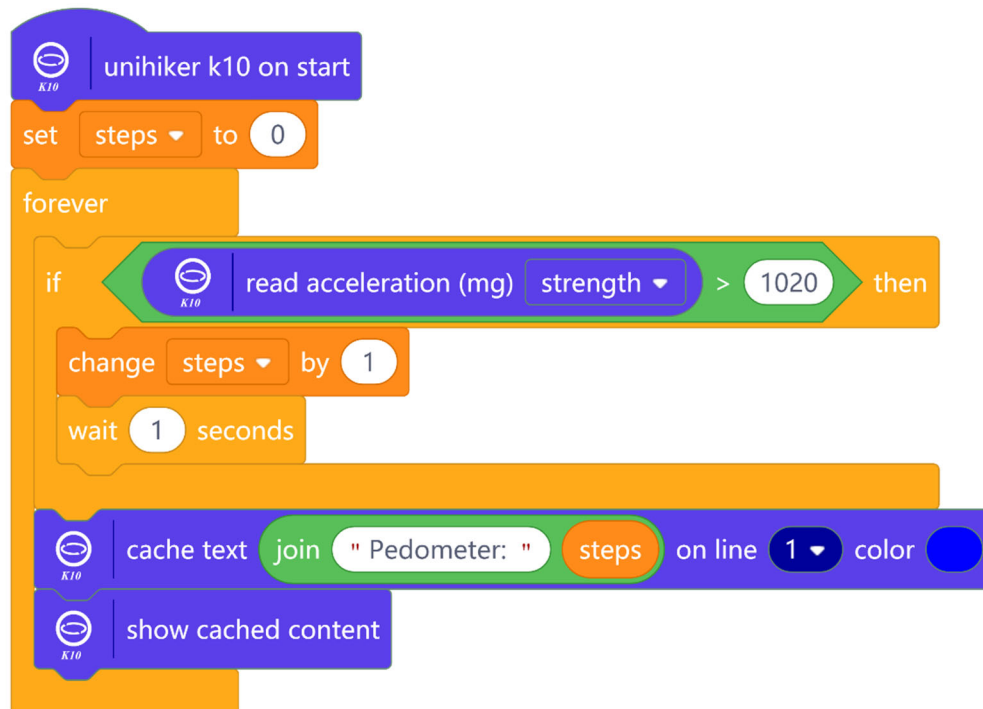
Output

Note:
1. Strength means how hard the Unihiker needs to be shaken to register a step.

Pedometer: 0.00

f)   Accelerometer – Angle
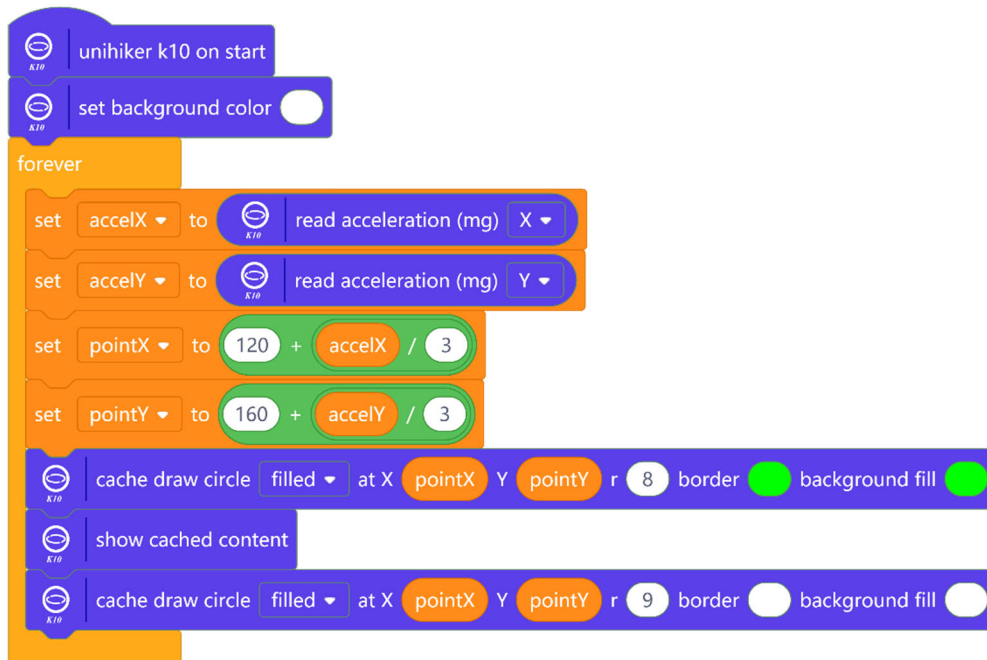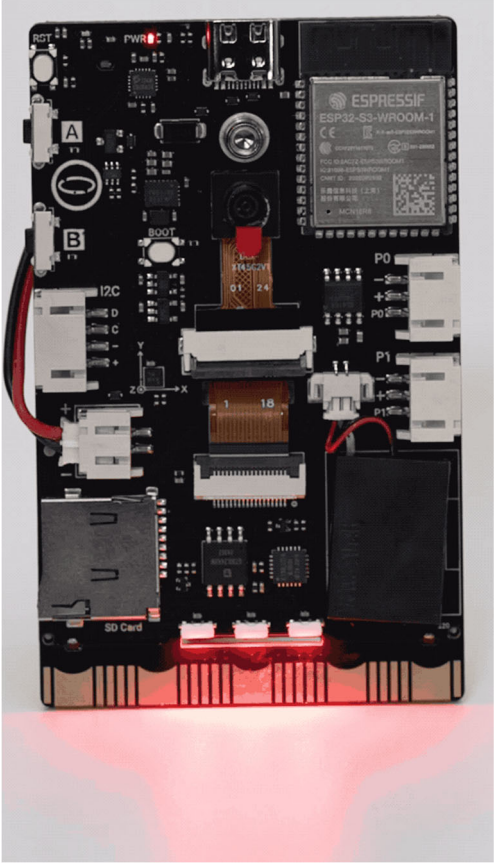
Output
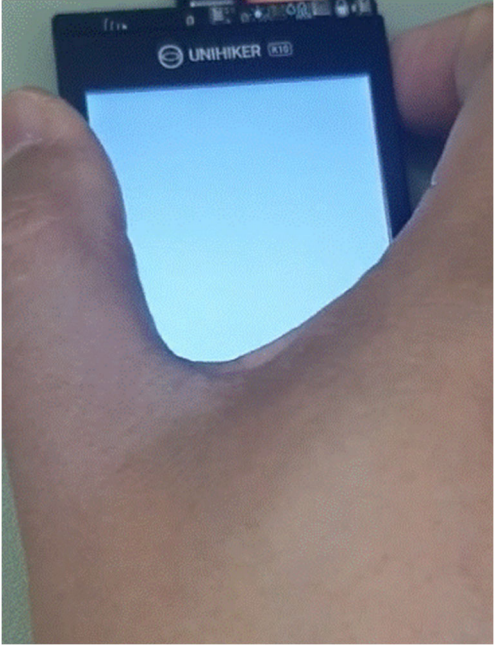
Note:
1.   accelX means how much the Unihiker is tilted in the X axis
2.   accelY means how much the Unihiker is tilted in the Y axis

