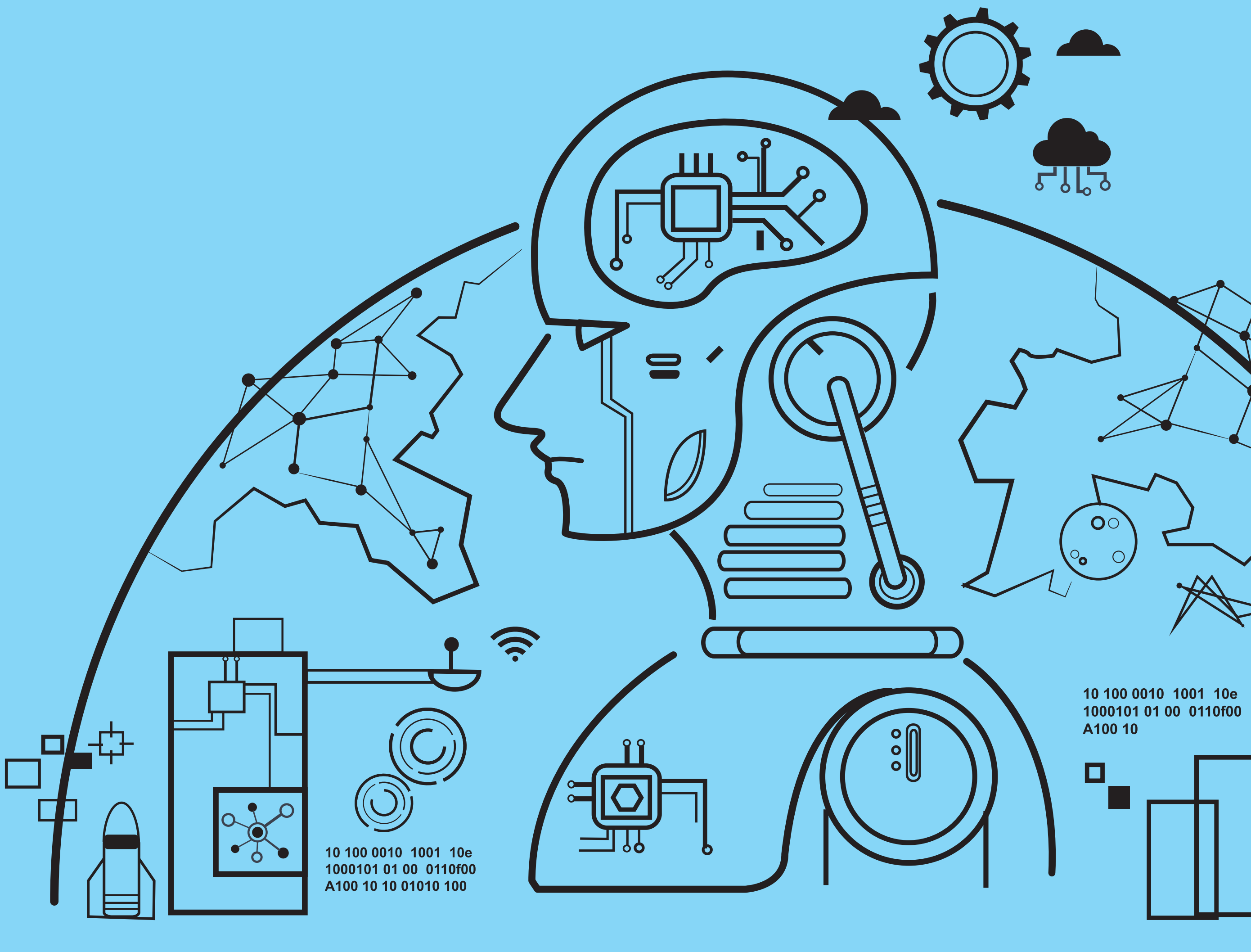
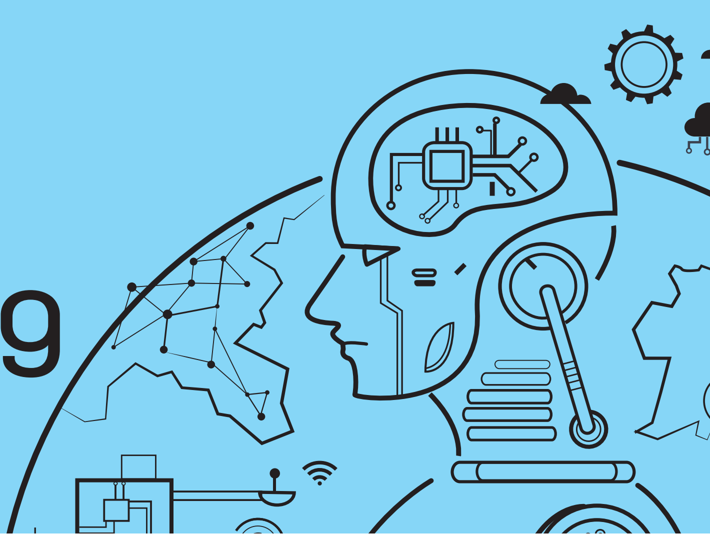
Part.1

1. Understanding AI.
2. R-GEE introduction
3. Coding with R-GEE
4. Practice AI with R-GEE


10 100 0010 1001 10e
1000101 01 00 0110f00
A100 10
10 100 0010 1001 10e
1000101 01 00 0110f00
A100 10 10 01010 100

Class
01

Understanding AI



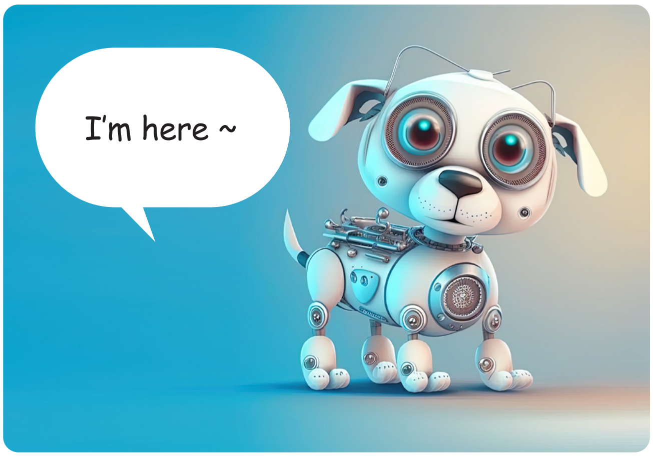
1 What is AI?

Hello! Artificial Intelligence (AI) is like having a super smart toy or computer that can learn things by itself, just like how you learn new things. It can do things that need human intelligence, like understanding your voice or playing games. Scientists and engineers are creating AI to help solve big problems, like curing diseases or making our cities work better.

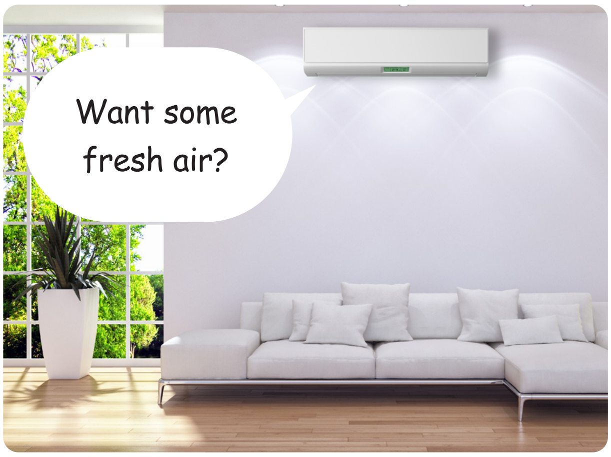
Look at the pictures on the right and answer the questions.

Q1 What do the robots and machines in the pictures each do?

Q2 What do we call the technology needed to make a robot or machine judge and work for itself?



A. A dog robot interacting with people


Want some fresh air?

B. An air-conditioner that can automatically control temperature in the house

Watch out !
ROBOTIS

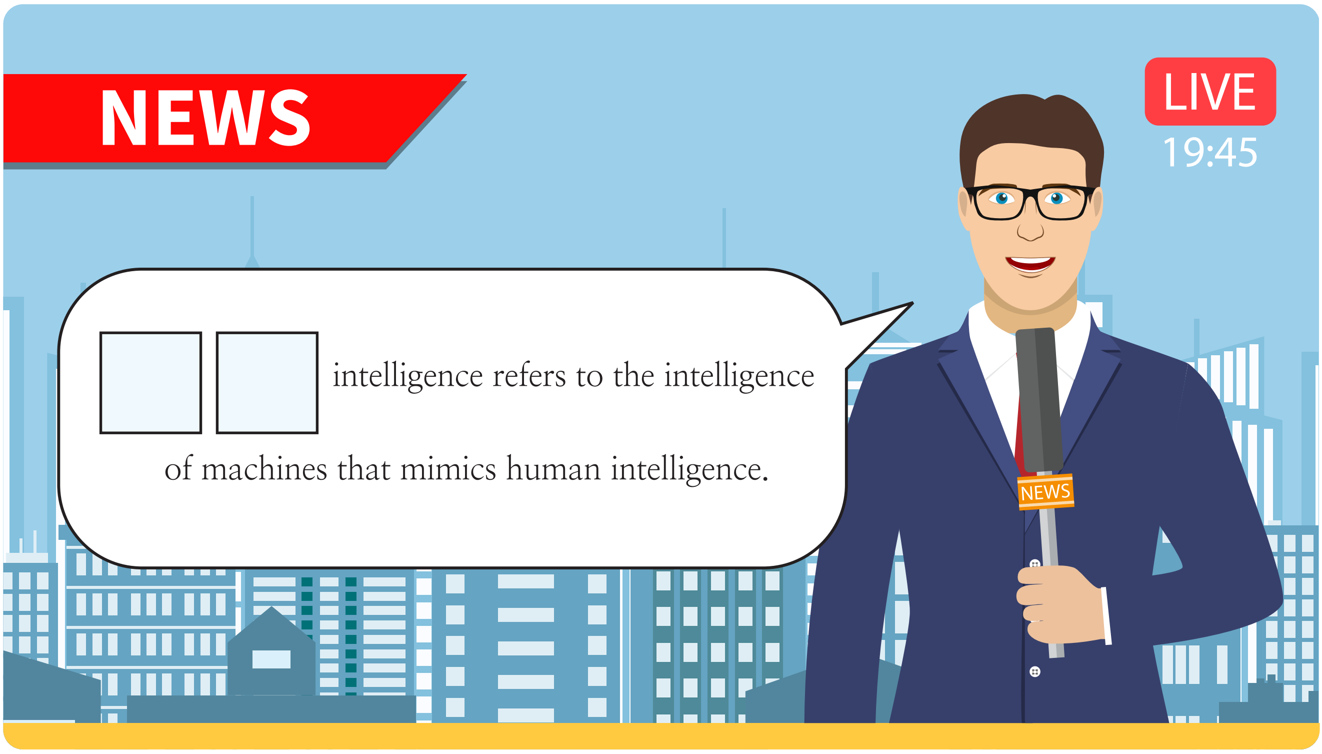
C. A robot that delivers goods

2 Into the World of AI

Let's think about the following two questions and fill in what the anchor has to say.

Q1 What is 'intelligence' that humans possess?

Q2 Can computers or machines have intelligence like humans?



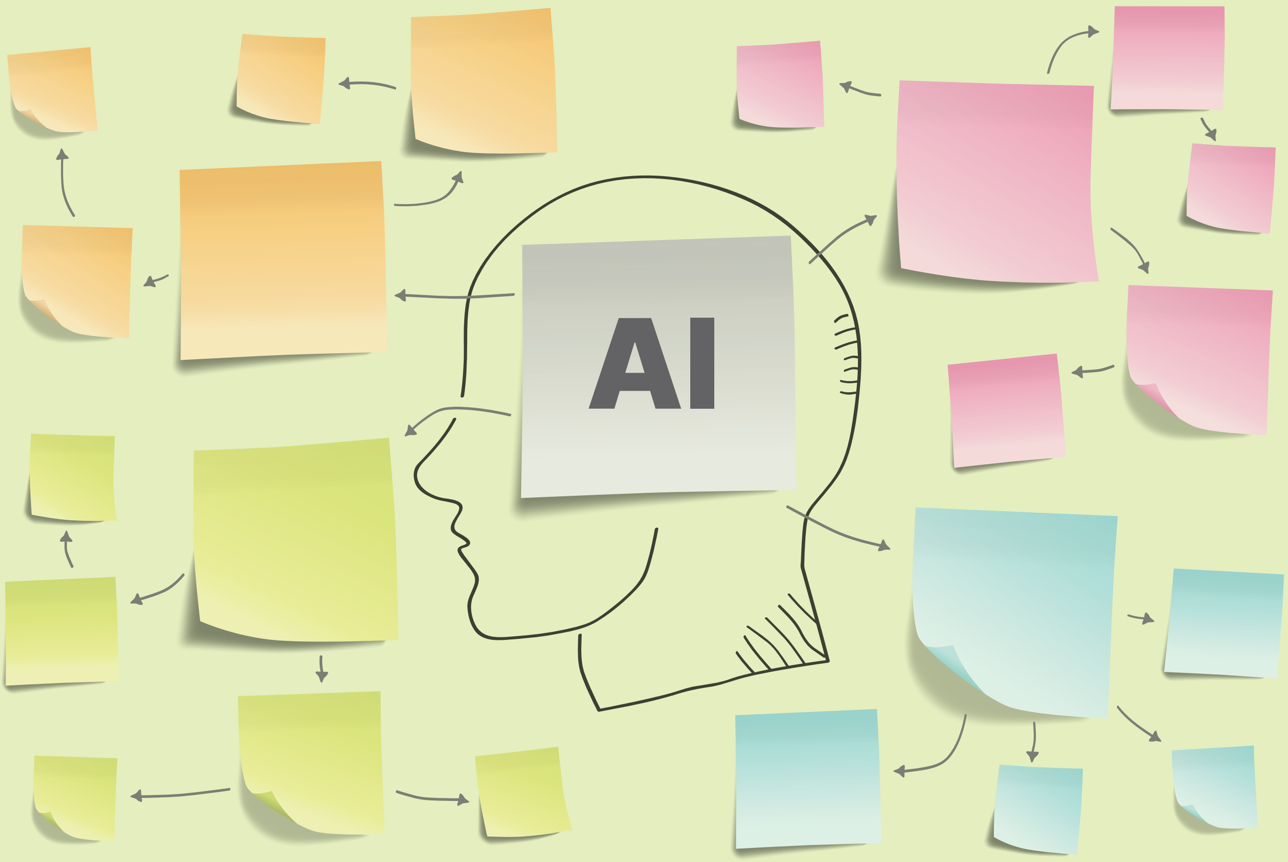
☐☐ intelligence refers to the intelligence of machines that mimics human intelligence.

MEMO

Learn Together

Let's think about and discuss some examples of AI being used around us.

Materials: Post-it notes, writing utensils



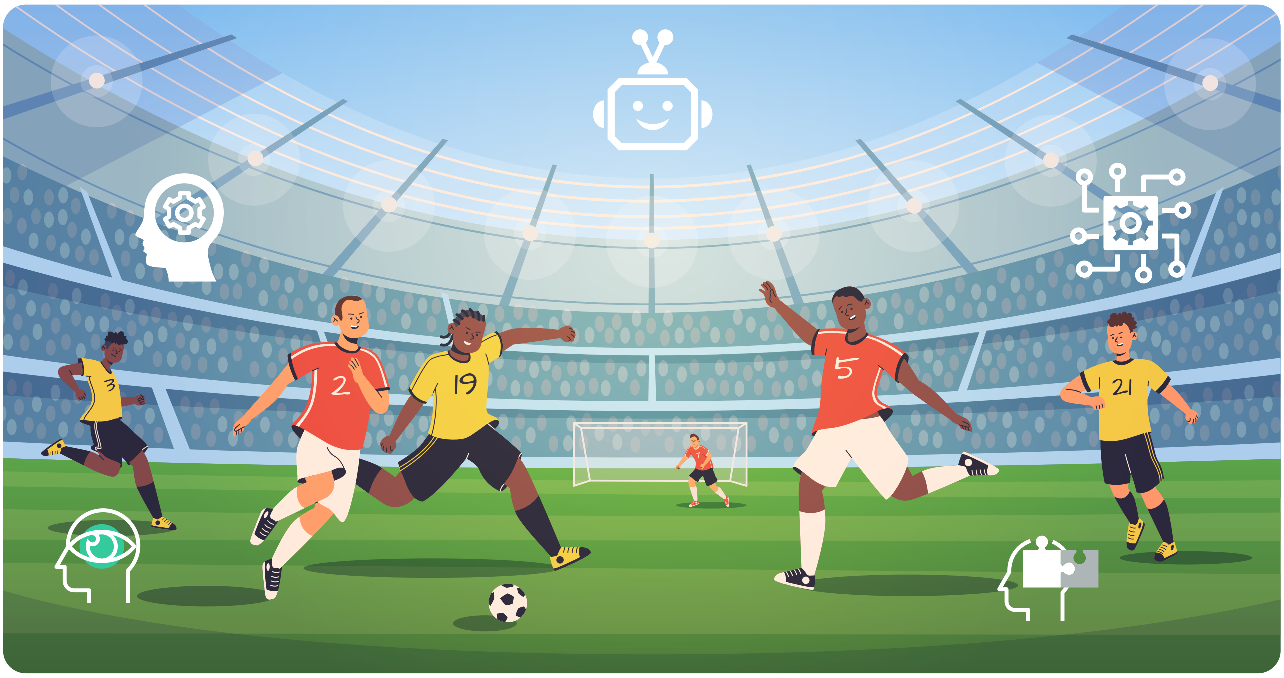
Examples of AI around us

Team Name:

Team Members:

Team Activity Google examples of AI, write them on the post-it notes, and share what you find with your teammates.

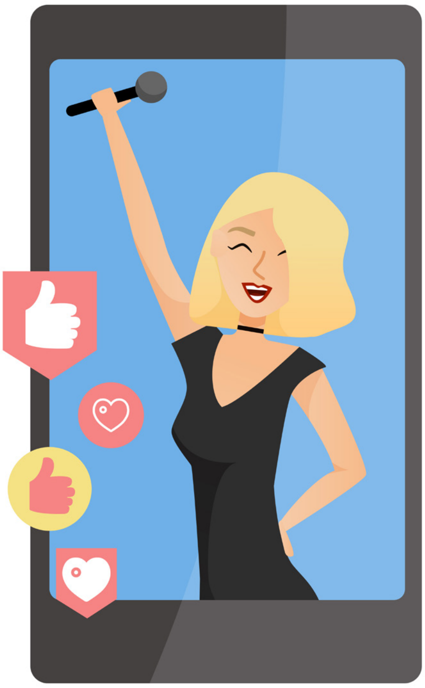
3 AI in the Real World



AI is already being used in soccer games to assist in various aspects of the game.
For example, AI is used to analyze the performance of the team and individual players.
AI algorithms can process large amounts of data and provide real-time feedback, which allows coaches and analysts to gain greater insights into players' movements, passing accuracy, and other metrics that can help make effective strategic decisions during a game.
AI can also be used to replay videos, helping referees to make accurate decisions about whether or not a foul has been committed or a free kick should be awarded.
Additionally, AI-powered cameras can be used to track the movement of the ball and players on the field, providing fans with a better view of the game and enabling a more immersive and interactive experience.
So while AI may not be able to replace human judges entirely, it plays an important role in assisting with certain aspects of the game.