g) RGB LED

Code	Output

Code blocks:

```
unihiker k10 on start
set brightness to 0
forever
  repeat until brightness = 9
    set led brightness brightness
    turn on led ALL color (red)
    wait 0.5 seconds
    change brightness by 1
  repeat until brightness = 0
    set led brightness brightness
    turn on led ALL color (red)
    wait 0.5 seconds
    change brightness by -1
```

h) Audio – Play Music

Code	Output
unihiker k10 on start forever when button [A ▾] [pressed ▾] play built-in music [BIRTHDAY ▾] in background cache text [" Happy Birthday "] on line [1 ▾] color ● show cached content when button [B ▾] [pressed ▾] Stop background playback wait [1] seconds cache text [" A B C D E F G "] on line [1 ▾] color ● show cached content play tone [Middle C/C4] for [1 ▾] beat play tone [Middle C/C4] for [1 ▾] beat play tone [Middle G/G4] for [1 ▾] beat play tone [Middle G/G4] for [1 ▾] beat play tone [Middle A/A4] for [1 ▾] beat play tone [Middle A/A4] for [1 ▾] beat play tone [Middle G/G4] for [1 ▾] beat	

1.3.4 Sample Codes (AI Functions)

a)   Face Detection

Code
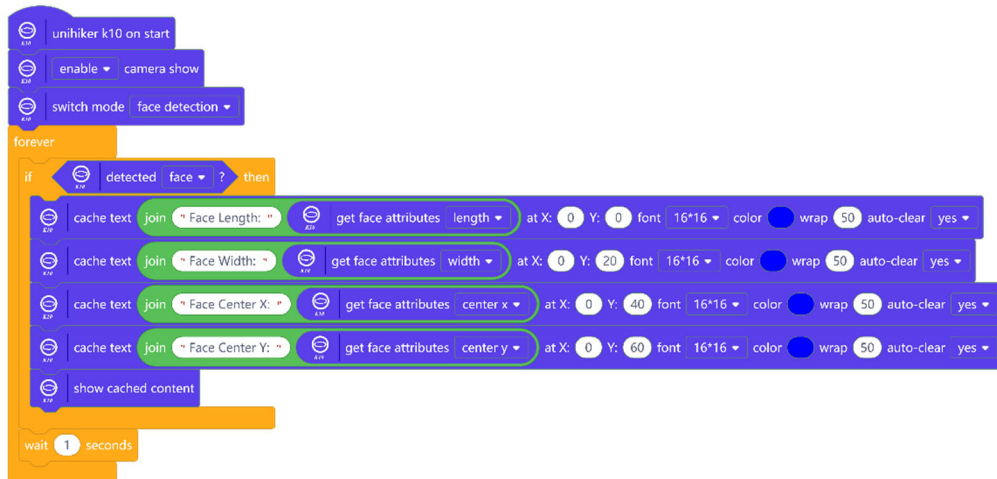
Output	
Note: 1. There is a 1 second delay to give the camera time to detect face. 2. There are more face results that can be used: - position of left and right eye - position of nose - position of mouth	

b) Face Recognition

Code
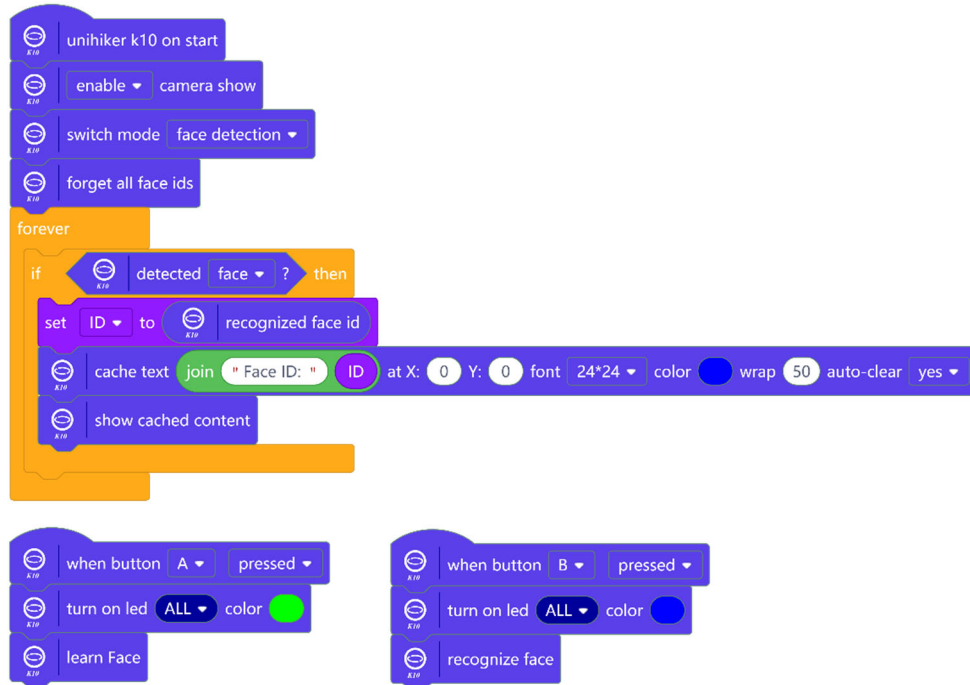
Output	
Note: 1. Press button A to learn a face. Each learnt face will be allocated a Face ID. 2. Press button B to recognize a face. If the Face ID is -1, then it means the face cannot be recognized.	

c) Cat/Dog Recognition

Code
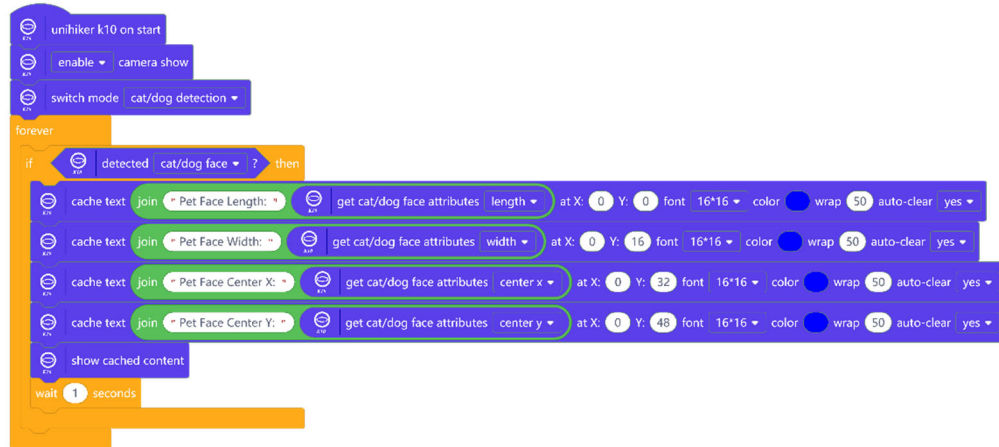
Output

Note:
1. There is a 1 second delay to give the camera time to detect a cat or dog face.

d) Movement Detection

Code

```
unihiker k10 on start
enable ▼ camera show
switch mode  motion detection ▼
set motion detection sensitivity 50
forever
  if      detected  motion ▼  ?  then
    cache draw circle  filled ▼  at X 120 Y 160 r 80 border ⬤ background fill ⬤
    set line width 20
    cache draw line from X1 120 Y1 100 to X2 120 Y2 180 color ⬤
    cache draw line from X1 120 Y1 200 to X2 120 Y2 220 color ⬤
    turn on led  ALL ▼  color ⬤
  else
    clear screen
    turn on led  ALL ▼  color ⬤
  show cached content
  wait 1 seconds
```

Code
Output Note: 1. There is a 1 second delay to give the camera time to detect motion.	

e) QR Code Reader

Code
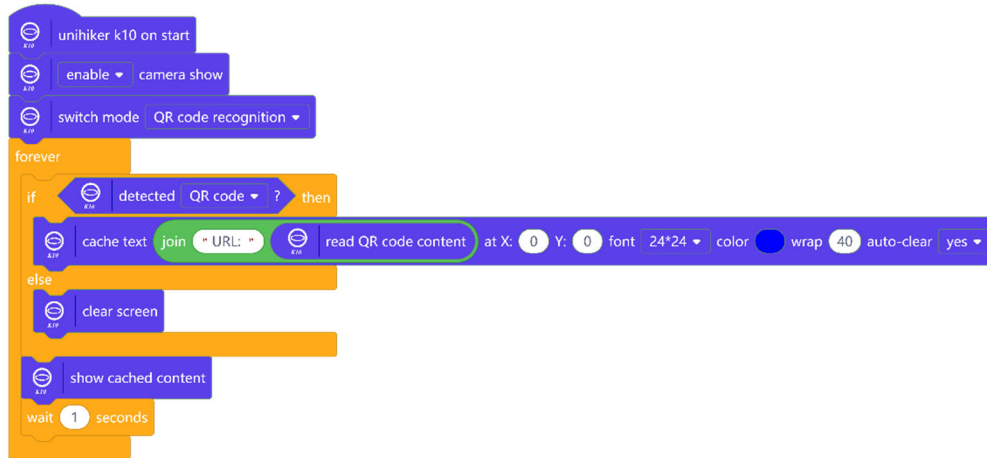
Output	
Note: 1. There is a 1 second delay to give the camera time to detect the QR code.	

f) Speech Recognizer

Code

```
unihiker k10 on start
set speech recognition  continuous ▾  wake time  6000  ms language  EN ▾
add voice command id  0   " lights on "
add voice command id  1   " lights off "
set background color  (  )
forever
    if        speech recognition awake?   then
        if        command id  0  detected?   then
            turn on led  ALL ▾  color  (  )
        else if   command id  1  detected?   then ⊖
            turn off led  ALL ▾
        else ⊖
            cache text  " Awaiting Command "  on line  1 ▾  color  ●
        ⊕
    else
        cache text  " Say "Hi Telly" "  on line  1 ▾  color  ●
    show cached content
```

Code
Output Note: 1. Say "Hi Telly" to start the AI Speech Recognizer before saying the command word. 2. The green LED on the top right corner will be turned on when the AI Speech Recognizer is listening for a command word.	
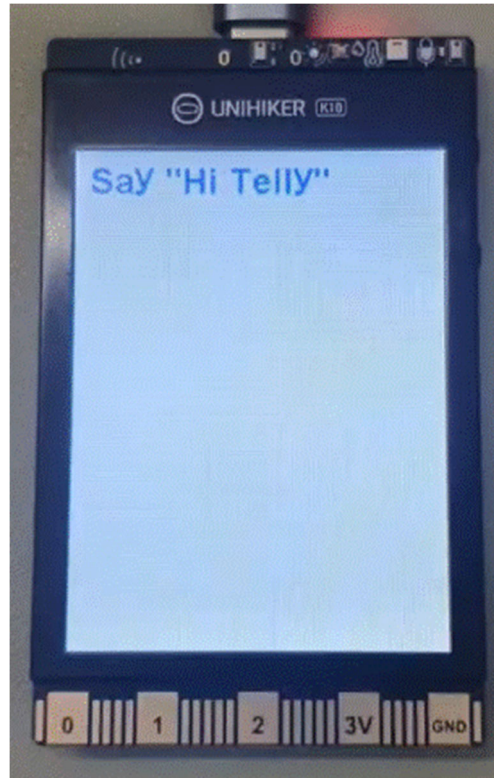
1.4.1 What is an Ultrasonic Sensor and how it works

An ultrasonic sensor is an output device that uses sound to accurately measure distance.
It is often used to detect objects.

Connection to the UniHiker K10
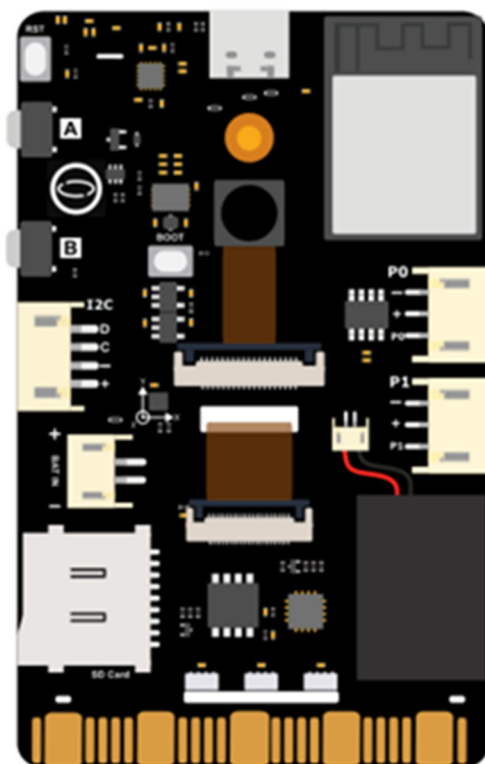
P0 connect to ultrasonic sensor