MEMO

Will AI take over the role of a singer?

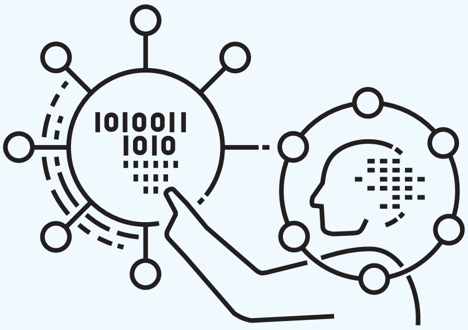


An AI singer is a computer program that has been trained to sing like a human. Just like how humans can learn to sing by listening to music and practicing, AI singers are taught to sing by analyzing recordings of human singers and learning from them.

The AI singer can then use this knowledge to create its own music and sing songs just like a human would. Some AI singers even use special software to create unique vocal styles and effects that human singers might not be able to do.

To summarize, an AI singer is like a robot that has been taught to sing by listening to human singers and learning from them. It can then create its own music and sing songs in a unique way.

Find and share more examples of AI in use



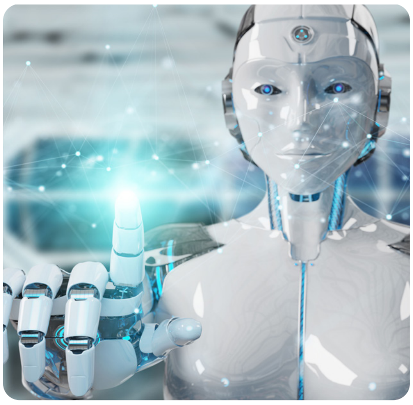
4 AI and Future Jobs

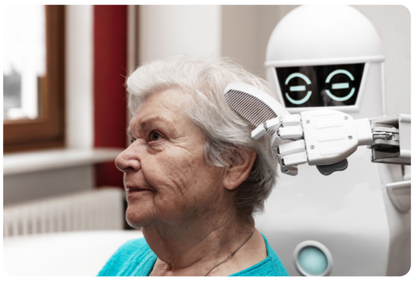
What jobs will AI take away?

It is said that the development of AI will have a great impact on the job market.

Futurist Thomas Frey, director of the Da Vinci Institute, predicts that half of the existing jobs worldwide will disappear by 2030.

However, there will be jobs that survive these changes, and new jobs will be created in the process.





HERE'S YOUR ORDER!
Set A x 1

MEMO

Let’s look at some of the future promising jobs related to AI.

Robot Engineers

Robot engineers do research on technology such as AI, sensors, software, and hardware to develop robots. Additionally, they work to create robots that can be used in various fields such as home and personal service, rescue and lifesaving, medical service, education, and space exploration. Robot engineers also manage and supervise robots to see if there are any problems when in use or any technical defects. Robot engineers can enter various vocational fields such as robot development research institutes, robot-related product manufacturing companies, and robot education-related companies.

Big Data Experts

Big data experts manage and analyze large amounts of big data to predict people's behavior patterns or changes in the market. They collect, store, and analyze large amounts of data to predict consumer behavior and market trends. Data analysis results are used not only in corporate marketing, but also in various fields such as economics, medical care, and education to help people make decisions. Big data experts can enter a company's big data management department, marketing department, work in an Internet portal company, or data analysis company.

Robot Ethicist

Robot ethicists explore the ethical aspects of the relationship between robots and humans and study the behavioral norms that robots must follow. Additionally, they create moral and legal criteria to determine whether problems caused by operating robots are due to mechanical defects or intentional harm to humans. Robot ethicists require advanced knowledge of robots, ethics, and law, and can work as university professors or in robot-related research institutions.

When I grow up, I want to be a/an

________________________________ .

Class
02

R-GEE Introduction

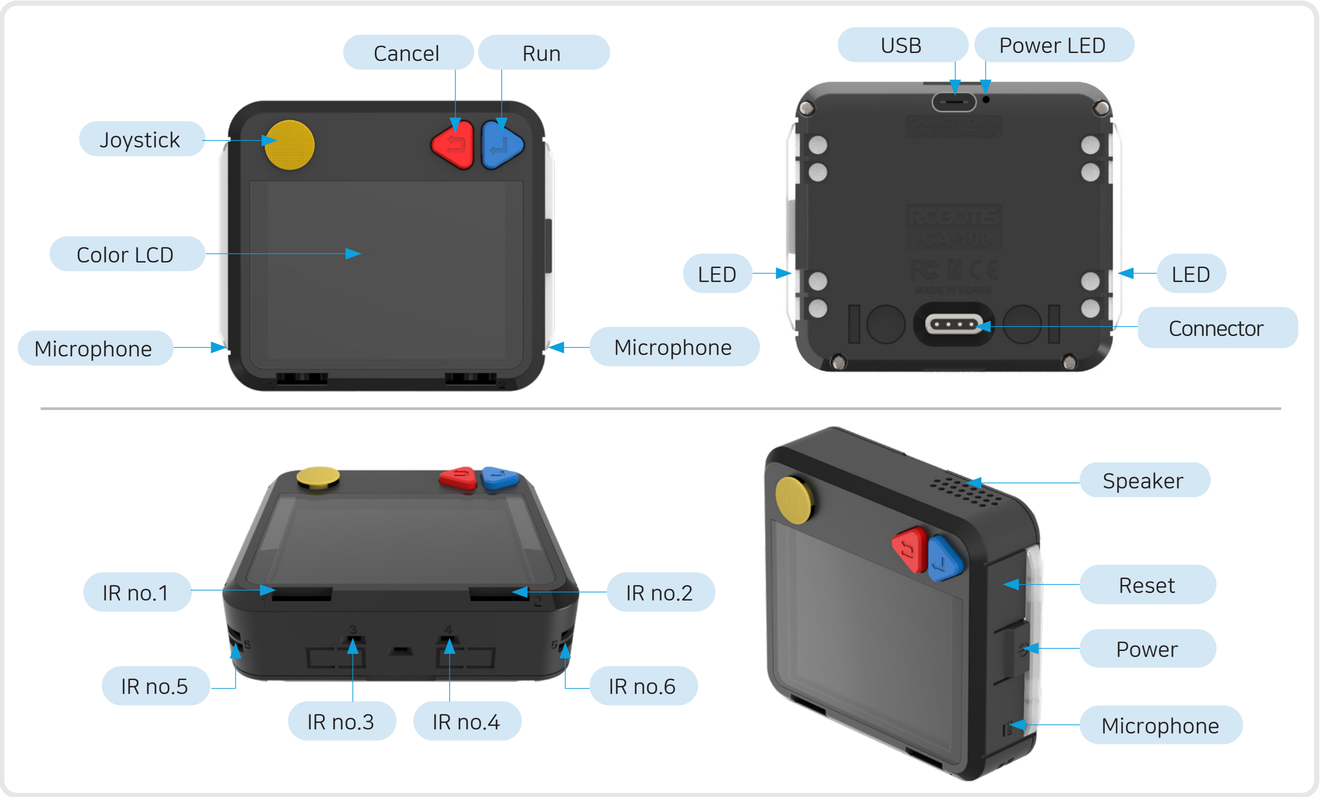
1 What is R-GEE?

Hi ~ **I'm R-GEE**

R-GEE is a companion robot that can learn AI and coding. It has a function for communicating with the user, and by solving various presented missions, you can access more functions as R-GEE evolves.

Let's see videos about R-GEE
https: /youtu.be/aQSNnGtJt28

2 Let's See What R-GEE Brain Consists of


Cancel
Run
Joystick
Color LCD
Microphone
Microphone
USB
Power LED
LED
LED
Connector
IR no.1
IR no.2
IR no.5
IR no.6
IR no.3
IR no.4
Speaker
Reset
Power
Microphone

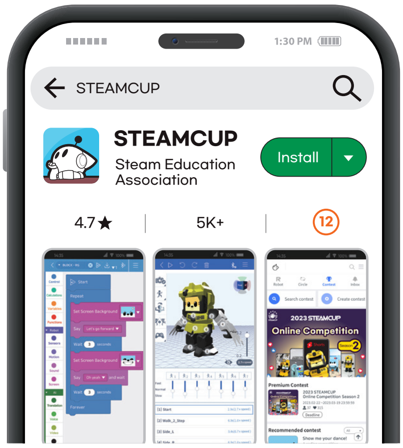
3 How to Download STEAMCUP APP and Connect to the Robot

After installing the app, follow the instructions to sign up and log in.

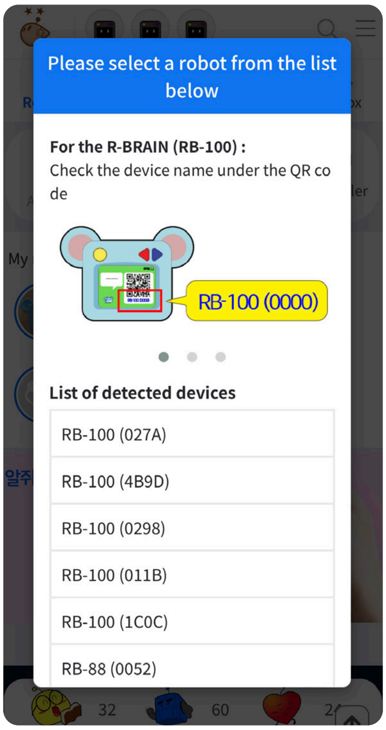
Download APP | **Connect Robot** | **Enter Verification Code**

STEAMCUP
Steam Education Association

Google Play | App Store


1:30 PM
STEAMCUP
STEAMCUP
Steam Education Association
Install
4.7★
5K+
12
2023 STEAMCUP
Online Competition

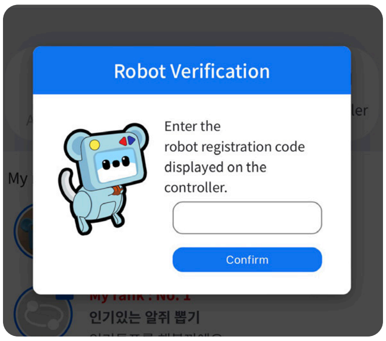
APP Installation QR code


Please select a robot from the list below

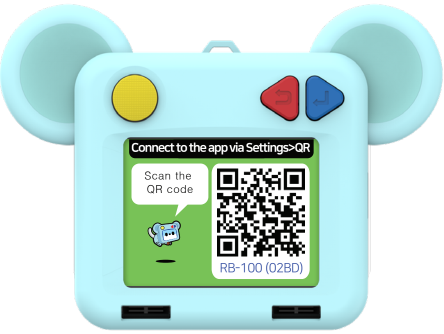
For the R-BRAIN (RB-100) :
Check the device name under the QR code

List of detected devices

RB-100 (027A)
RB-100 (4B9D)
RB-100 (0298)
RB-100 (011B)
RB-100 (1C0C)
RB-88 (0052)


Robot Verification

Enter the robot registration code displayed on the controller.


Connect to the app via Settings>QR
Scan the QR code
RB-100 (02BD)

Companion Mode and Non-member Mode

Companion Mode is a mode in which you register the robot to your app account, as mentioned above, and use R-GEE's companion function.
Non-member Mode is a mode used without connecting to an app account when multiple people share and use one R-GEE. In this mode, the rejection function is disabled.

Changing the Mode

You can change the mode to either "Companion Mode" or "Non-member Mode" in the R-GEE screen's Settings > Detailed Option Settings > Mode Change.

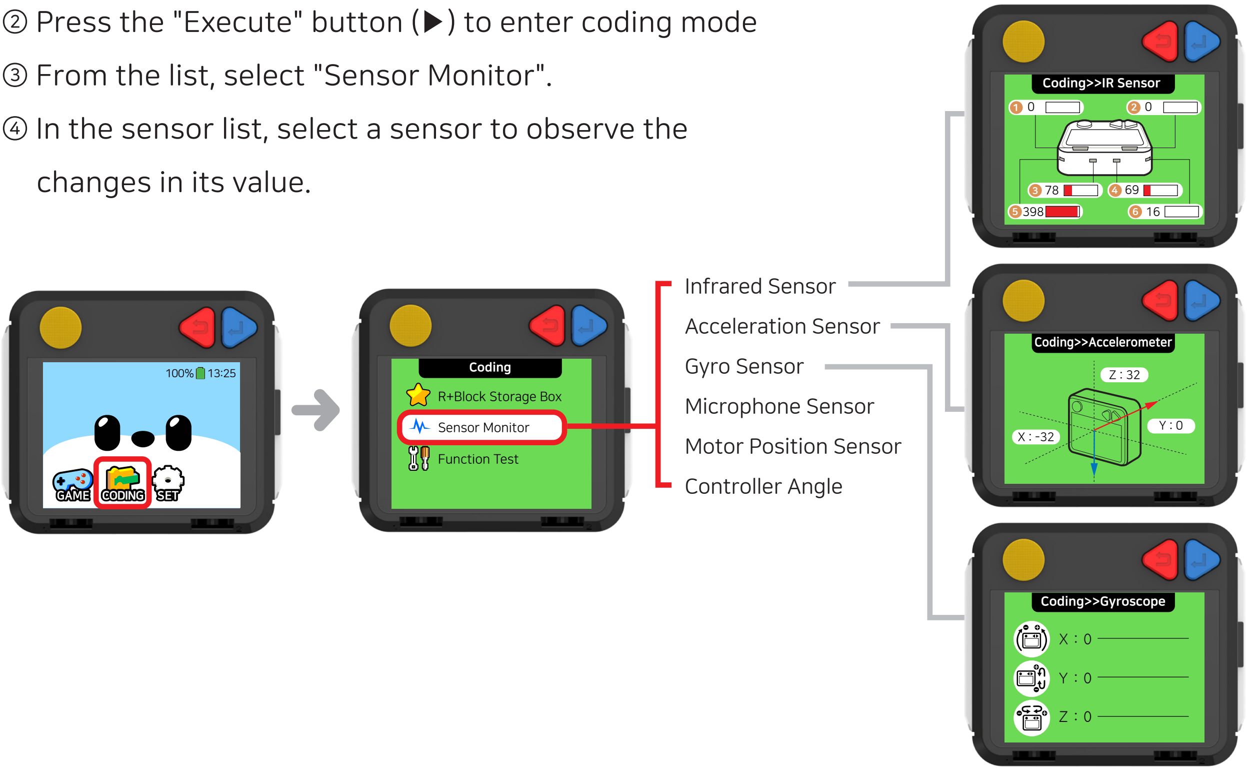
4 Learn about the Sensor Monitor Function

① To enter coding, control the joystick on the R-GEE screen and move to "Coding".

② Press the "Execute" button (▶) to enter coding mode

③ From the list, select "Sensor Monitor".

④ In the sensor list, select a sensor to observe the changes in its value.



Coding>>IR Sensor
① 0
② 0
③ 78
④ 69
⑤ 398
⑥ 16
100%
13:25
GAME
CODING
SET
Coding
R+Block Storage Box
Sensor Monitor
Function Test
Infrared Sensor
Acceleration Sensor
Gyro Sensor
Microphone Sensor
Motor Position Sensor
Controller Angle
Coding>>Accelerometer
Z : 32
X : -32
Y : 0
Coding>>Gyroscope
X : 0
Y : 0
Z : 0

- Infrared sensor: A sensor that measures the reflected value of infrared rays.
- Acceleration sensor: A sensor that measures the magnitude of acceleration using the X, Y, and Z axes.
- Gyro sensor: A sensor that measures the rotating force of the controller using the X, Y, and Z axes.
- Microphone Sensor: A sensor that measures the loudness and direction of sound using two microphones.
- Motor position value: The position value of each motor is measured after attaching the controller to the body.
- Controller Angle: The degree of the controller’s tilt in terms of Roll and Pitch is measured.

✓ Use the "Sensor Monitor" to observe how the value of each sensor changes.

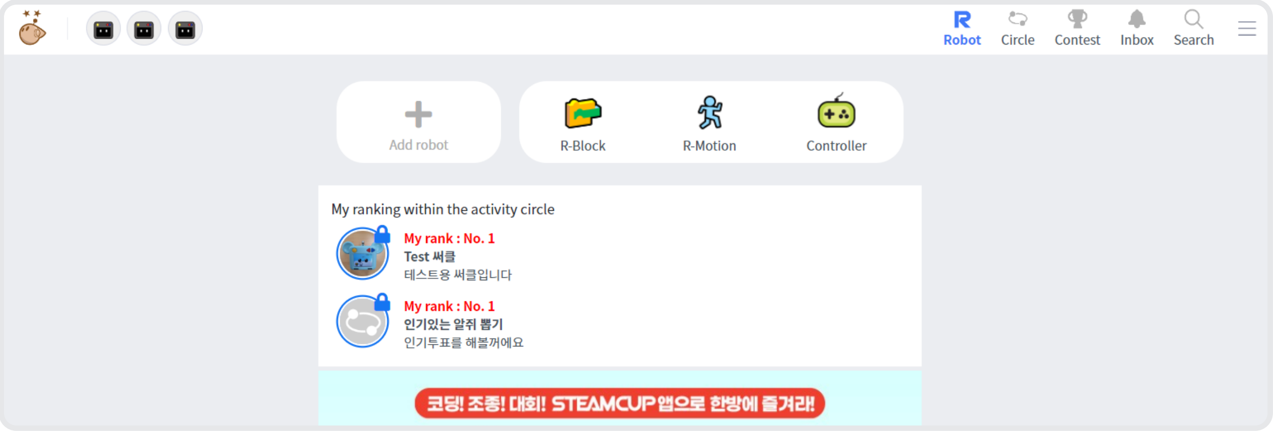
MEMO

5 Running R-Block

① Launch the STEAMCUP app or go to enjoy.steamcup.org in the Chrome browser's address bar.

② If you have a STEAMCUP ID, log in and select "R-Block".

③ After the screen switches, find and select an R-GEE from the list, and then click "Done".