Adding the ultrasonic sensor extension

1. Click on the [EXTENSIONS] icon on the bottom left corner of Mind+

2. The list of extensions will be displayed

3. Click on the [SENSOR] tab

4. Select the [ULTRASONIC SENSOR] extension

5. When done, the [ULTRASONIC SENSOR] extension will be found on the code menu
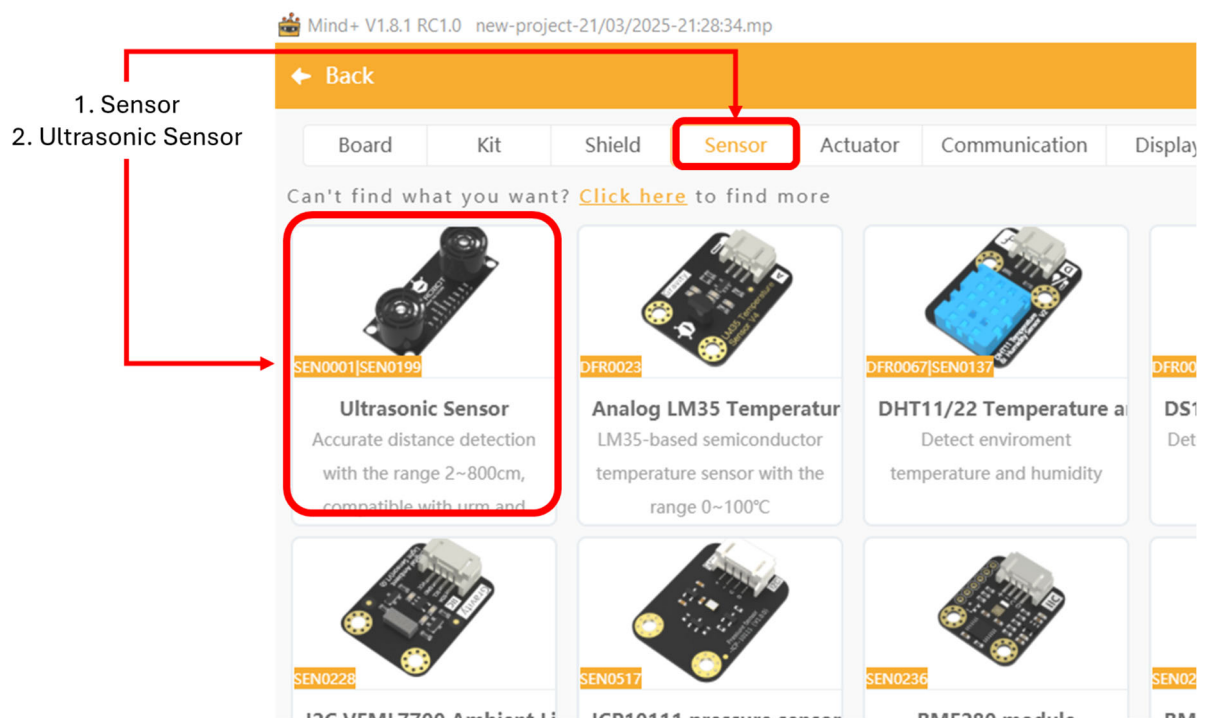
Sample code
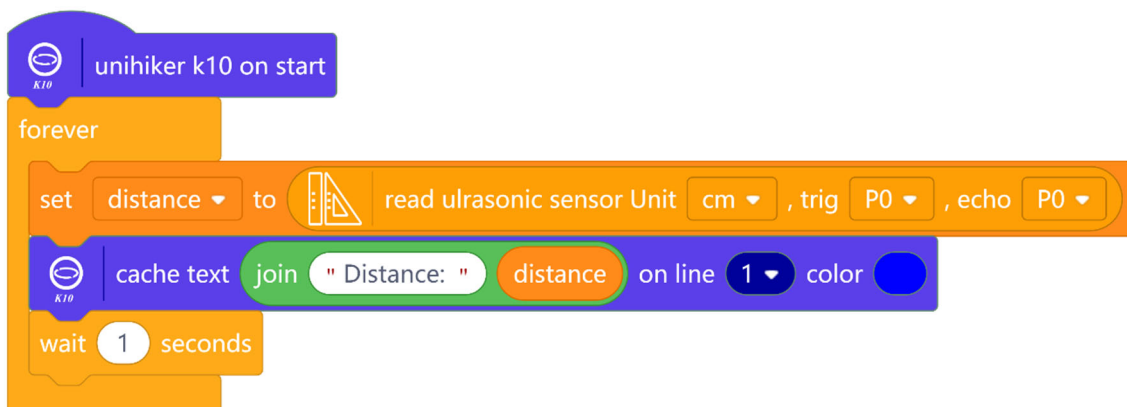
The values returned by the ultrasonic sensor is the distance to an obstacle detected by the ultrasonic sensor. The unit of measurement is in "cm" or "inch".

1.4.2 Invisible Guitar

```
unihiker k10 on start
forever
    set distance ▾ to [read ulrasonic sensor Unit cm ▾ , trig P0 ▾ , echo P0 ▾ ]
    cache text join " Distance: " distance on line 1 ▾ color ⬤
    show cached content
    if distance > 0 then
        if distance < 5 then
            play tone Middle C/C4 for 1/4 ▾ beat
        else if distance < 10 then ⊖
            play tone Middle E/E4 for 1/4 ▾ beat
        else if distance < 15 then ⊖
            play tone Middle G/G4 for 1/4 ▾ beat
        else if distance < 20 then ⊖
            play tone Middle B/B4 for 1/4 ▾ beat
        ⊕
    wait 1 seconds
```

1.5.1 What is a Servo Motor and how it work

A servo motor is an output device with integrated gears and a shaft that can be precisely controlled. Standard servos allow the shaft to be positioned at various angles, usually between 0 and 180 degrees.

Typical uses of servo motors include operating remote-controlled or radio-controlled toy cars, robots and airplanes. Servo motors are also used in industrial applications, robotics, in-line manufacturing, pharmaceutics and food services.


Connection to the breakout board

P0 connect to servo
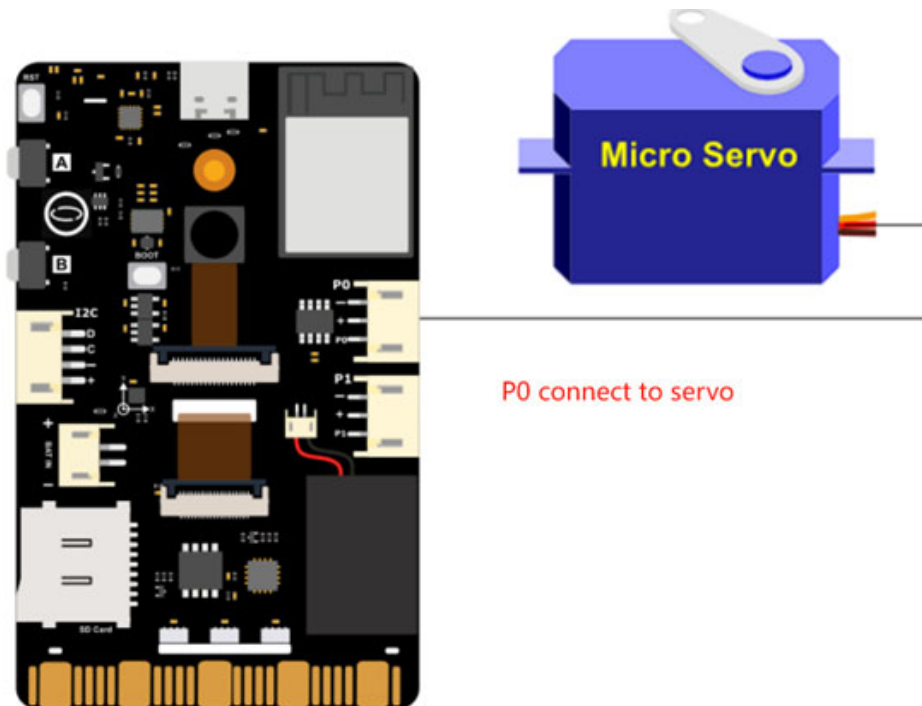
Adding the Servo extension

1. Click on the [EXTENSIONS] icon on the bottom left corner of Mind+

2. The list of extensions will be displayed

3. Click on the [SENSOR] tab

4. Select the [ULTRASONIC SENSOR] extension

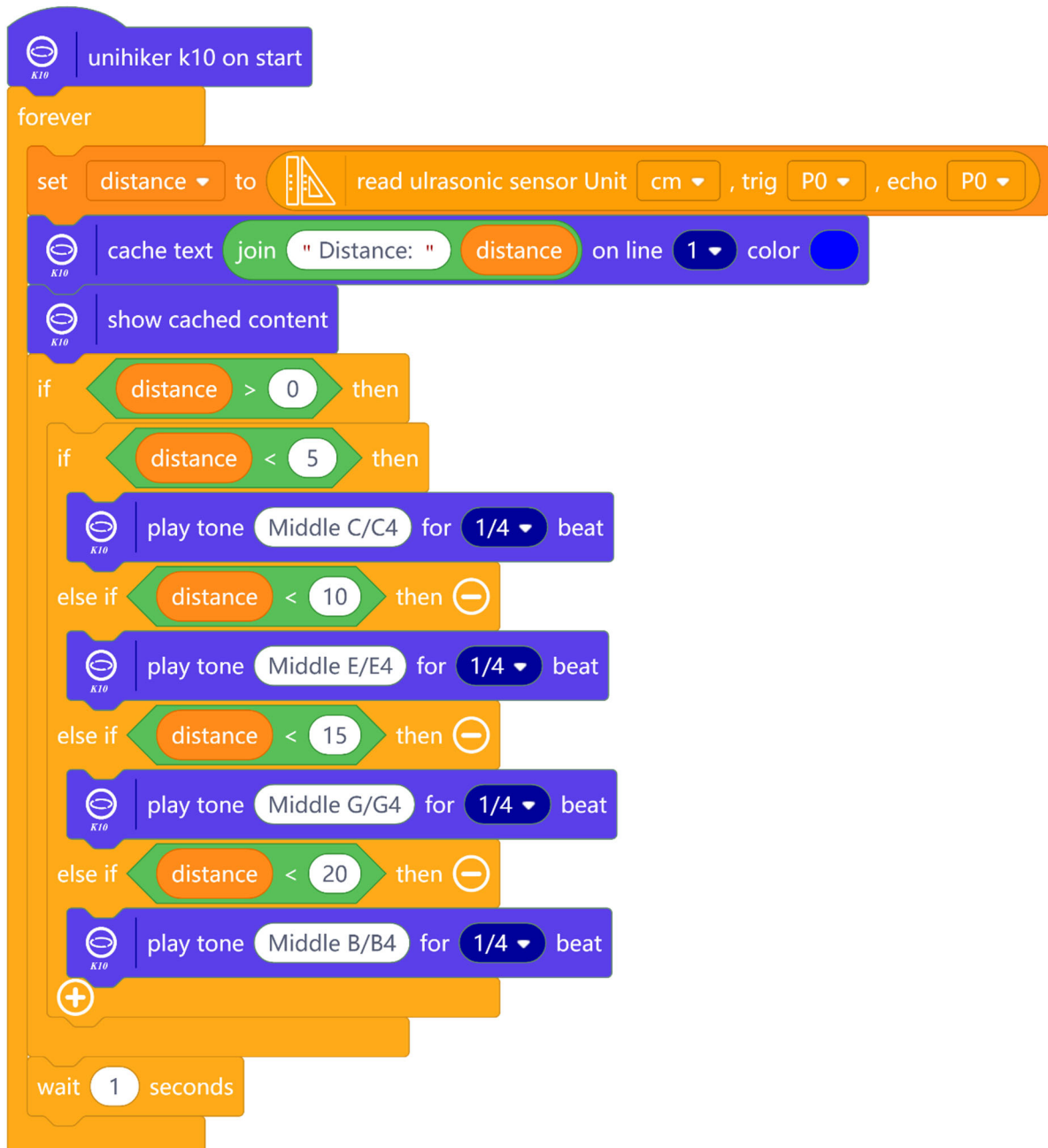5. When done, the [ULTRASONIC SENSOR] extension will be found on the code menu
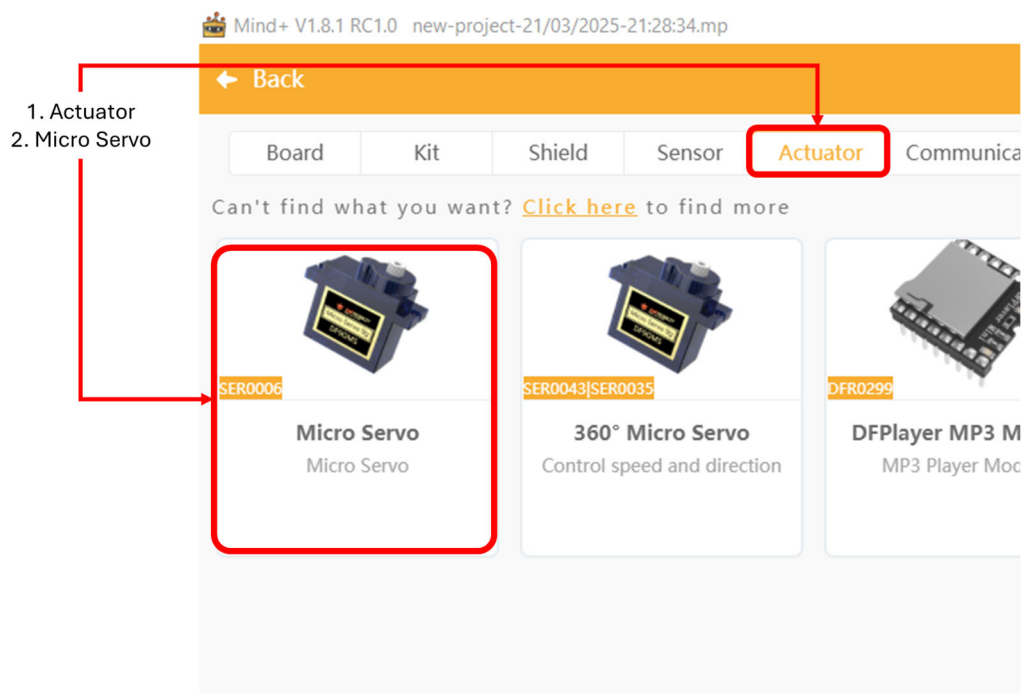
Sample code