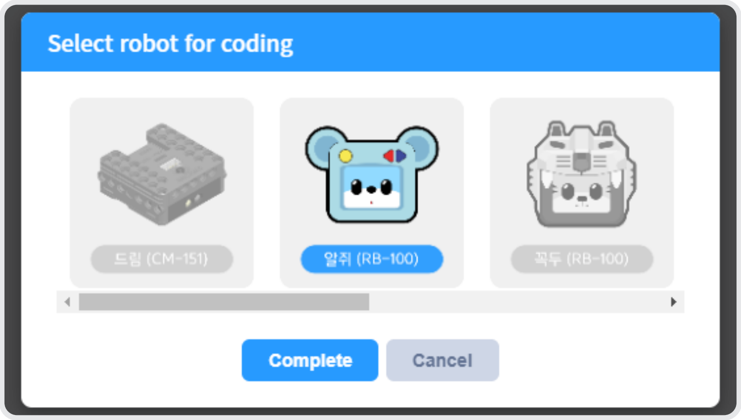

Robot
Circle
Contest
Inbox
Search
Add robot
R-Block
R-Motion
Controller

My ranking within the activity circle

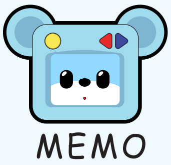
My rank : No. 1
Test 써클
테스트용 써클입니다

My rank : No. 1
인기있는 알쥐 뽑기
인기투표를 해볼꺼에요

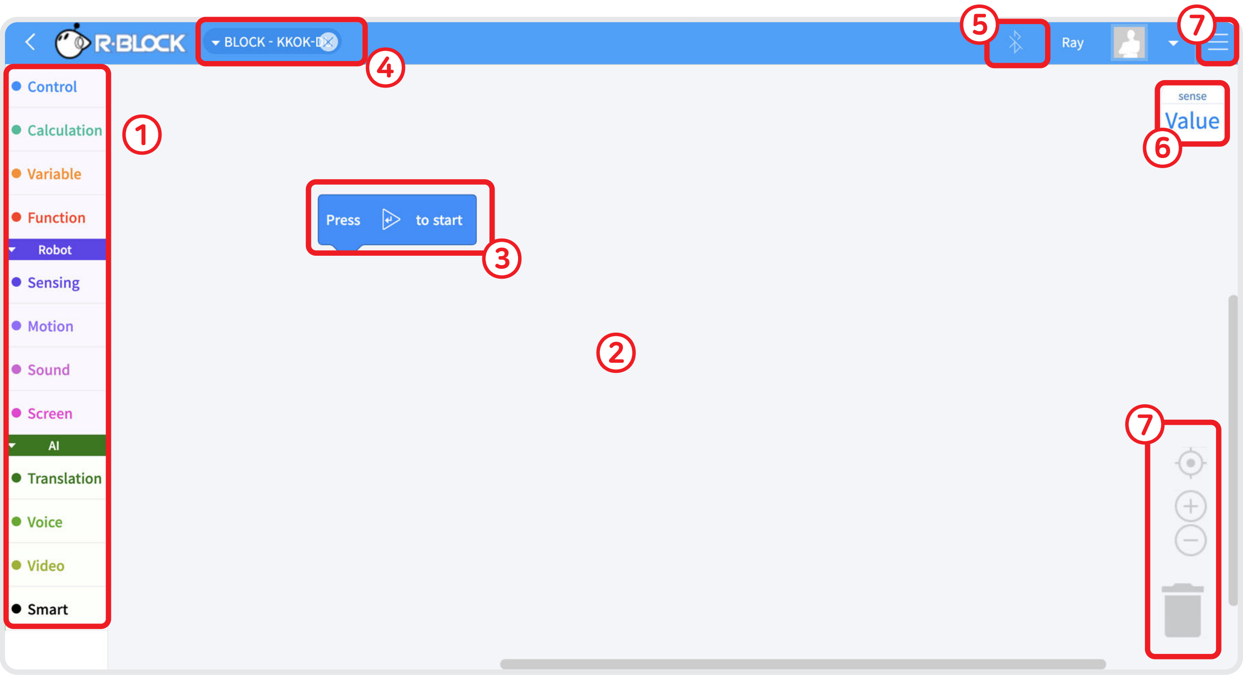
코딩! 조종! 대회! STEAMCUP 앱으로 한방에 즐겨라!


Select robot for coding

드림 (CM-151)
알쥐 (RB-100)
꼭두 (RB-100)
Complete
Cancel



6 R-Block Interface


R-BLOCK
BLOCK - KKOK-D
Ray
sense
Value
Press to start
Control
Calculation
Variable
Function
Robot
Sensing
Motion
Sound
Screen
AI
Translation
Voice
Video
Smart
①
②
③
④
⑤
⑥
⑦
⑦

① Block category

This is the place where you can find the command blocks for each function. You can find and drag a block from the ‘block category’ to place it on the ‘starting block’ or drag a block back to the ‘block category’ to delete it.

② Work screen

This is the space where blocks can be placed.

③ Starting block

Excluding ‘function blocks’, you must combine a ‘command block’ with a ‘starting block’ when coding for the code to work.

④ List of Codes

You can find a list of working codes at the top of the screen. You can import and work with multiple files.

⑤ Bluetooth icon

This icon is used when connecting communication with the robot. You can connect the robot with R-Block using the BLE number indicated on the controller.

⑥ Sensor monitor

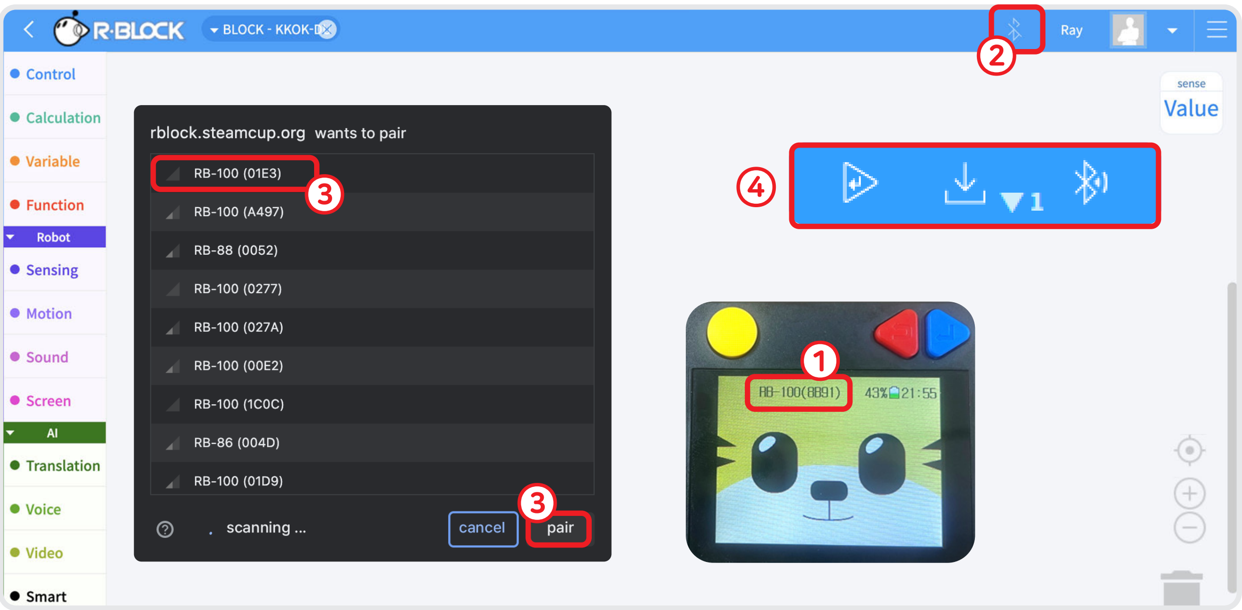
This is a sensor monitor function supported by R-Block. If you select a ‘value block’, you can check the value of the corresponding sensor here in real time.

⑦ Menu icon

You can find various functions such as create, import, save, and AI monitor under menu. You must log in to STEAMCUP app to use functions such as save and import.

7 Connect Communication

Let's connect the Bluetooth communication between R-Block and R-GEE.



rblock.steamcup.org wants to pair

RB-100 (01E3)
RB-100 (A497)
RB-88 (0052)
RB-100 (0277)
RB-100 (027A)
RB-100 (00E2)
RB-100 (1C0C)
RB-86 (004D)
RB-100 (01D9)

scanning ...

R·BLOCK
BLOCK - KKOK-
Ray
sense
Value
Control
Calculation
Variable
Function
Robot
Sensing
Motion
Sound
Screen
AI
Translation
Voice
Video
Smart
cancel
pair
1
RB-100(8B91)
43% 21:55
①
②
③
③
④

① After turning on the power of the controller, check the last 4 digits of the BLE address on the screen.

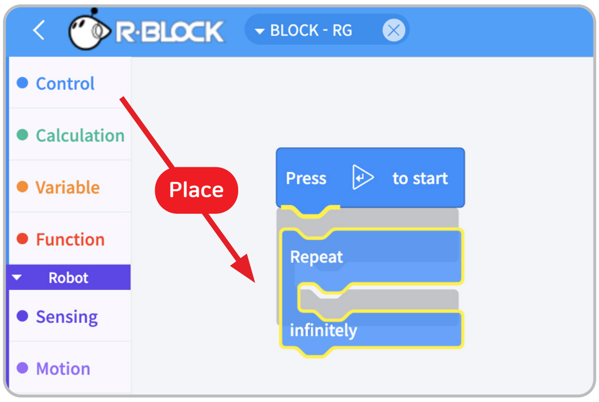
② Click the Bluetooth icon to open the pop-up window with the list of Bluetooth devices.

③ Find and select the name of the device with the same BLE address from the list. Then, click the [Pairing] button.

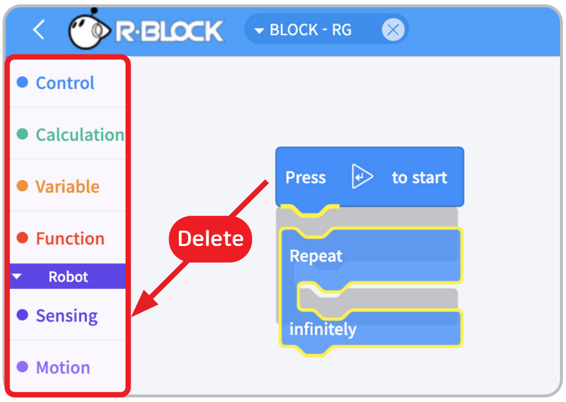
④ Once the robot is connected to the app, the [Execution] and [Download] icons appear on the left side of the Bluetooth icon after a ‘beeping’ sound, and a mobile phone icon appears on the left side of the controller screen.

8 Placing and Deleting Blocks

Blocks can be placed and deleted by dragging and dropping using the left mouse button



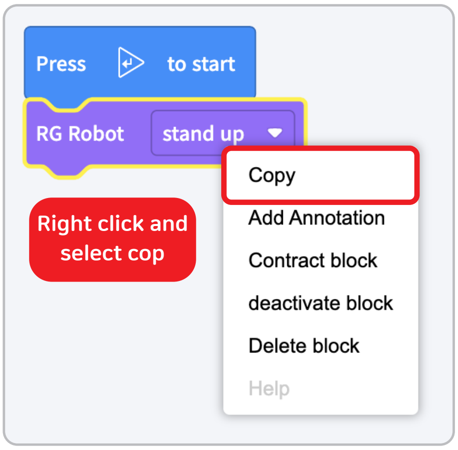
R·BLOCK
BLOCK - RG
Control
Calculation
Variable
Function
Robot
Sensing
Motion
Place
Press to start
Repeat
infinitely

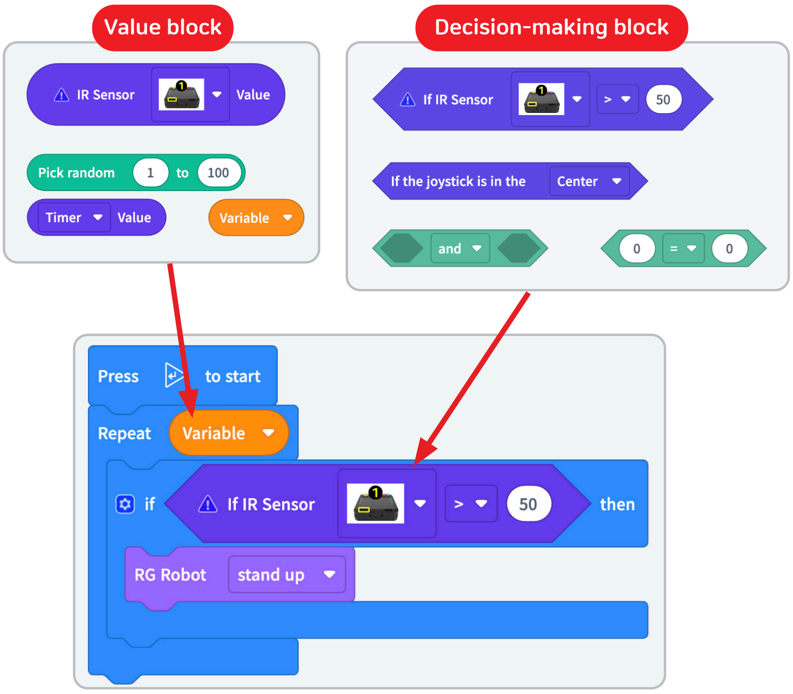


R·BLOCK
BLOCK - RG
Control
Calculation
Variable
Function
Robot
Sensing
Motion
Delete
Press to start
Repeat
infinitely

9 Duplicating and Combining Blocks

Let's connect the Bluetooth communication between R-Block and R-GEE.


Press to start
RG Robot stand up
Copy
Add Annotation
Contract block
deactivate block
Delete block
Help
Right click and select cop

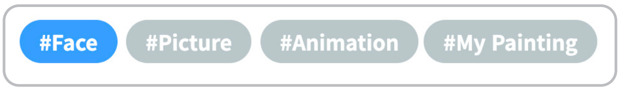

Value block
IR Sensor Value
Pick random 1 to 100
Timer Value
Variable
Decision-making block
If IR Sensor > 50
If the joystick is in the Center
and
0 = 0

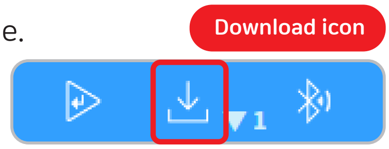
```
Press to start
Repeat Variable
    if If IR Sensor > 50 then
        RG Robot stand up
```

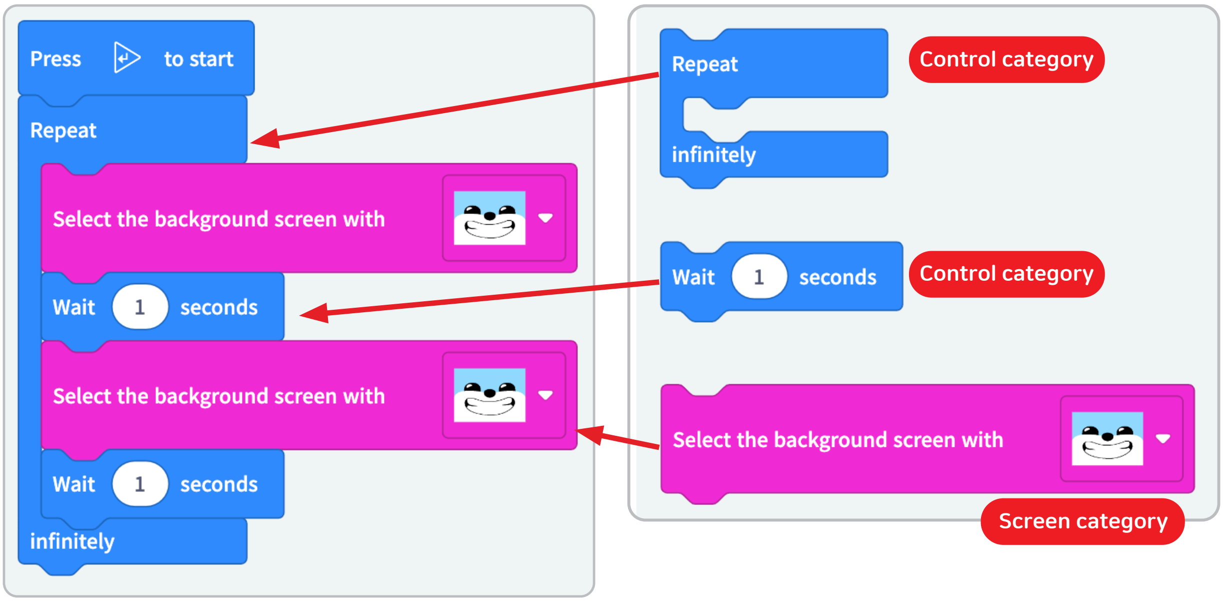
10 Changing to R-GEE Expression

After writing the code as shown below, click the download icon to download it.

You can see the expression on KKOK-DU's face change.


#Face
#Picture
#Animation
#My Painting

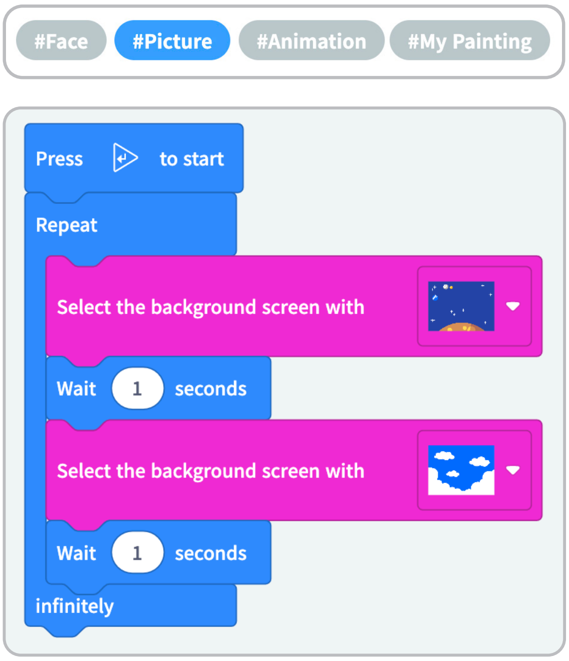

Download icon
1


Repeat infinitely
Control category
Wait 1 seconds
Control category
Select the background screen with
Screen category

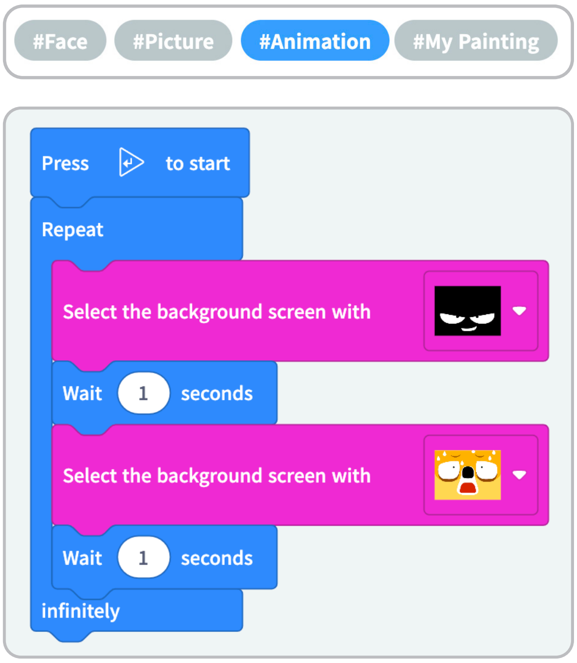
```
Press to start
Repeat
    Select the background screen with
    Wait 1 seconds
    Select the background screen with
    Wait 1 seconds
infinitely
```

11 Change to Background Animation

At the top, select the tab of the background block and choose either [#background] or [#animation]. Then, write each of the codes below and download them. If you also draw your own background and print your drawing on the screen by selecting [#My background], and saving it on the screen.

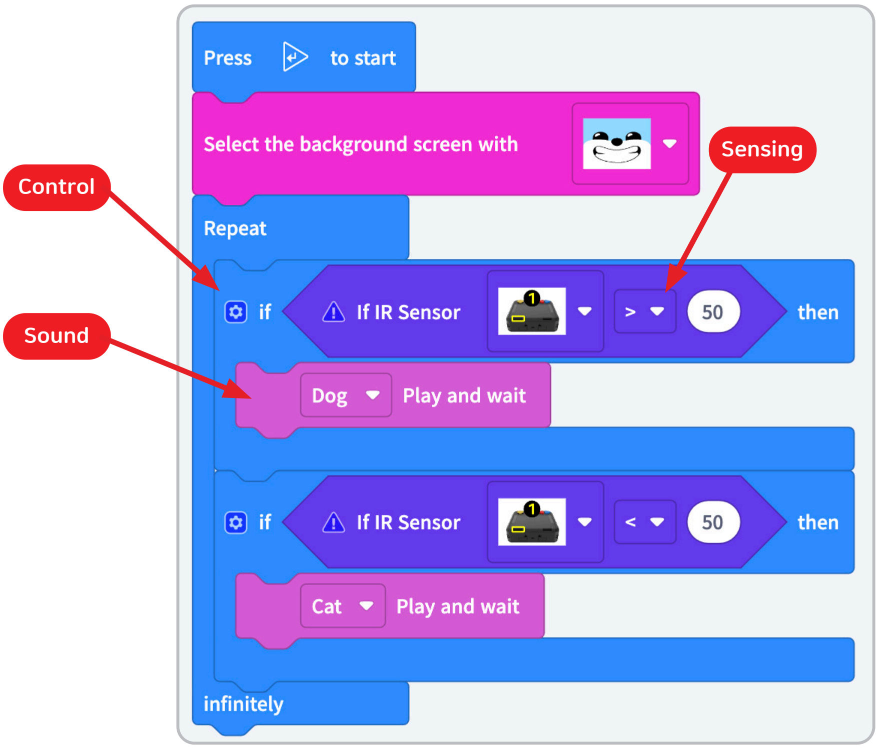

#Face
#Picture
#Animation
#My Painting

```
Press ▷ to start
Repeat
    Select the background screen with
    Wait 1 seconds
    Select the background screen with
    Wait 1 seconds
infinitely
```


#Face
#Picture
#Animation
#My Painting

```
Press ▷ to start
Repeat
    Select the background screen with
    Wait 1 seconds
    Select the background screen with
    Wait 1 seconds
infinitely
```

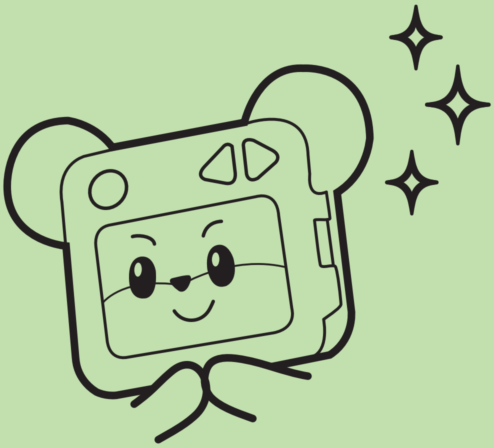
After coding, download or execute the program. When you place your hand on the infrared sensors labeled 1 and 2, the sound will be played.


Control
Sound
Sensing

```
Press ▷ to start
Select the background screen with
Repeat
    if ⚠ If IR Sensor 1 > 50 then
        Dog Play and wait
    if ⚠ If IR Sensor 1 < 50 then
        Cat Play and wait
infinitely
```

Class
03

Coding with R-GEE



1 Levels of Artificial Intelligence

Artificial intelligence can be classified into weak and strong AI

It will be difficult for AI to match human abilities in recognizing voice, text and objects!
AI can process and analyze large amounts of data much faster than humans can, allowing for more efficient and accurate decision-making.

Artificial Intelligence

Weak AI

An AI designed as a useful tool(Chatbot, AI assistance, etc.)

Strong AI

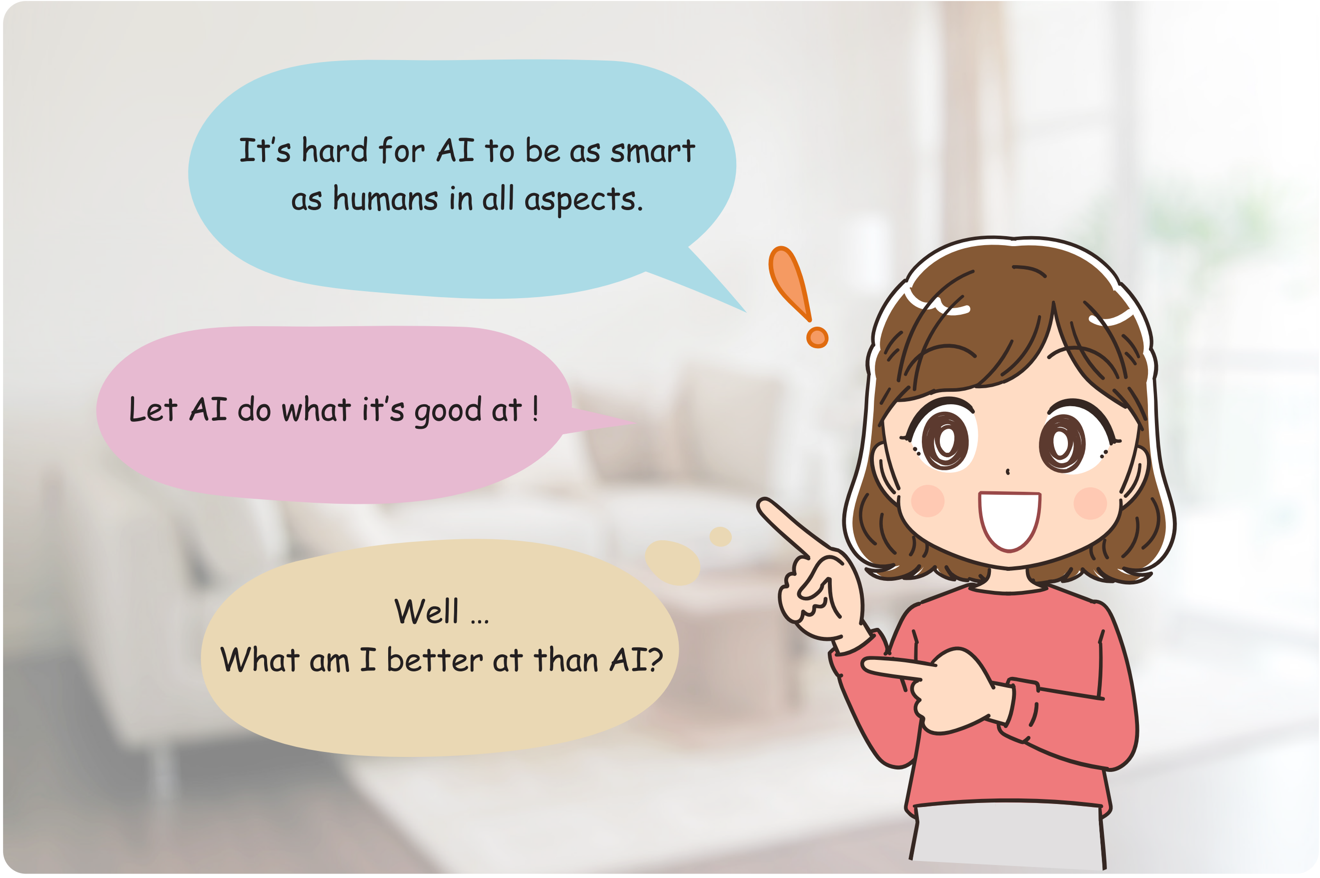
An AI that perfectly imitates humans (robots in Sci-Fi movies)

Weak AI

The existing artificial intelligence is capable of intelligent behavior or decision-making based on pre-defined algorithms and vast amounts of data. Though artificial intelligence can find a solution though recognizing patterns, we cannot know why it solved the problem the way it did. Another limitation is that it can only solve problems in a limited range. Recently, program that learn by themselves and surpass humans or shown similar performance in limited areas have emerged. However, this shows only a narrow application of human learning ability.

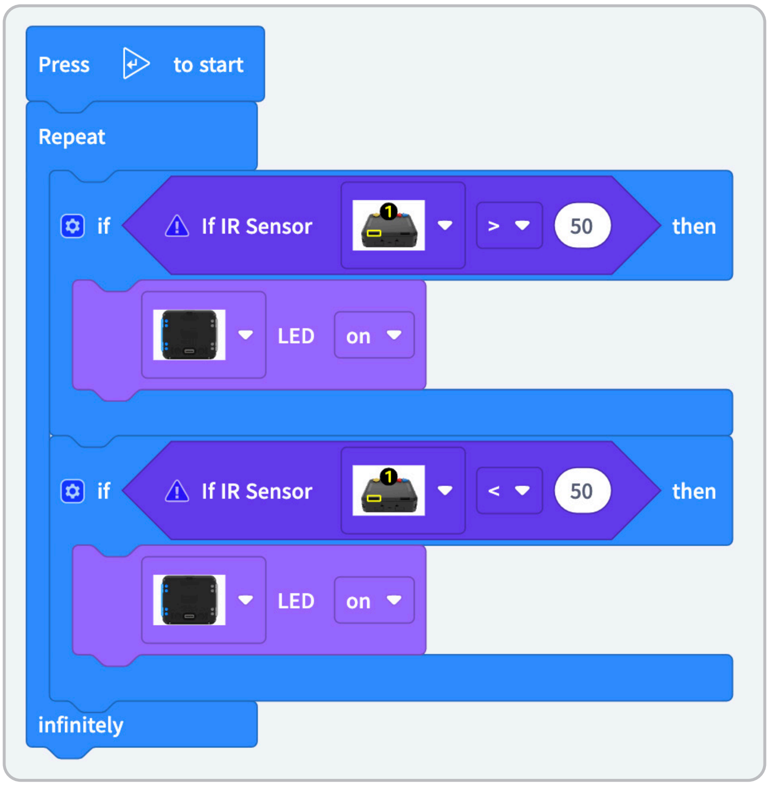
Strong AI

Strong artificial intelligence is a term in contrast with the weak artificial intelligence. Strong artificial intelligence is more advanced than weak artificial intelligence surpassing its limited functionality. However, we have not yet reached the level of strong artificial intelligence, and the concept is still ambiguous.


It's hard for AI to be as smart as humans in all aspects.
Let AI do what it's good at !
Well ... What am I better at than AI?

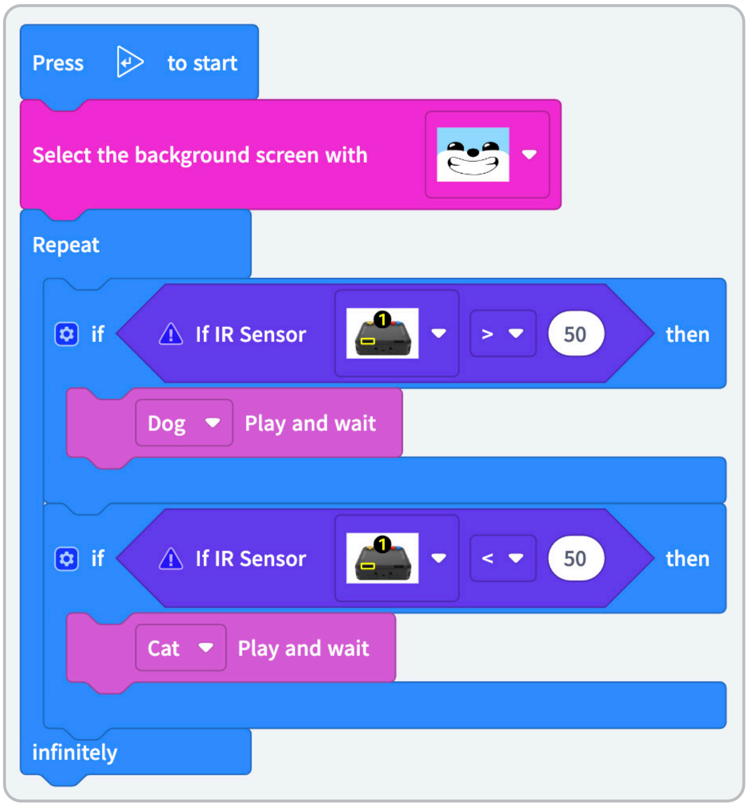
2 Use of Infrared Sensor

When your hand is detected by the first infrared sensor (number 1), the LED turns on, and when it's detected by the second infrared sensor (number 2), the LED turns off.



```
Press ▷ to start
Repeat
    if ⚠ If IR Sensor [1] > 50 then
        LED on
    if ⚠ If IR Sensor [1] < 50 then
        LED on
infinitely
```

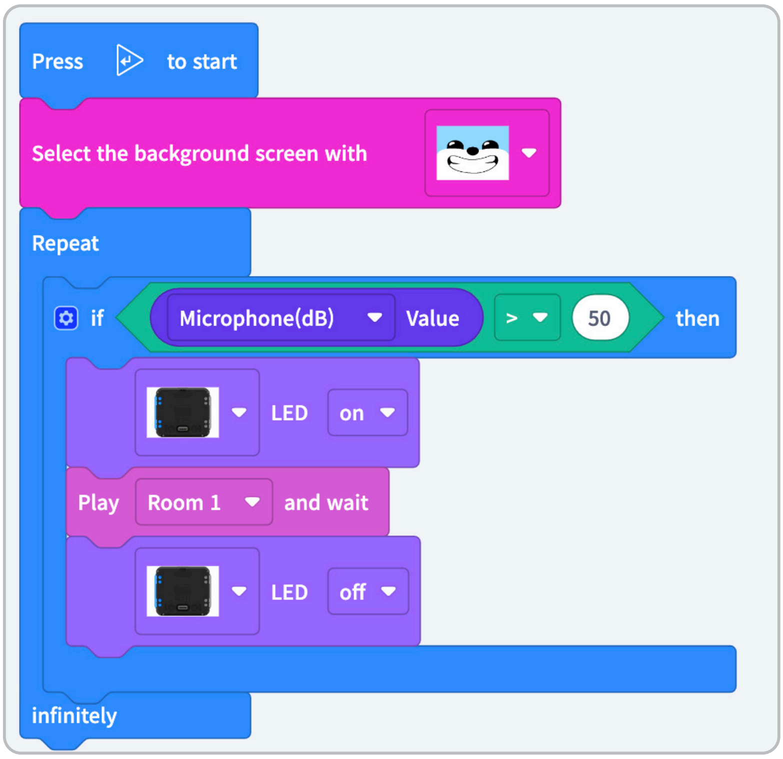
After coding as described, download and execute the program. When you place your hand on the first and second infrared sensors, a sound will be played.



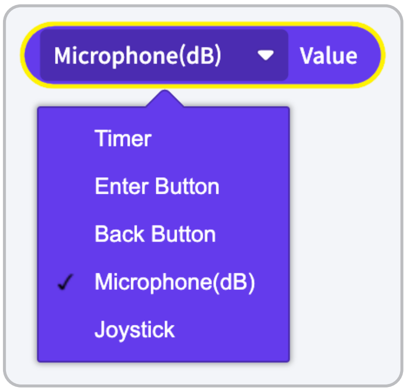
```
Press ▷ to start
Select the background screen with
Repeat
    if ⚠ If IR Sensor [1] > 50 then
        Dog Play and wait
    if ⚠ If IR Sensor [1] < 50 then
        Cat Play and wait
infinitely
```

3 Use of Microphone

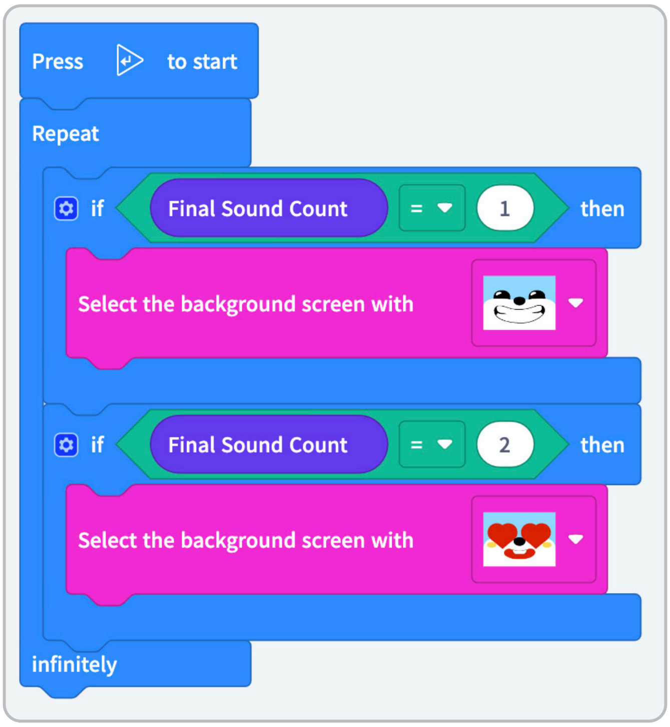
After downloading and running the code, clap your hands to activate the LED and hear a greeting from R-GEE.



```
Press ▷ to start
Select the background screen with [ ▾]
Repeat
    if < Microphone(dB) ▾ Value  > ▾  50 > then
        [ ▾] LED on ▾
        Play Room 1 ▾ and wait
        [ ▾] LED off ▾
infinitely
```


Microphone(dB) ▾ Value
Timer
Enter Button
Back Button
✓ Microphone(dB)
Joystick

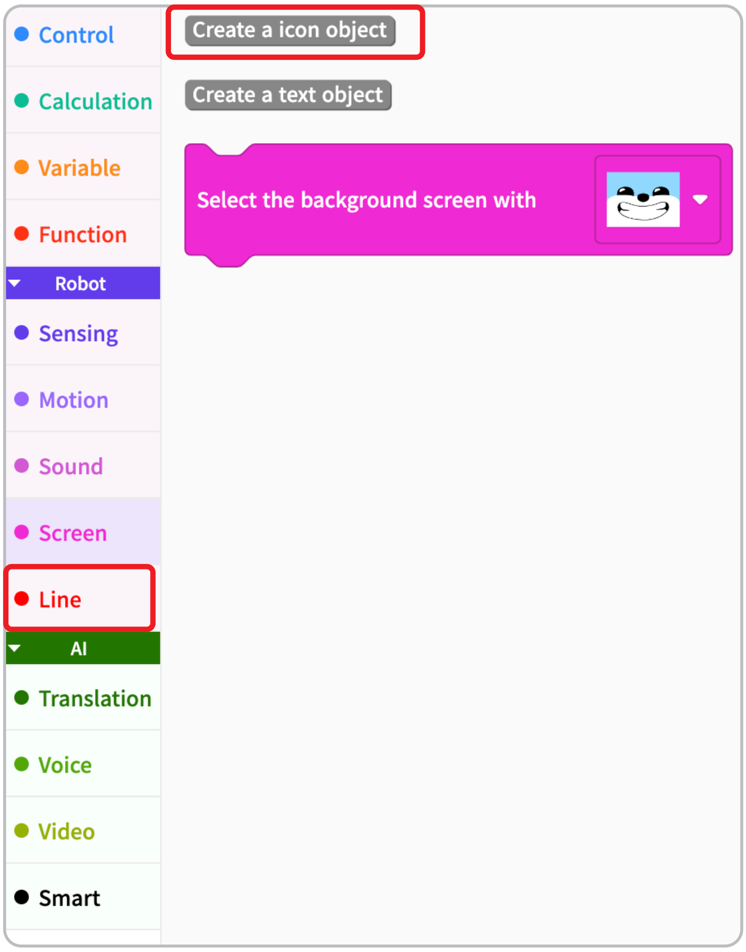
Each time you clap your hands once or twice, the expression will change.