1.5.2 Windscreen Wiper

```
unihiker k10 on start
set startStop to 0
forever
    if startStop = 1 then
        set pin P0 servo to 0 degree
        wait 2 seconds
        set pin P0 servo to 180 degree
        wait 2 seconds
    else
        set pin P0 servo to 0 degree
```

```
when button A pressed
set startStop to 1
cache text " Start " on line 1 color
show cached content
```

```
when button B pressed
set startStop to 0
cache text " Stop " on line 1 color
show cached content
```
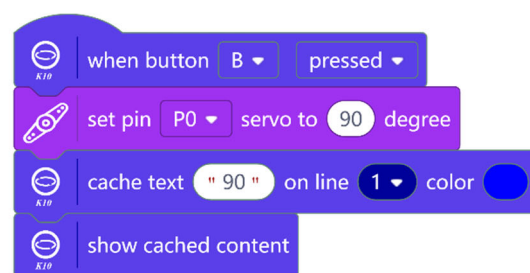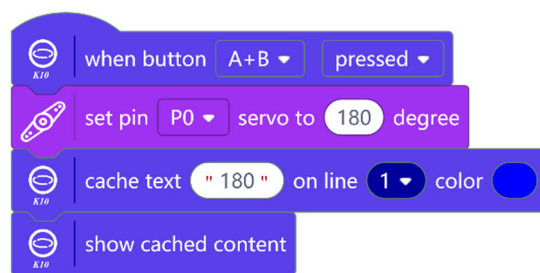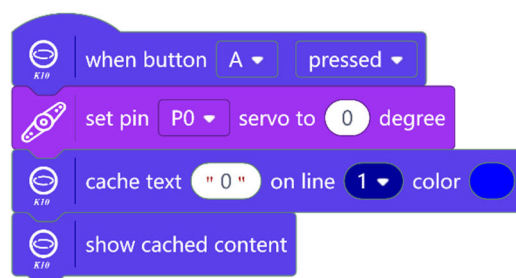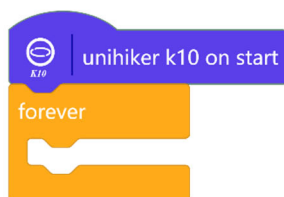
2.1.1 Introduction to Design Thinking

Design thinking is an approach towards solving real world design problems by understanding users' needs and developing key insights to solve those needs.

Problem Scoping

Problem scoping involves the critical process of identifying a good design problem. Identification can be through interviewing and asking questions and brainstorming and coming out with multiple issues and problem areas.

Concept Generation

Concept generation is the creative process of generating, developing, and communicating new ideas, where an idea is understood as a basic element of thought that can be either visual, concrete, or abstract. Concept generation comprises all stages of a thought cycle, from innovation, to development, to actualization.

Concept Selection

Concept selection arrives at the winning solution by comparing the relative strengths and weaknesses of the concepts generated.

Prototyping

Prototyping process involves development of an early representation of the final solution.

Testing

Testing is the final stage of design thinking. This is where the prototype solution is tested in real life and in real time by the actual users.
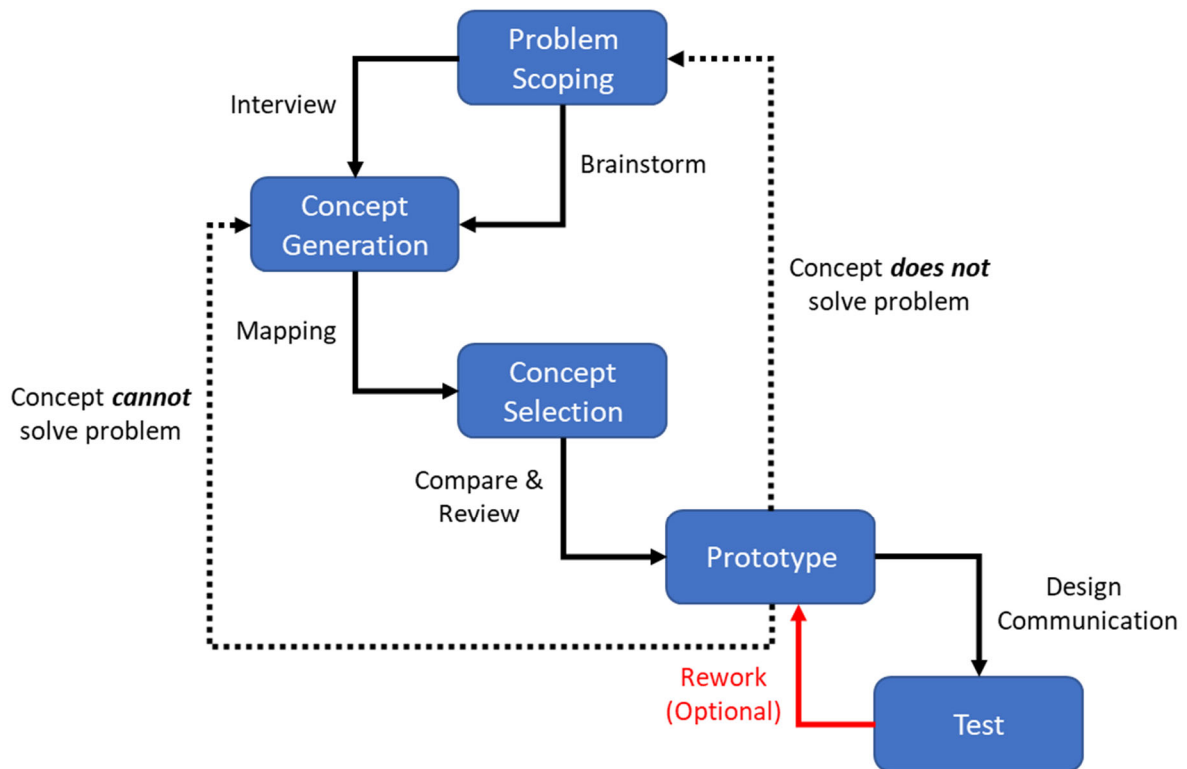
Theme

The theme for this hackathon is all about finding creative and innovative solutions to the problems we might face in the future. As students, you are the future leaders of our world, and we believe that you can come up with brilliant ideas to solve the problems of tomorrow.

We want you to think outside the box and come up with solutions that are sustainable, efficient, and scalable. Some areas of focus could be climate change, healthcare, transportation, education, and more.

During this hackathon, you will have the opportunity to work in teams and collaborate with other students from different schools. You will be given access to mentors who will guide you and help you develop your ideas.

At the end of the hackathon, you will present your solutions to a panel of judges who will evaluate your projects based on innovation, feasibility, and impact.
(https://phss.epc-education.com/hackathon-2023/)

Activity 1: Problem Scoping – Interview

Here are some sample problems that primary school students could potentially solve during the hackathon:

1. Climate change: Develop a solution to reduce carbon emissions in your school or community. This could include ways to conserve energy, reduce waste, or promote sustainable transportation.

2. Healthcare: Create a technology or tool to help people manage their health better. This could be an app that reminds people to take their medication, a device that monitors vital signs, or a platform that connects patients with doctors remotely.

3. Education: Find a way to make learning more engaging and accessible for students. This could include a game that teaches a subject, a platform that connects students with mentors, or a tool that helps students track their progress.

4. Transportation: Create a solution to make transportation more efficient and sustainable. This could include a carpooling app for parents, a platform that encourages walking or biking to school, or a device that tracks carbon emissions from transportation.

5. Community building: Develop a solution to bring people together and promote social cohesion. This could include an app that connects volunteers with local organizations, a platform that helps people organize community events, or a tool that promotes cultural understanding and diversity.

These are just a few sample problems, but there are many other challenges that students can tackle during the hackathon. The key is to identify a problem that resonates with you and your team, and to come up with a creative and innovative solution that can make a real difference in the world.