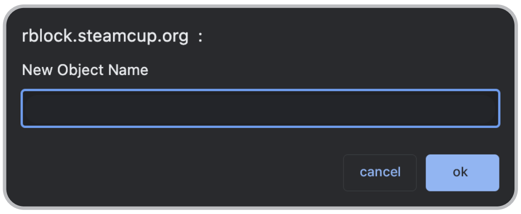


```
Press ▷ to start
Repeat
    if < Final Sound Count  = ▾  1 > then
        Select the background screen with [ ▾]
    if < Final Sound Count  = ▾  2 > then
        Select the background screen with [ ▾]
infinitely
```

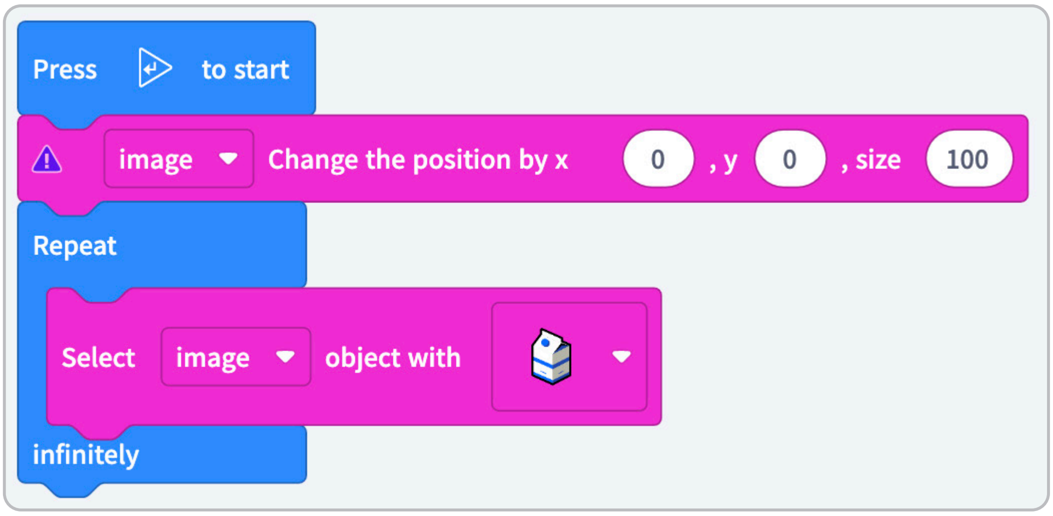
4 Icon Object Output

Let's print a picture object on the LCD screen. In the "Screen" category, click "Create Icon Object" and give it a name.

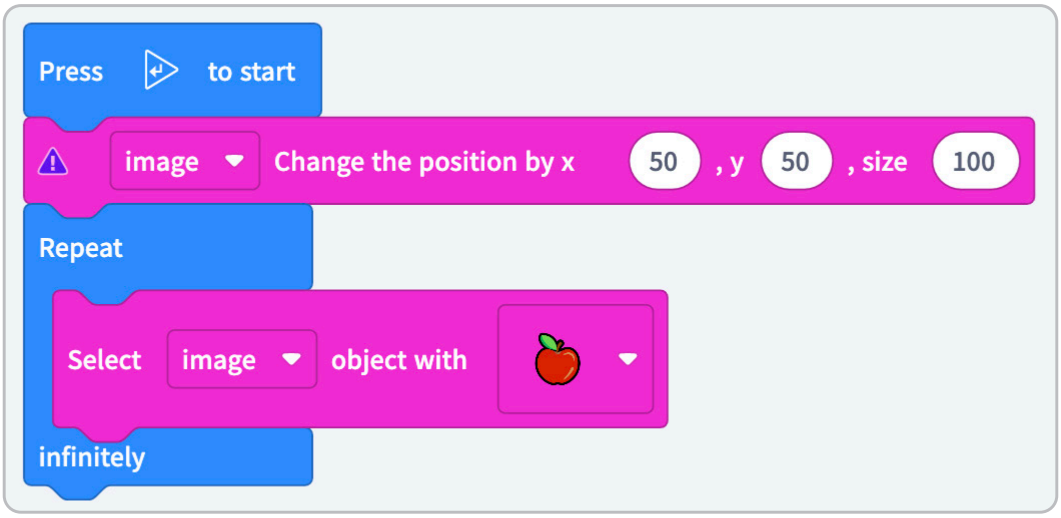

Control
Calculation
Variable
Function
Robot
Sensing
Motion
Sound
Screen
Line
AI
Translation
Voice
Video
Smart
Create a icon object
Create a text object
Select the background screen with


rblock.steamcup.org :
New Object Name
cancel
ok

Additionally, after coding as described, if you download and run the program, milk will appear on the screen.

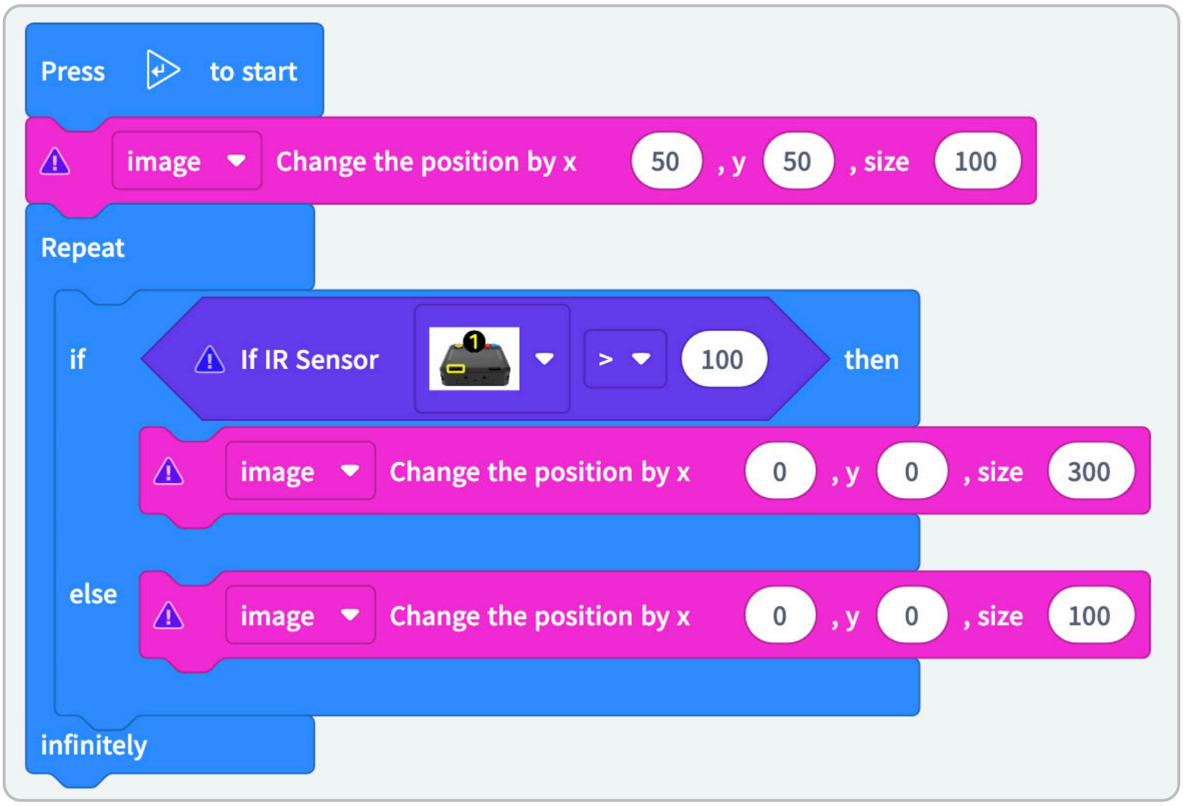

Press to start
image
Change the position by x
0
, y
0
, size
100
Repeat
Select
image
object with
infinitely

After coding as described, if you download and run the program, an apple will appear on the top right corner of the screen.



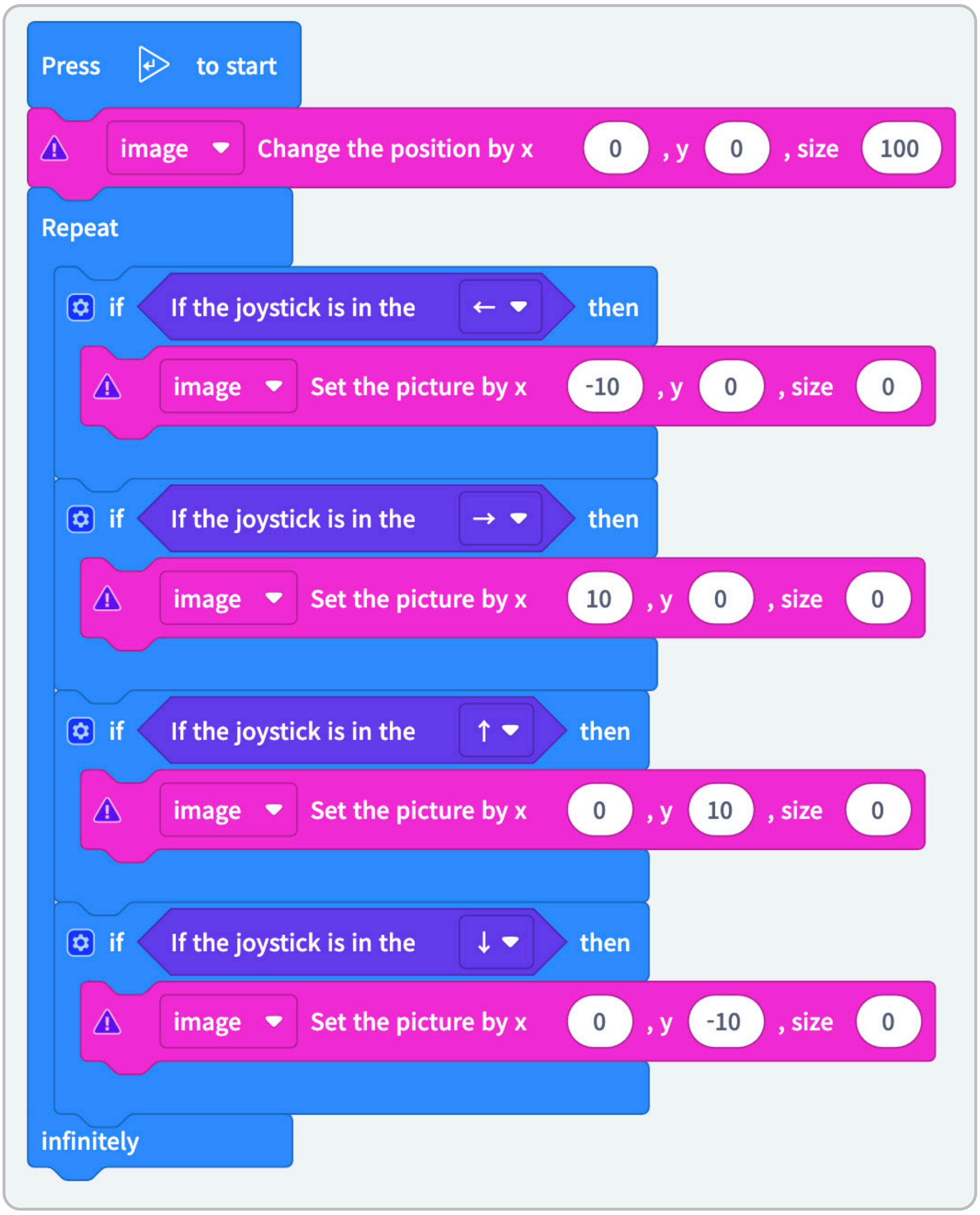
```
Press to start
image Change the position by x 50 , y 50 , size 100
Repeat
    Select image object with
infinitely
```

When the first infrared sensor detects your hand, the apple will grow.



```
Press to start
image Change the position by x 50 , y 50 , size 100
Repeat
    if If IR Sensor > 100 then
        image Change the position by x 0 , y 0 , size 300
    else
        image Change the position by x 0 , y 0 , size 100
infinitely
```

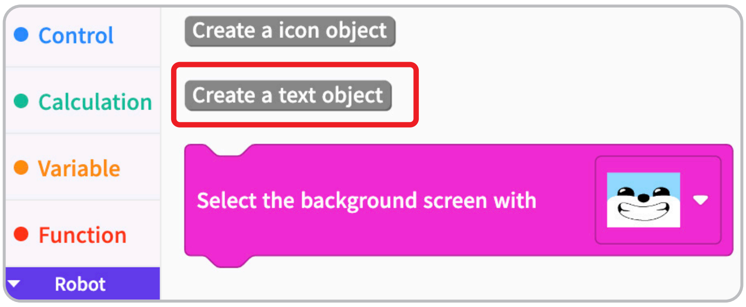
Let's print a picture object on the LCD screen. In the "Screen" category, click "Create Picture Object" and give it a name.

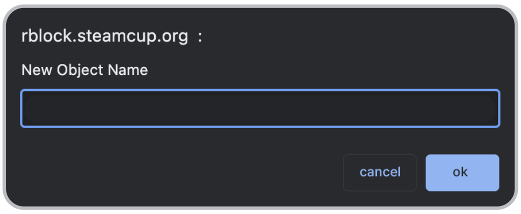


```
Press ⊳ to start
  image ▾ Change the position by x (0) , y (0) , size (100)
  Repeat
    if ⟨If the joystick is in the ← ▾⟩ then
      image ▾ Set the picture by x (-10) , y (0) , size (0)
    if ⟨If the joystick is in the → ▾⟩ then
      image ▾ Set the picture by x (10) , y (0) , size (0)
    if ⟨If the joystick is in the ↑ ▾⟩ then
      image ▾ Set the picture by x (0) , y (10) , size (0)
    if ⟨If the joystick is in the ↓ ▾⟩ then
      image ▾ Set the picture by x (0) , y (-10) , size (0)
  infinitely
```

5 Text Object Output

To display a text object on the LCD screen, go to the "Screen" category and create a new picture object, then give it a name.

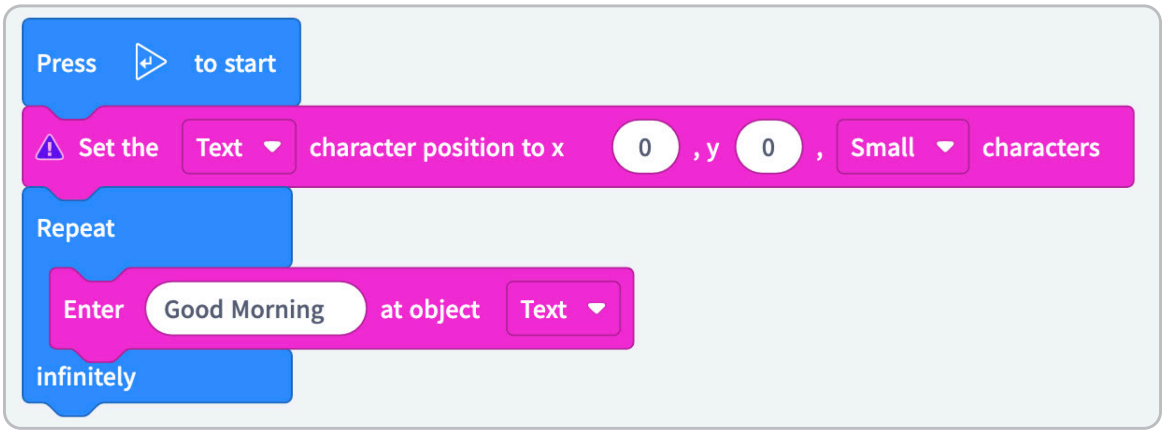

Control
Calculation
Variable
Function
Robot
Create a icon object
Create a text object
Select the background screen with



rblock.steamcup.org :

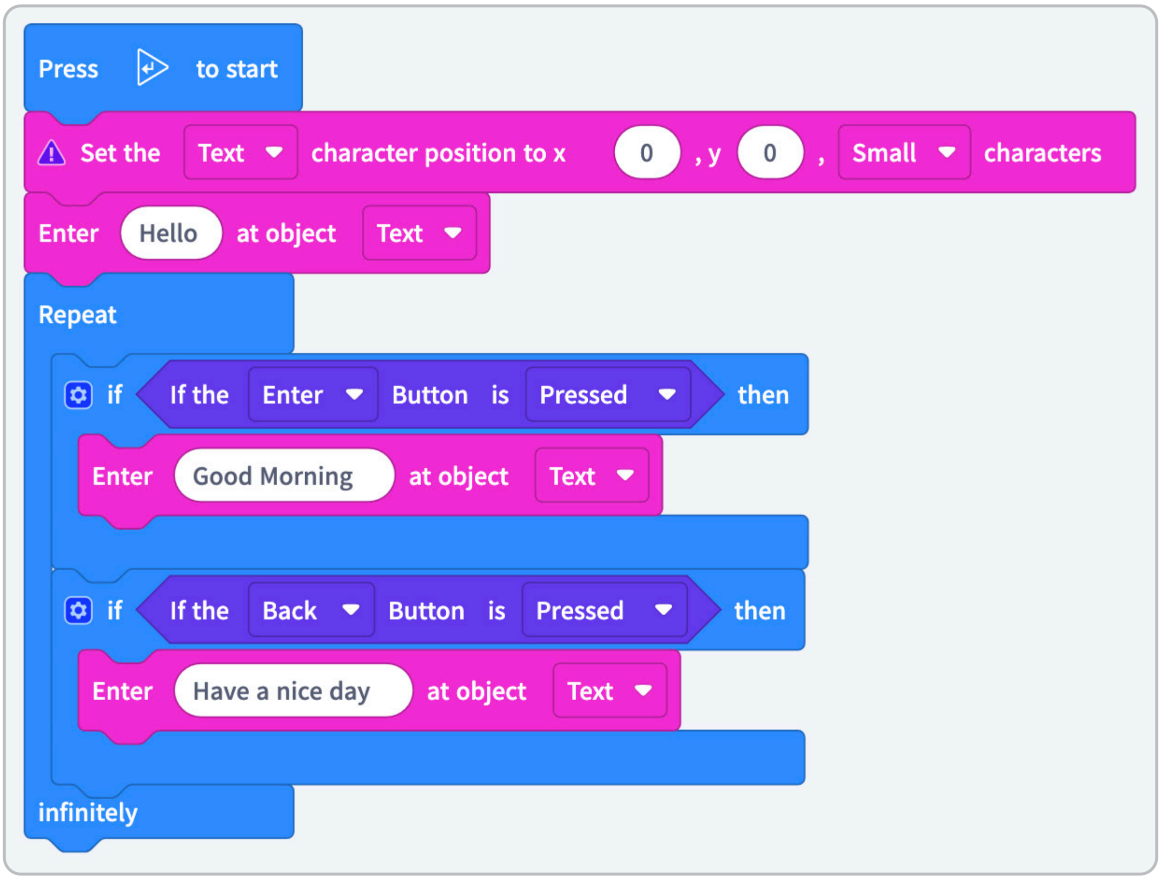
New Object Name

If you input the letters according to the example code provided, they will appear on the screen.



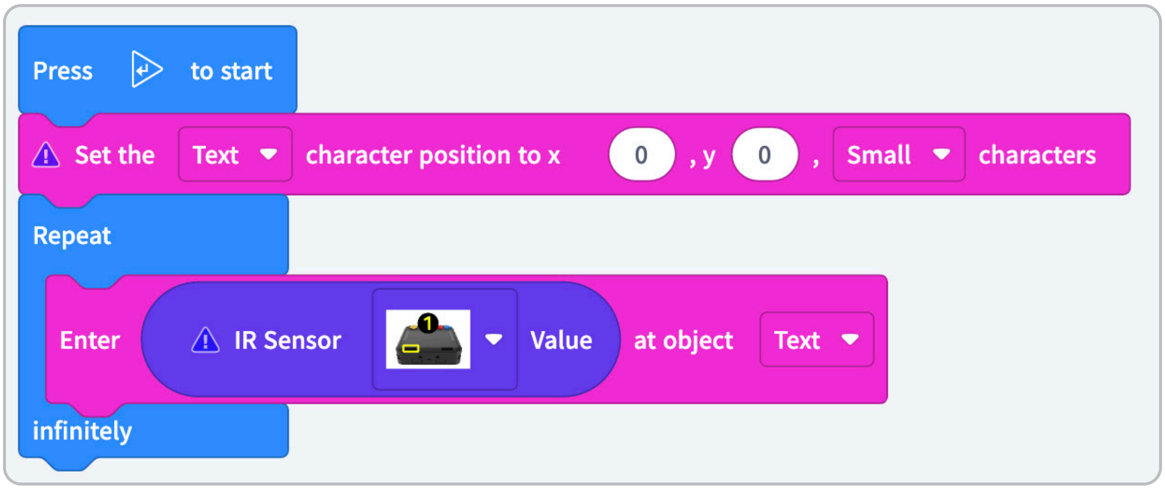
```
Press ▷ to start
⚠ Set the Text ▾ character position to x 0 , y 0 , Small ▾ characters
Repeat
    Enter Good Morning at object Text ▾
infinitely
```

You can adjust the size and position of the text to be displayed. To see the changes, try pressing the "Run" button and then the "Cancel" button.



```
Press ▷ to start
⚠ Set the Text ▾ character position to x 0 , y 0 , Small ▾ characters
Enter Hello at object Text ▾
Repeat
    if If the Enter ▾ Button is Pressed ▾ then
        Enter Good Morning at object Text ▾
    if If the Back ▾ Button is Pressed ▾ then
        Enter Have a nice day at object Text ▾
infinitely
```

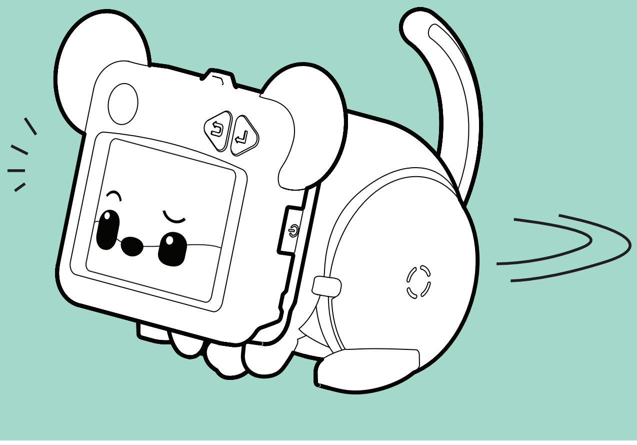
Additionally, you can check the value of the infrared sensor.



```
Press ▷ to start
⚠ Set the Text ▾ character position to x 0 , y 0 , Small ▾ characters
Repeat
    Enter ⚠ IR Sensor [1] ▾ Value at object Text ▾
infinitely
```

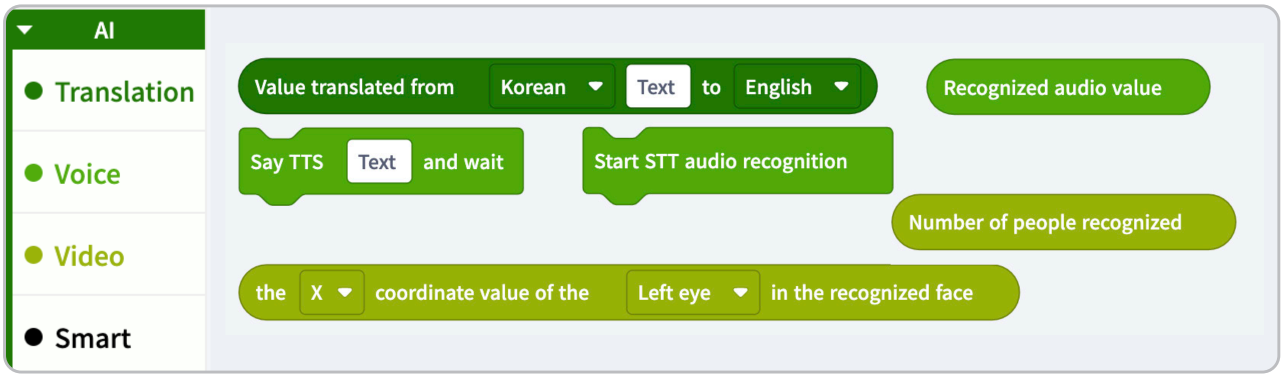
Class
04

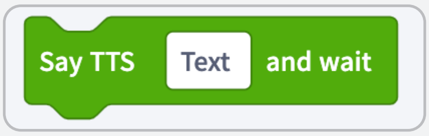
Practice AI with R-GEE



1 R-Block AI Command Block

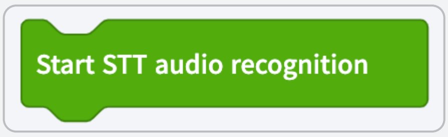
AI commands such as voice recognition, voice synthesis, translation, and image recognition can be used in R block programming.


AI
Translation
Voice
Video
Smart
Value translated from Korean Text to English
Recognized audio value
Say TTS Text and wait
Start STT audio recognition
Number of people recognized
the X coordinate value of the Left eye in the recognized face


Say TTS Text and wait

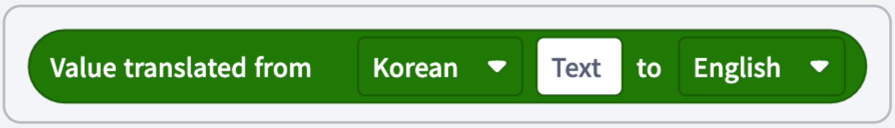
TTS (Text To Speech)

AI technology that converts text data into voice data.


Start STT audio recognition

STT (Speech To Text)

AI technology that converts voice data into text data.

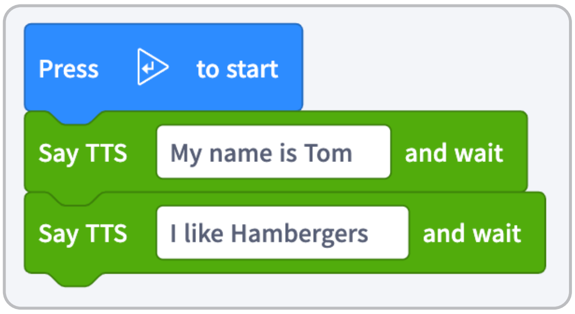

Value translated from Korean Text to English

Text Translation

AI technology that translates text into text in another language.

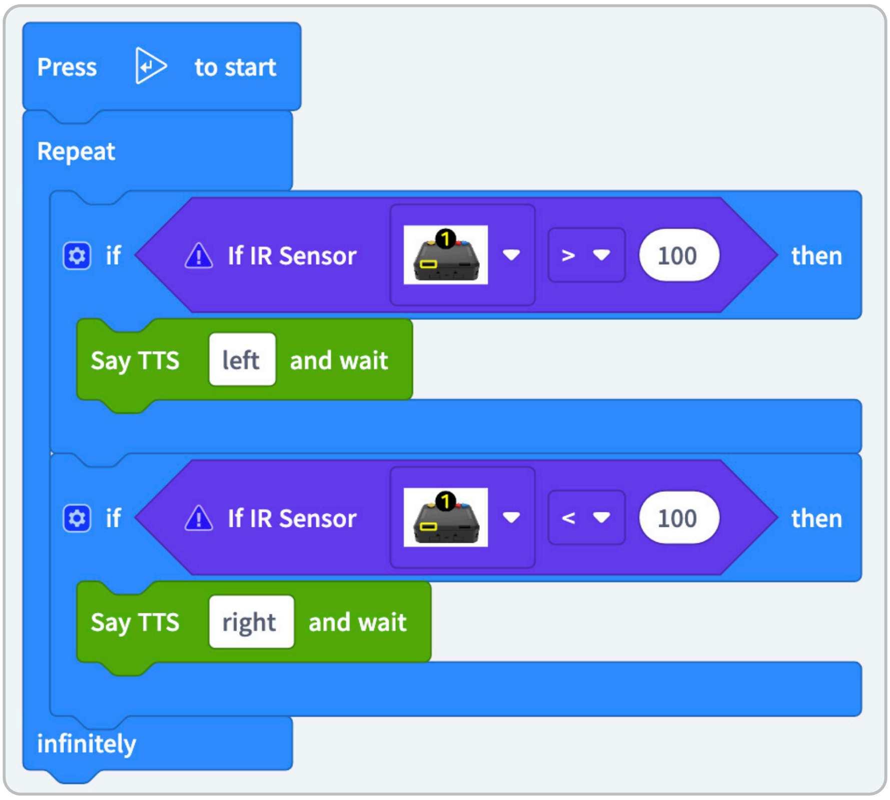
② Using TTS

Let's download/execute after coding as below.



```
Press ▷ to start
Say TTS [My name is Tom] and wait
Say TTS [I like Hambergers] and wait
```

Text-to-speech (TTS) can be used to announce the direction of the detected infrared sensor.



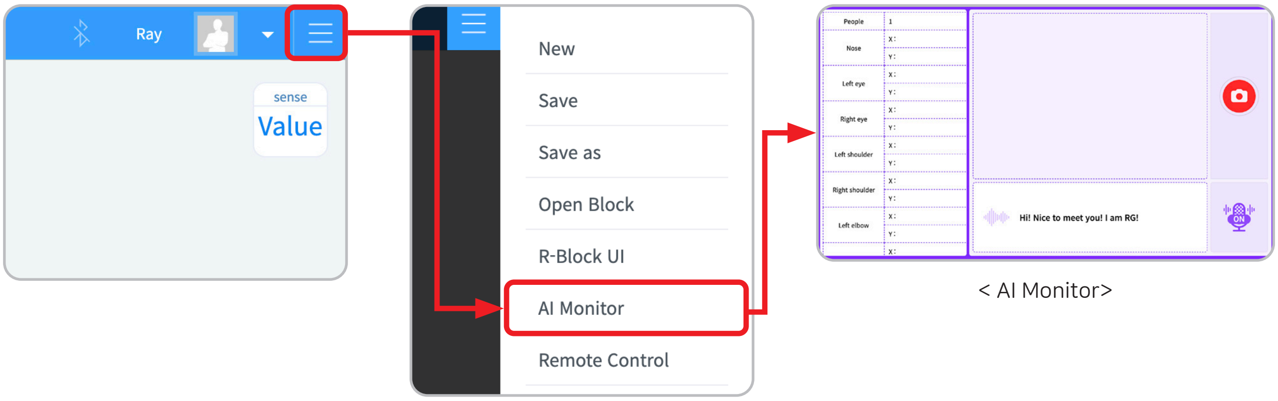
```
Press ▷ to start
Repeat
    if < If IR Sensor [1] > 100 > then
        Say TTS [left] and wait
    if < If IR Sensor [1] < 100 > then
        Say TTS [right] and wait
infinitely
```

MEMO

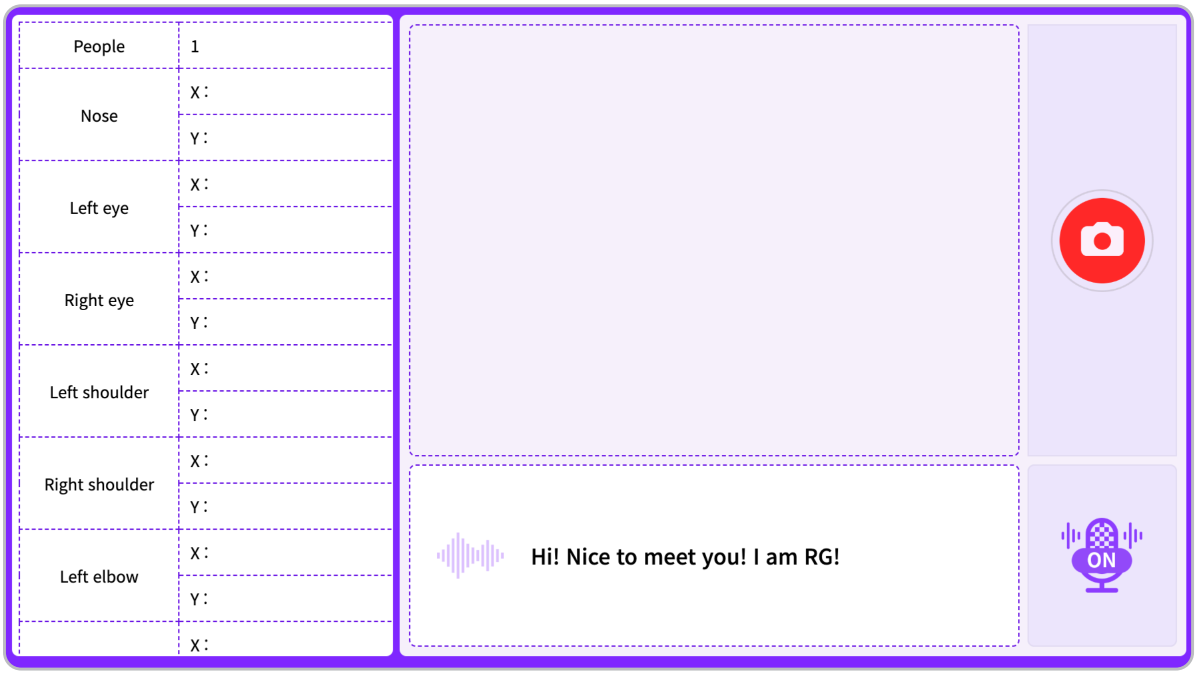
3 Using AI Monitor

The AI Monitor function uses artificial intelligence for voice recognition and image recognition. If a relevant command block is used in the code, the AI Monitor will automatically pop up when executed. You can also manually run the AI Monitor by following these steps:

1. Select the menu icon located in the top right corner of ALBlock.
2. Choose "AI Monitor" from the list of options.
3. Once the loading is complete, the AI Monitor will be executed.


Ray
sense
Value
New
Save
Save as
Open Block
R-Block UI
AI Monitor
Remote Control

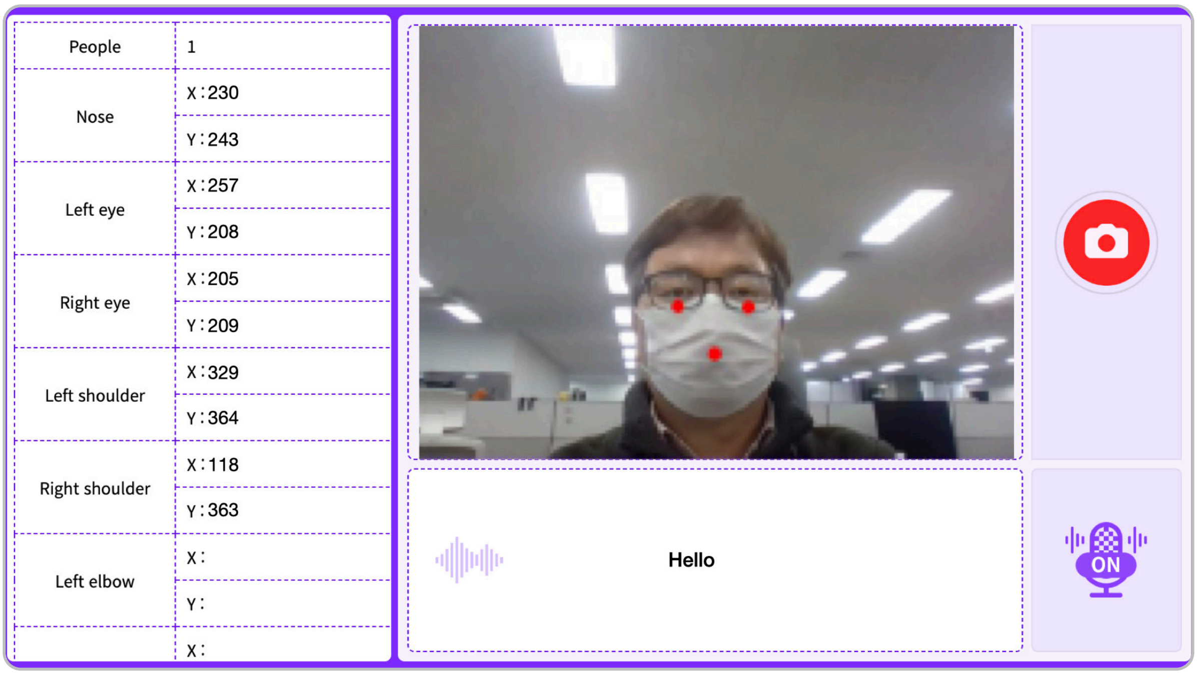
< AI Monitor>



People	1
Nose	X :
	Y :
Left eye	X :
	Y :
Right eye	X :
	Y :
Left shoulder	X :
	Y :
Right shoulder	X :
	Y :
Left elbow	X :
	Y :
	X :

Hi! Nice to meet you! I am RG!

④ Features of AI Monitor



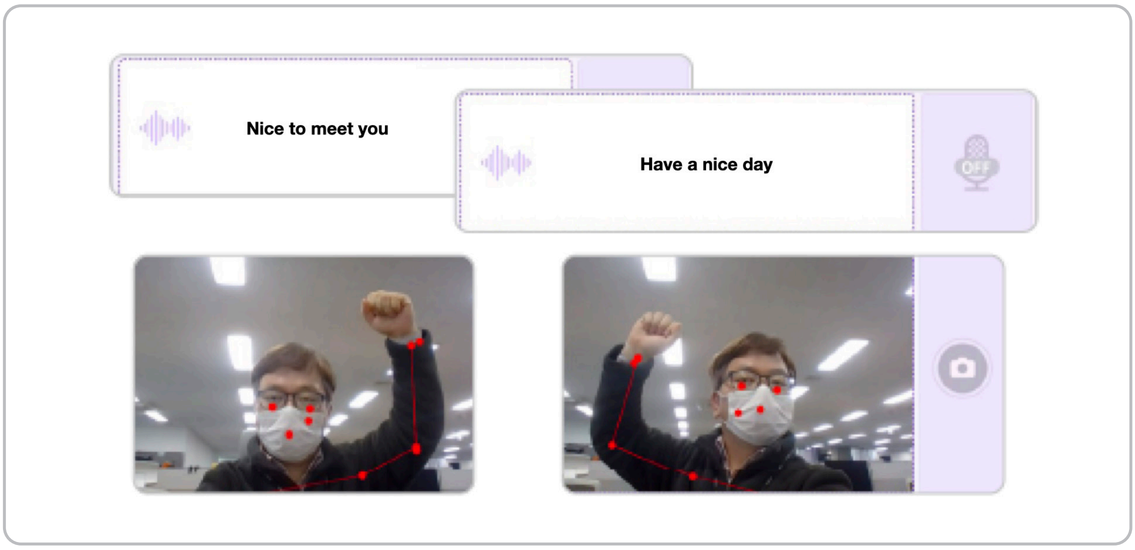
People	1
Nose	X :230
	Y :243
Left eye	X :257
	Y :208
Right eye	X :205
	Y :209
Left shoulder	X :329
	Y :364
Right shoulder	X :118
	Y :363
Left elbow	X :
	Y :
	X :

Hello

The AI Monitor has several features, including:

① Microphone button: This button is used to start and stop voice recognition.
② Voice Recognition Window: This window displays the text of the recognized voice.
③ Camera button: This button is used to start and stop image recognition.
④ Image recognition window: This window displays the image recognized by the camera.
⑤ Recognition coordinate window: This window displays the coordinates of the object recognized in the image

Let's test the audio and video by pressing the camera and microphone buttons.