Ask questions like:

1. Have you heard about people suffering from mental health issues during the pandemic?

2. Who were they referring to?

3. What kind of problems/issues did they face?

4. What could be done to help these people?

5. Are these issues only due to the pandemic or do they also occur without the pandemic?

6. Do you have any personal stories or heard about your friends having mental health issues?

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Activity 2: Problem Scoping –Brainstorm

Identify issues and problem areas that we see/hear/read about locally that are linked with the problems that occurred due to the mental health issue you selected.

Describe the problem:

1. What is the impact of the pandemic on the mental health issue?

2. How does it affect people/environment/things?

3. Who is affected by it?

4. Why do you think these problem areas are important to address?

5. Where does these problem areas normally occur?

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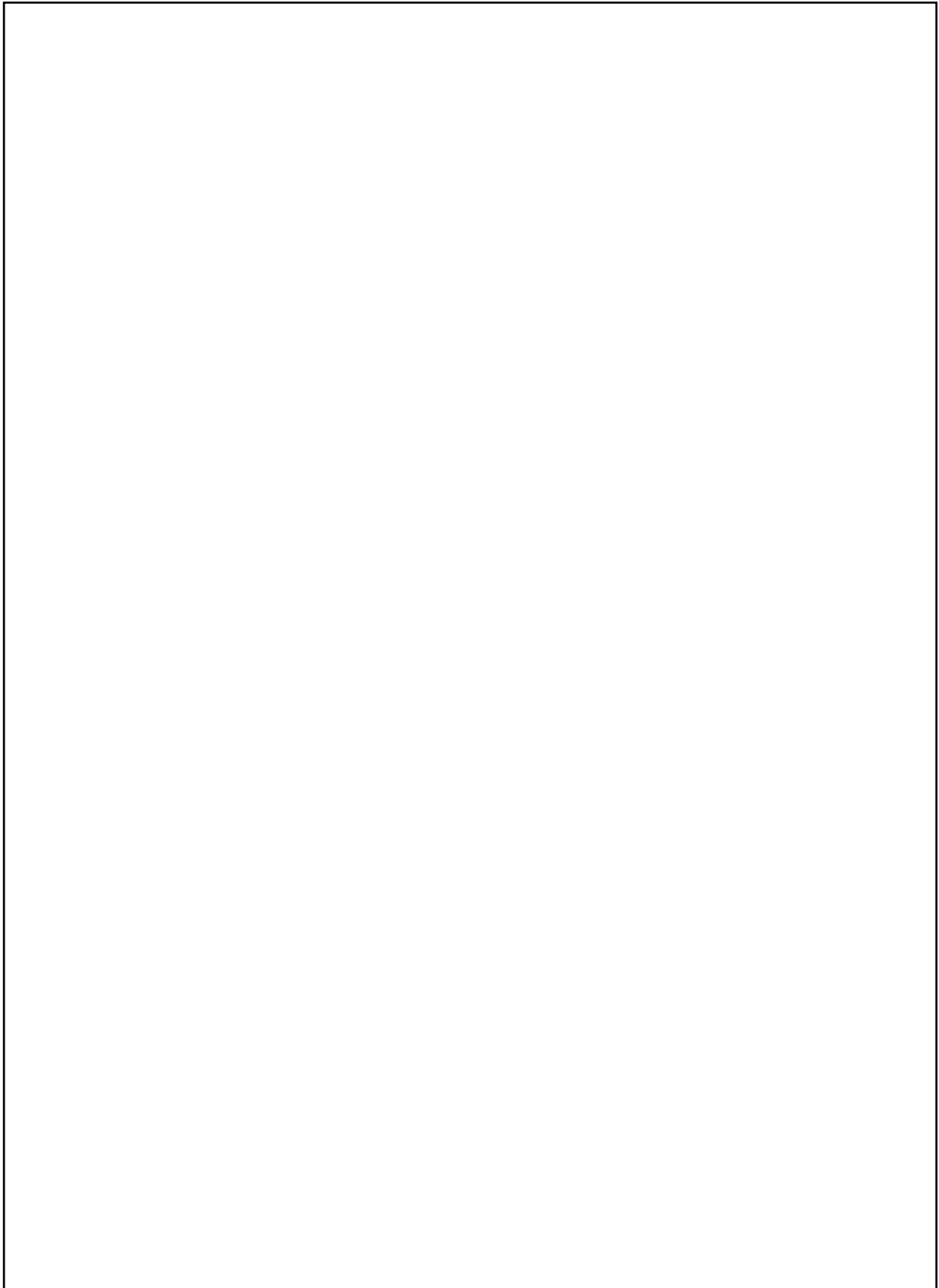
Activity 3: Concept Generation – Mapping

Concept generation maps are graphical tools for organizing and representing knowledge, usually enclosed in circles or boxes of some type, and relationships between concepts indicated by a connecting line linking two concepts.
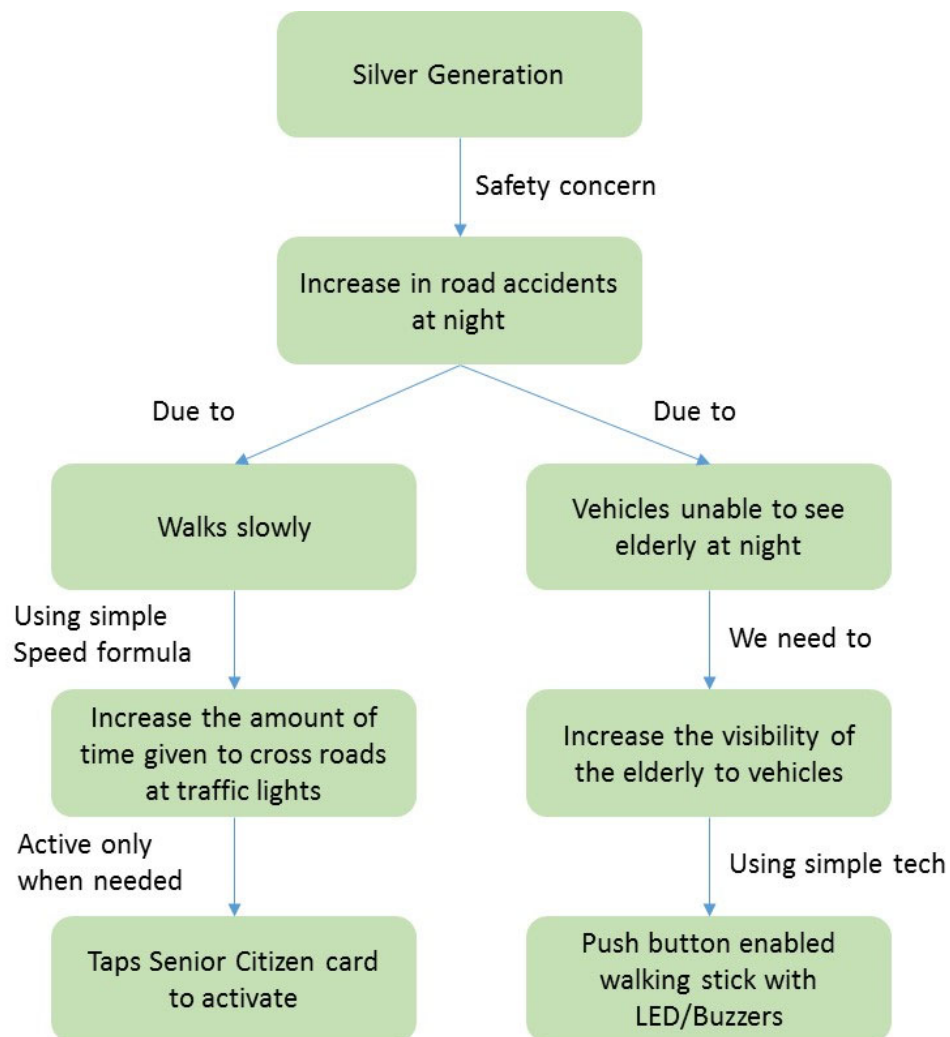
Concepts are represented in a hierarchical fashion with the most inclusive, most general concepts at the top of the map and the more specific, less general concepts at the bottom of the map.

Can you generate a concept map to address the issues and problem areas you identified?

Activity 4: Concept Selection –Comparison and Review

Share your concept map and solution with your team. Like the problem scoping phase, list out suggestions and comments from your team about your solution.

1. Take note of likes/dislikes and builds on the idea, but also listen for new insights.

2. Spend the time listening to your teammates' reactions and questions.

3. Consider what you have learned both about your teammates, and about the solutions you generated.

4. Do you need to return to Problem Scoping or Concept Generation Phase?

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Activity 5: Prototyping – Design Communication

In this phase you will need to create a small but crucial representation of the final solution. This prototype can be either virtual or physical.

1. What are the characteristics of your solution?

2. How does it work? What are the functional requirements?

3. What does it look like?

4. How will people use it?

5. How must it make the user feel?

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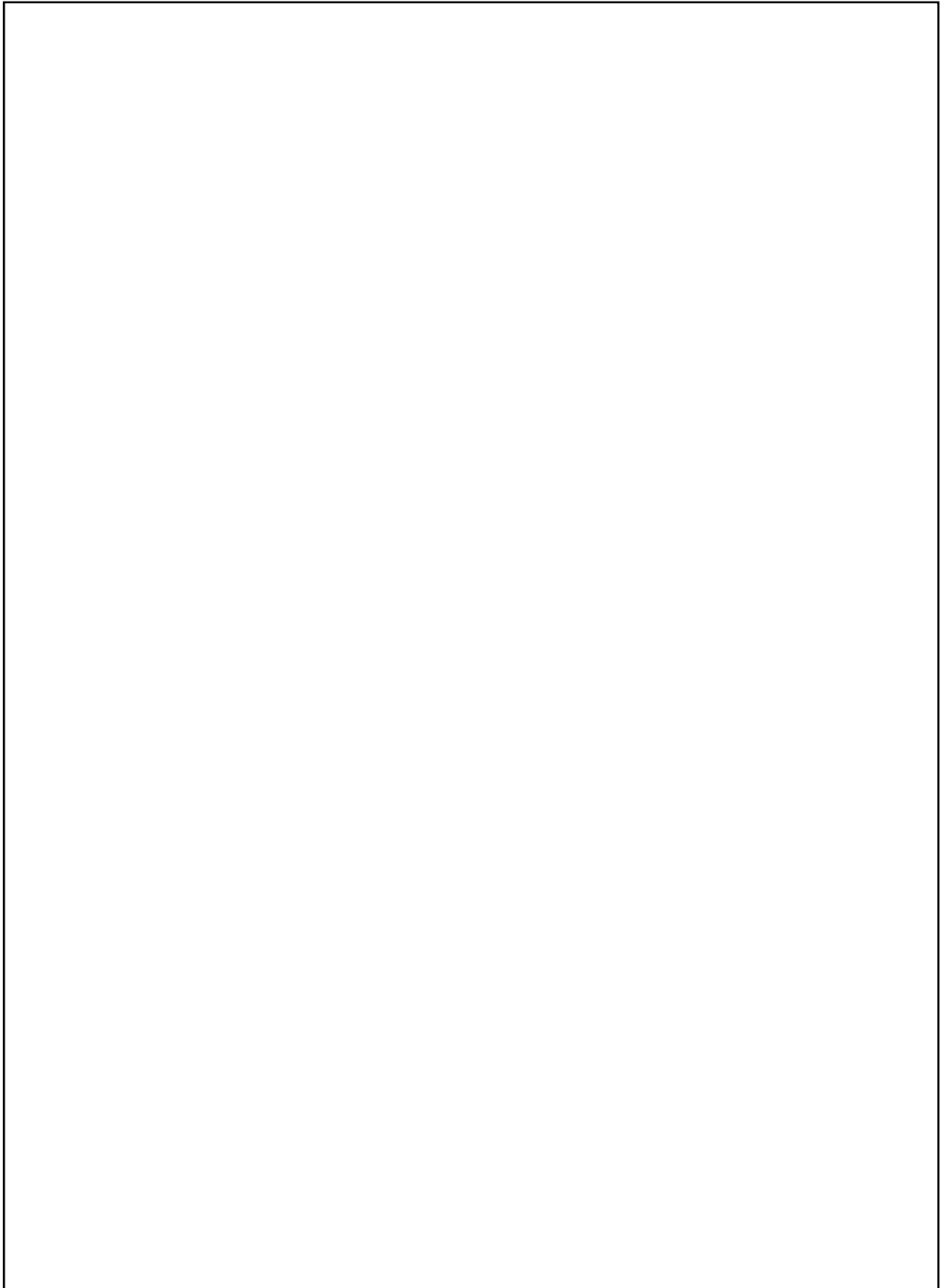
Draw out how you want the prototype to look like and list down what materials/tools/components do you need to complete the prototype.

Activity 6: Testing

In this phase you will need to test the prototype according to the previously listed design communication.

1. Does it display the characteristics of your solution?

2. Does it work according to the functional requirements?

3. Does it look like the way it was designed?

4. Can people use it the way it was designed?

5. How does the user feel after testing?

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Final Points to Note

Design thinking is a human-centred approach to problem-solving that focuses on understanding people's needs, exploring creative solutions, and testing and iterating on ideas. Here are some of the core values of design thinking that primary school students can consider for this hackathon:

- Empathy: Design thinking starts with empathy, which means understanding the needs, wants, and challenges of the people you are designing for. During the hackathon, students should aim to empathize with the people who will benefit from their solution, whether it's their classmates, their community, or the world at large.

- Creativity: Design thinking encourages students to think creatively and come up with novel solutions to problems. Students should feel free to think outside the box and explore a wide range of possibilities during the hackathon.

- Collaboration: Design thinking is a collaborative process that involves working with others to generate and refine ideas. Students should work closely with their teammates, mentors, and other participants to build on each other's strengths and come up with the best possible solution.

- Experimentation: Design thinking involves prototyping and testing ideas to see what works and what doesn't. Students should be willing to try out different approaches and be open to learning from their mistakes.

- Iteration: Design thinking is an iterative process that involves refining and improving ideas based on feedback. Students should be prepared to iterate on their ideas and make changes based on what they learn from testing and user feedback.

By embracing these core values of design thinking, students can develop innovative and effective solutions to the problems of tomorrow.