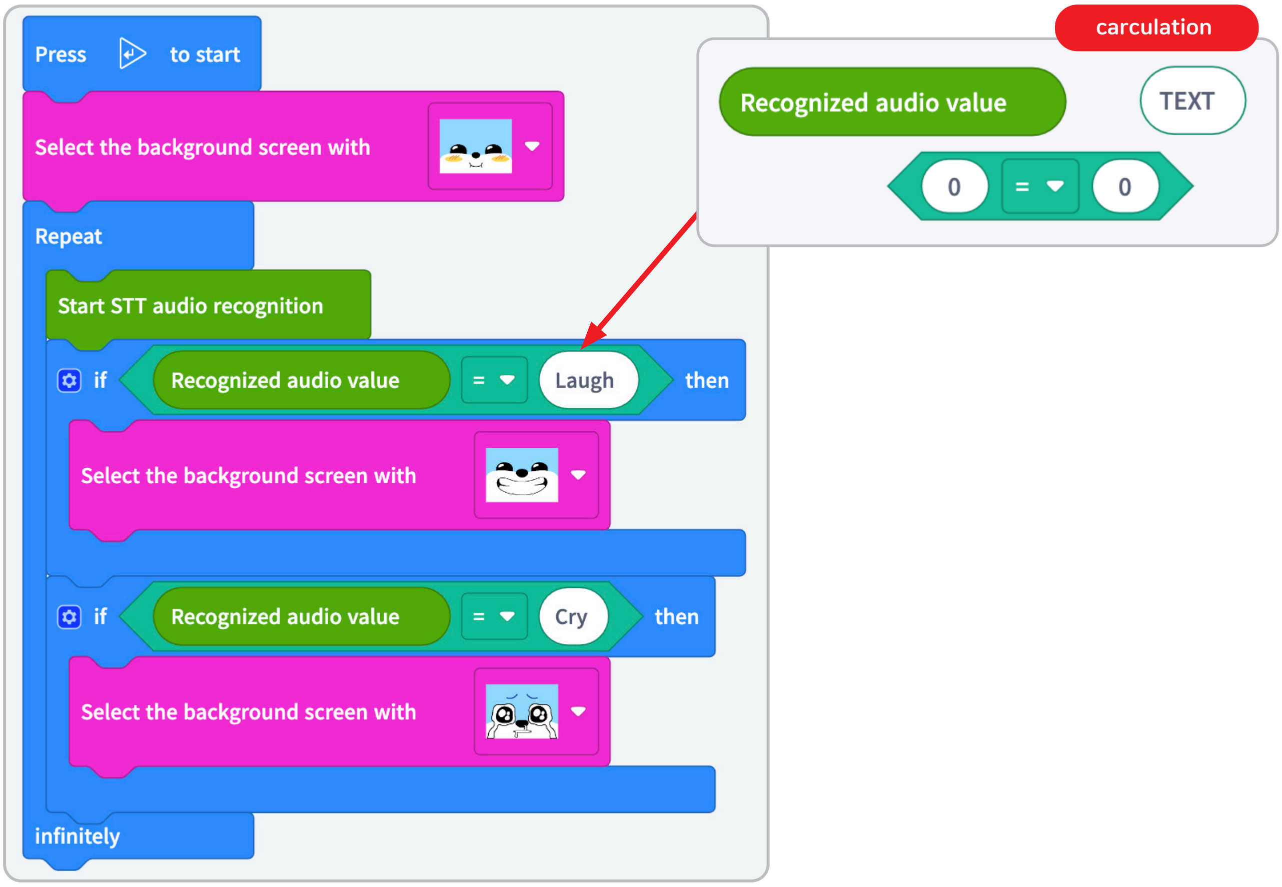


Nice to meet you

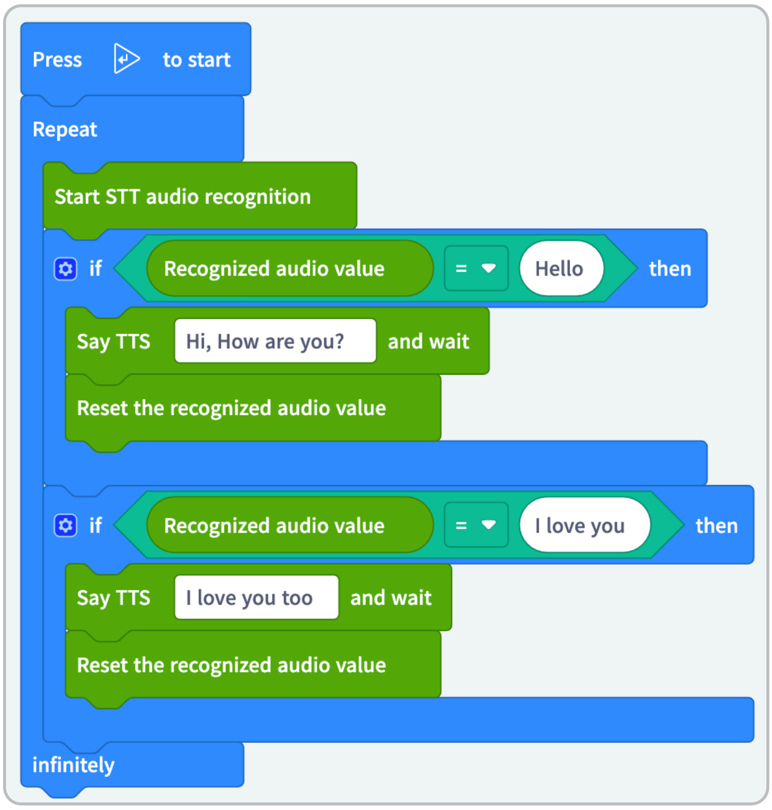
Have a nice day

5 Using Speech Recognition(STT)

To use speech recognition (STT), you need to enter the text by inserting the text block in the "Operation" category as shown below. When the AI Monitor pops up, press the microphone button and speak the two words you typed.



```
Press ▷ to start
Select the background screen with [▾]
Repeat
    Start STT audio recognition
    if Recognized audio value = ▾ Laugh then
        Select the background screen with [▾]
    if Recognized audio value = ▾ Cry then
        Select the background screen with [▾]
infinitely
```

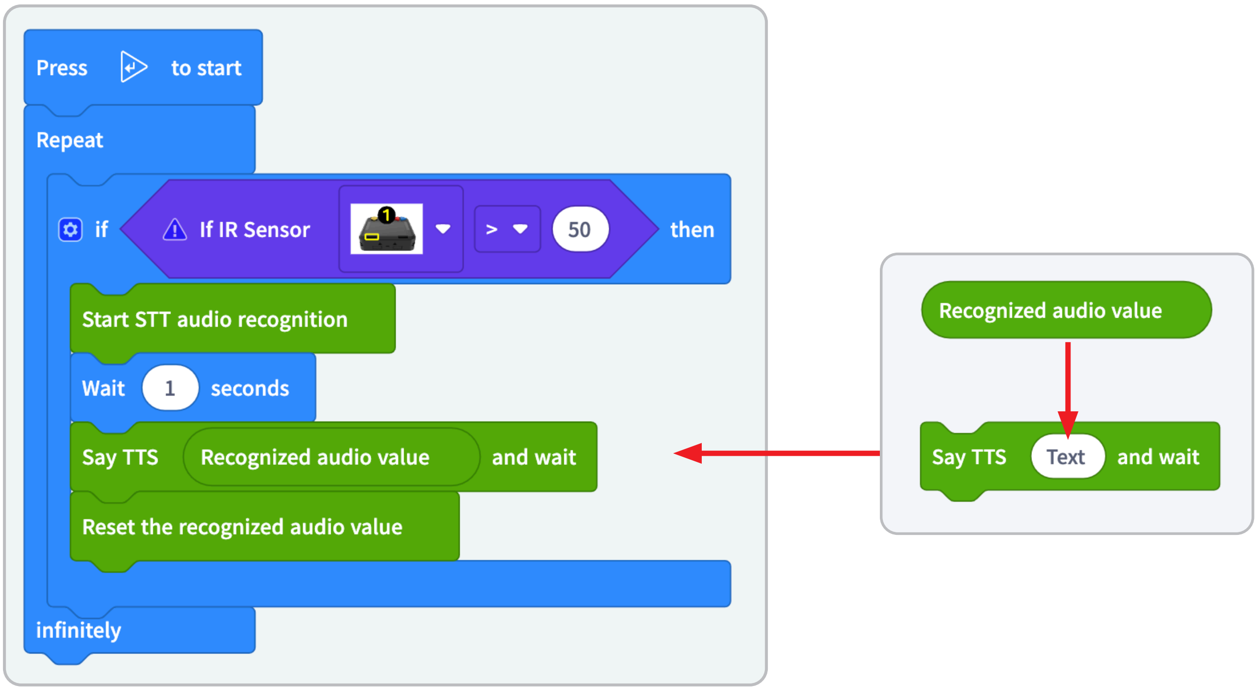


```
Press ▷ to start
Repeat
    Start STT audio recognition
    if Recognized audio value = ▾ Hello then
        Say TTS Hi, How are you? and wait
        Reset the recognized audio value
    if Recognized audio value = ▾ I love you then
        Say TTS I love you too and wait
        Reset the recognized audio value
infinitely
```

Let's try using STT and TTS together. After running the code, press the microphone button to say the word you typed.

6 Speak According to the Recognized Voice

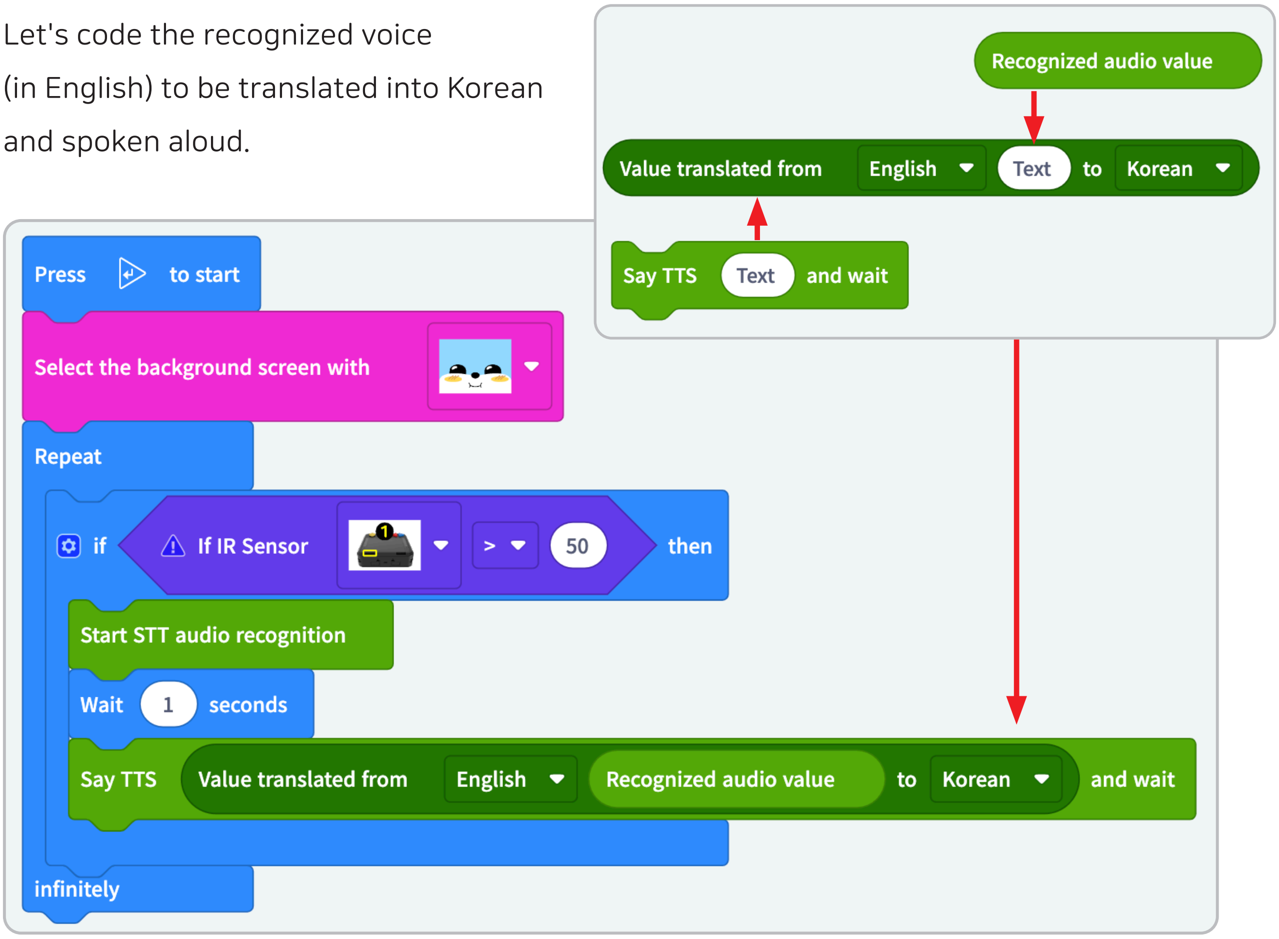
Voice recognition can be performed by pressing the microphone button as shown below. Once the recognized character appears, if you place your hand on the infrared sensor 1, R-GEE will follow what it recognizes.



```
Press ▷ to start
Repeat
    if If IR Sensor [1] > 50 then
        Start STT audio recognition
        Wait 1 seconds
        Say TTS (Recognized audio value) and wait
        Reset the recognized audio value
infinitely
```

```
Recognized audio value
Say TTS (Text) and wait
```

Let's code the recognized voice (in English) to be translated into Korean and spoken aloud.

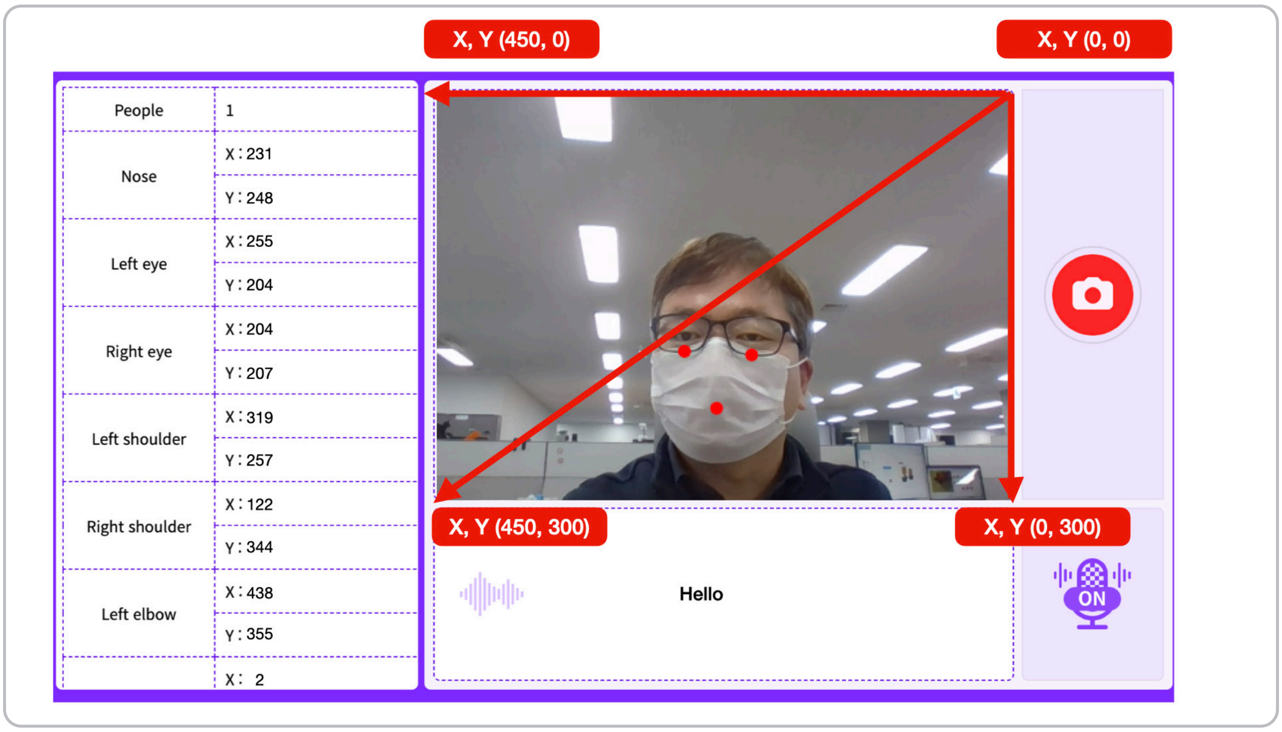


```
Recognized audio value
Value translated from English (Text) to Korean
Say TTS (Text) and wait
```

```
Press ▷ to start
Select the background screen with
Repeat
    if If IR Sensor [1] > 50 then
        Start STT audio recognition
        Wait 1 seconds
        Say TTS (Value translated from English (Recognized audio value) to Korean) and wait
infinitely
```

7 Using Image Recognition

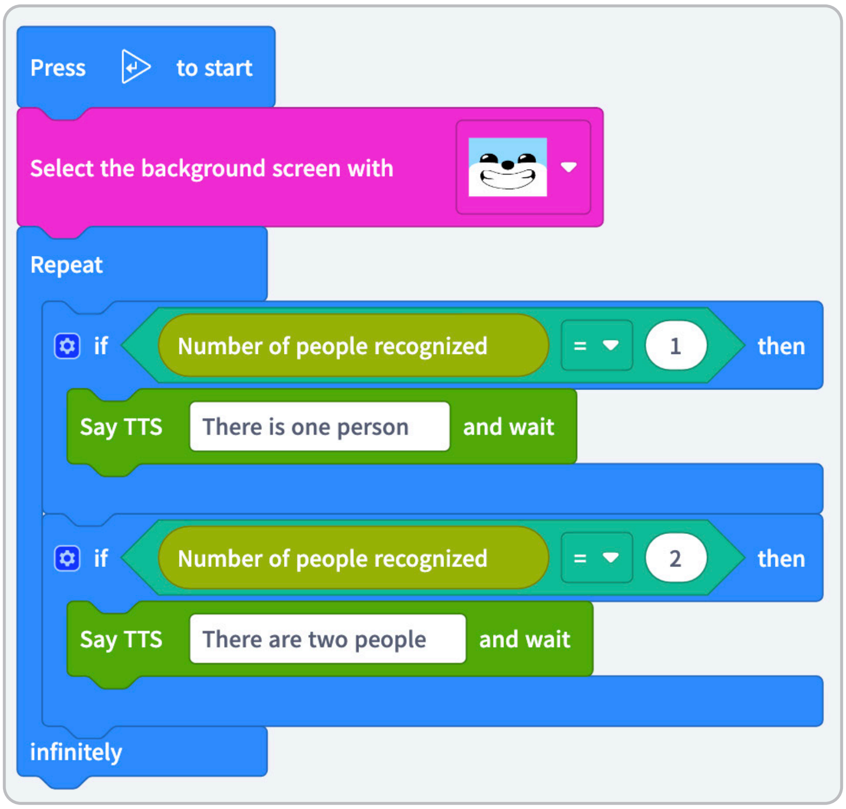
In image recognition, you can check the coordinates of the recognized object, and the range of coordinates is as follows:



People	1
Nose	X : 231
	Y : 248
Left eye	X : 255
	Y : 204
Right eye	X : 204
	Y : 207
Left shoulder	X : 319
	Y : 257
Right shoulder	X : 122
	Y : 344
Left elbow	X : 438
	Y : 355
	X : 2

Hello

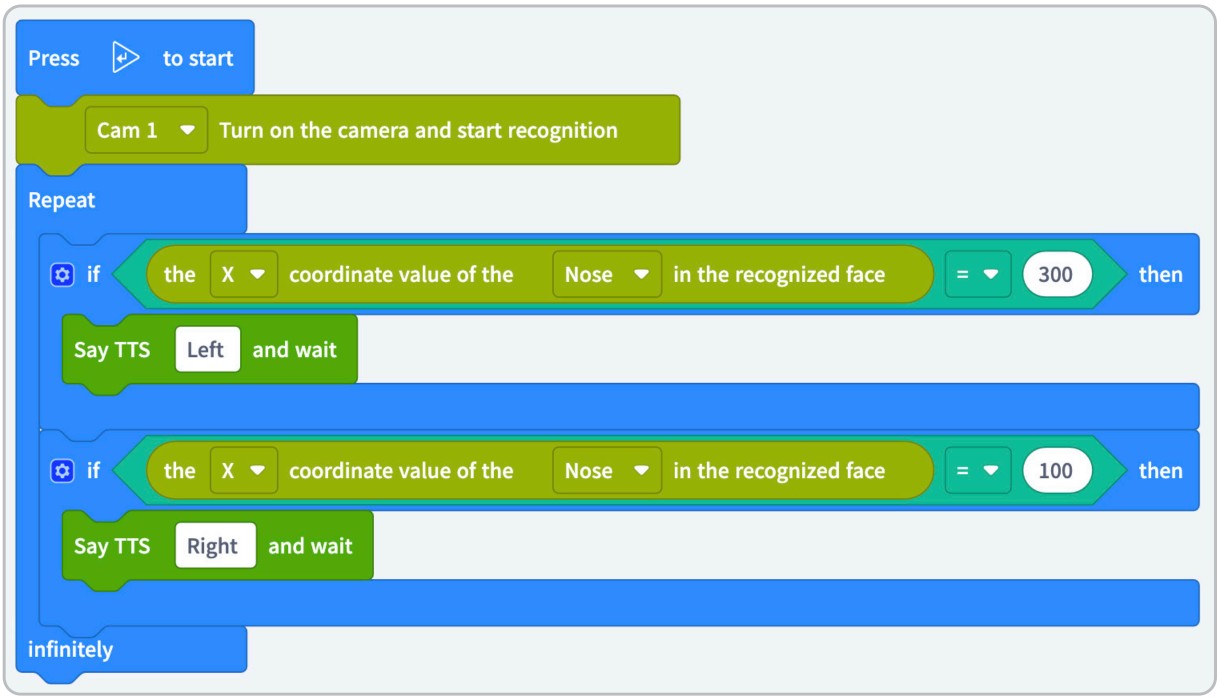
When the camera recognizes people, let's have R-GEE tell us how many people were recognized.



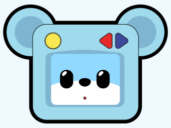
```
Press ▷ to start
Select the background screen with [ ▾]
Repeat
    if Number of people recognized [= ▾] 1 then
        Say TTS There is one person and wait
    if Number of people recognized [= ▾] 2 then
        Say TTS There are two people and wait
infinitely
```

8 Speak According to the Recognized Imange

Let's have R-GEE say the direction of the nose based on the recognized image.



```
Press ▷ to start
Cam 1 ▾ Turn on the camera and start recognition
Repeat
    if the X ▾ coordinate value of the Nose ▾ in the recognized face = ▾ 300 then
        Say TTS Left and wait
    if the X ▾ coordinate value of the Nose ▾ in the recognized face = ▾ 100 then
        Say TTS Right and wait
infinitely
```



MEMO

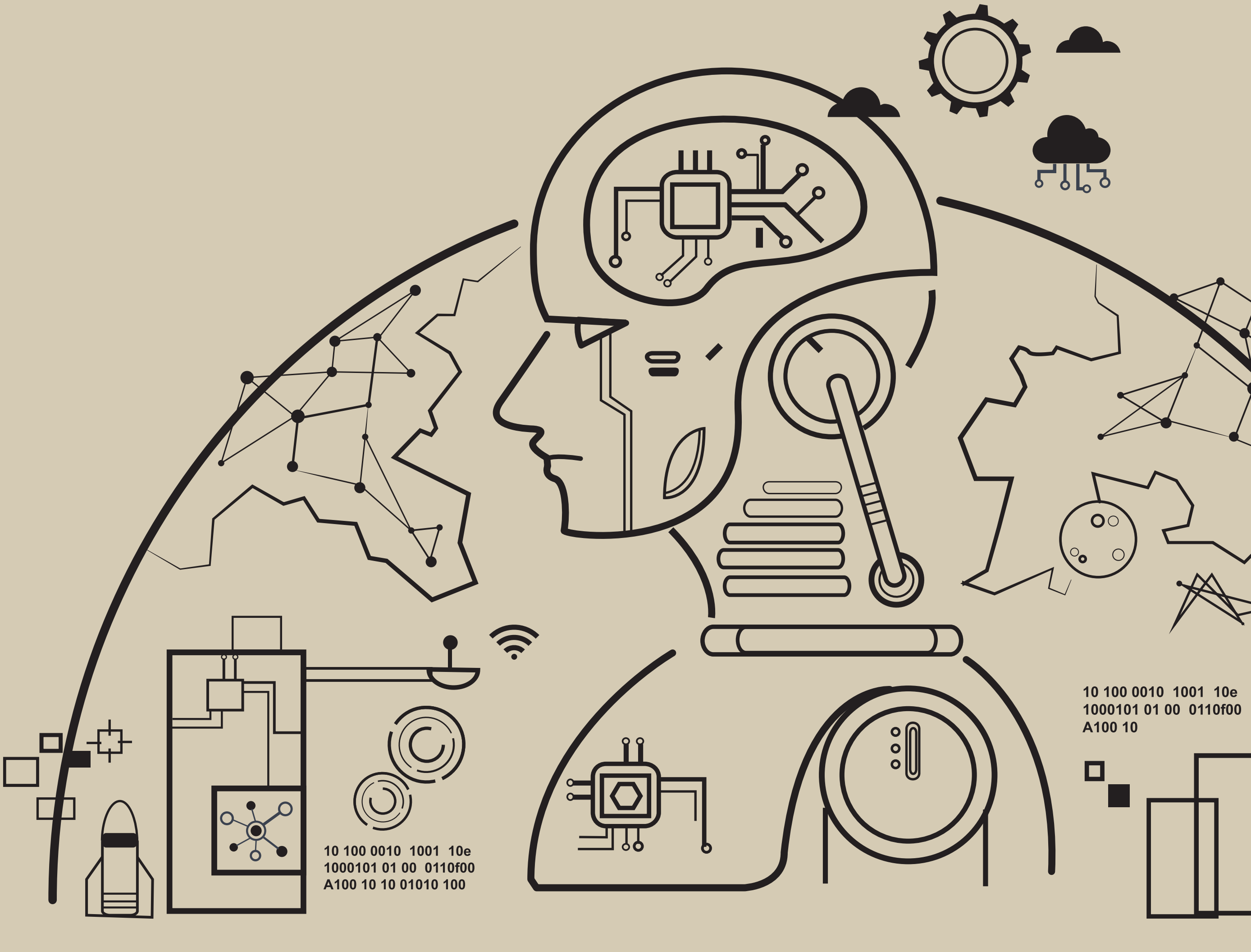
Review

Let's discuss the advantages and disadvantages of AI that we learned about today we studied.

Let's talk about the intelligent agent we learned about today.

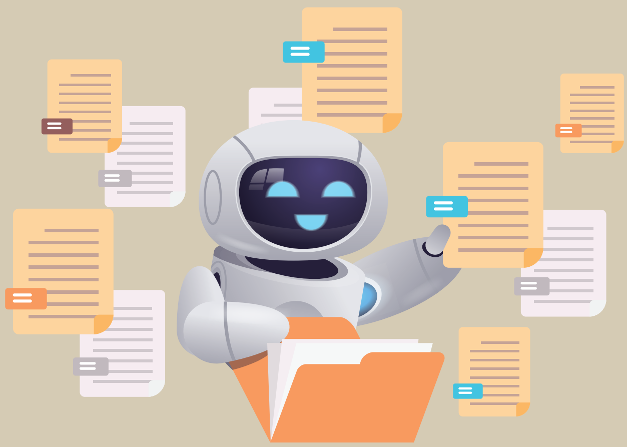
Part.2

1. Utilize data to AI
2. Complete R-GEE.
3. R-GEE control program.
4. R-GEE operation


10 100 0010 1001 10e
1000101 01 00 0110f00
A100 10
10 100 0010 1001 10e
1000101 01 00 0110f00
A100 10 10 01010 100

Class
01

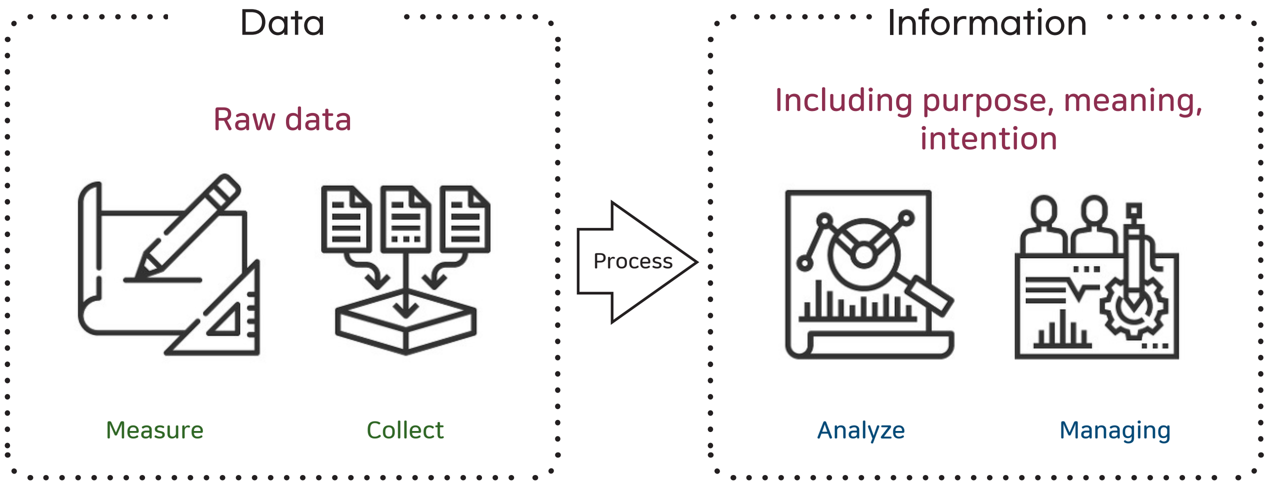
Utilize data to AI



1 Data - the ingredient of Artificial Intelligence

Data

Data is information expressed with numbers, letters, symbols, images, etc. If you want to create artificial intelligence technology, you need "a lot of data" and "good data." However, even if there is a lot of data, you cannot create good artificial intelligence technology without using it correctly.


Data
Raw data
Measure
Collect
Process
Information
Including purpose, meaning, intention
Analyze
Managing

Let’s play OX quiz about data, guess who will win!

O, X Quiz

1. To create AI technology, you need data. ○ ✕

2. AI can only learn about images. ○ ✕

3. If AI is trained with incorrect data, it can cause errors. ○ ✕

4. The only thing you need to create high performance AI technology is a lot of data. ○ ✕

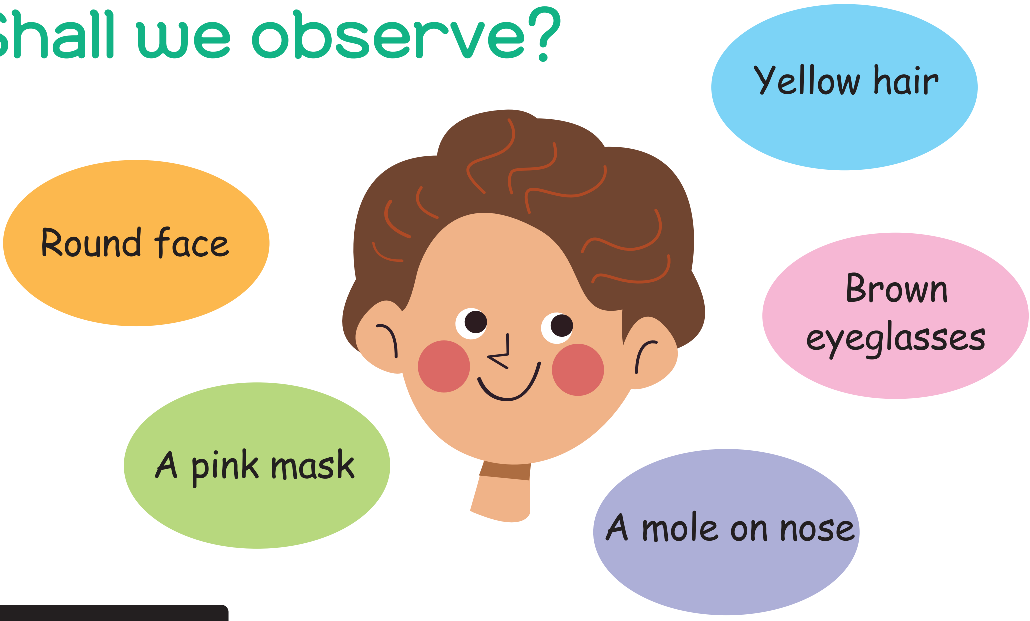
Create your own quiz about AI

○ ✕

2 Collecting Data

Let's become a developer who creates artificial intelligence technology that recognizes our face. To create good artificial intelligence, we need to collect appropriate training data. Let's collect relevant data!

Shall we observe?


Yellow hair
Round face
Brown eyeglasses
A pink mask
A mole on nose

Rules

materials : A pen and a notebook

① Check your face in the mirror, take a good look at all the different parts that make it unique.

② Write text data based on the searched information. At this time, keep it secret from your friends.

③ Publish the written data in one place.

④ Look at the data written by your friends and guess who they are.

MEMO

Let's create information using the following data

Jacob’s Library Book Loan Record

What information can you make out?

Mark’s Internet Shopping Order List

What can we learn from this information?

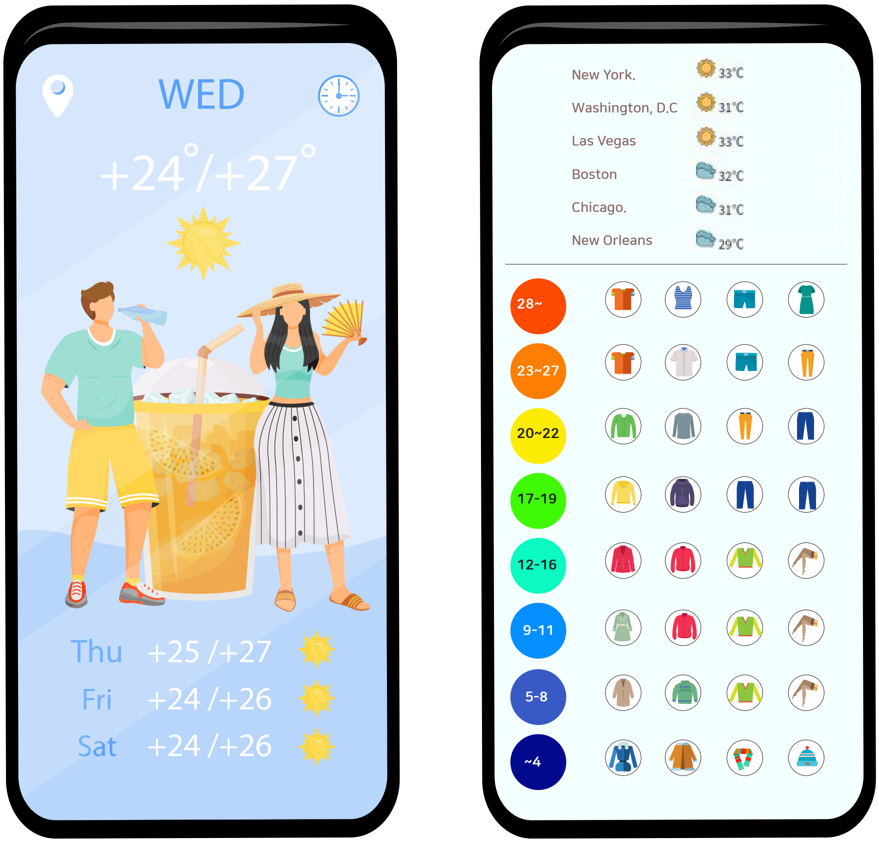
3 Attributes of Data

Attributes of Data

Attributes of data are qualities that describe and distinguish data from other data.

It has the property of no longer being divided into smaller categories. For example, if you have data called students, you can classify that data by attributes such as name, grade, class, number, address, and phone number.

The properties of data are important information that we use to distinguish the data in our lives. In our daily lives, we often check the attribute values of data to choose something or decide on an action. We choose to take an umbrella, wear sunscreen, or select our attire suitable for the weather after looking at the attribute values of the weather data.


WED
+24°/+27°
Thu +25 /+27
Fri +24 /+26
Sat +24 /+26
New York, 33℃
Washington, D.C 31℃
Las Vegas 33℃
Boston 32℃
Chicago, 31℃
New Orleans 29℃
28~
23~27
20~22
17~19
12~16
9~11
5~8
~4

[Image] Personal Stylist APP

Why data is important for AI?

Data is extremely important for AI technology because it is the fuel that powers the technology. In order to learn and make decisions, AI systems need to be trained on vast amounts of data. This is known as "machine learning," a key component of AI.

① Training: In order to train an AI system to perform a specific task, such as recognizing and classifying objects in images or translating languages, the system needs to be trained on large datasets. This allows the system to learn from examples and improve over time.

② Accuracy: The more data an AI system has to work with, the more accurate it can be. By training on large datasets, AI systems can identify patterns and make more accurate predictions or decisions.

③ Bias: AI systems are only as biased as the data they are trained on. If the data on which the AI is trained is biased, then the AI system may make biased decisions or predictions. By using large and diverse datasets, AI systems can help mitigate bias and improve accuracy.

④ Innovation: By collecting and analyzing large amounts of data, AI can help identify new patterns and insights that may not be apparent to humans. This can lead to new discoveries and innovations in fields such as healthcare, finance, and transportation.

4

How to create a dataset?

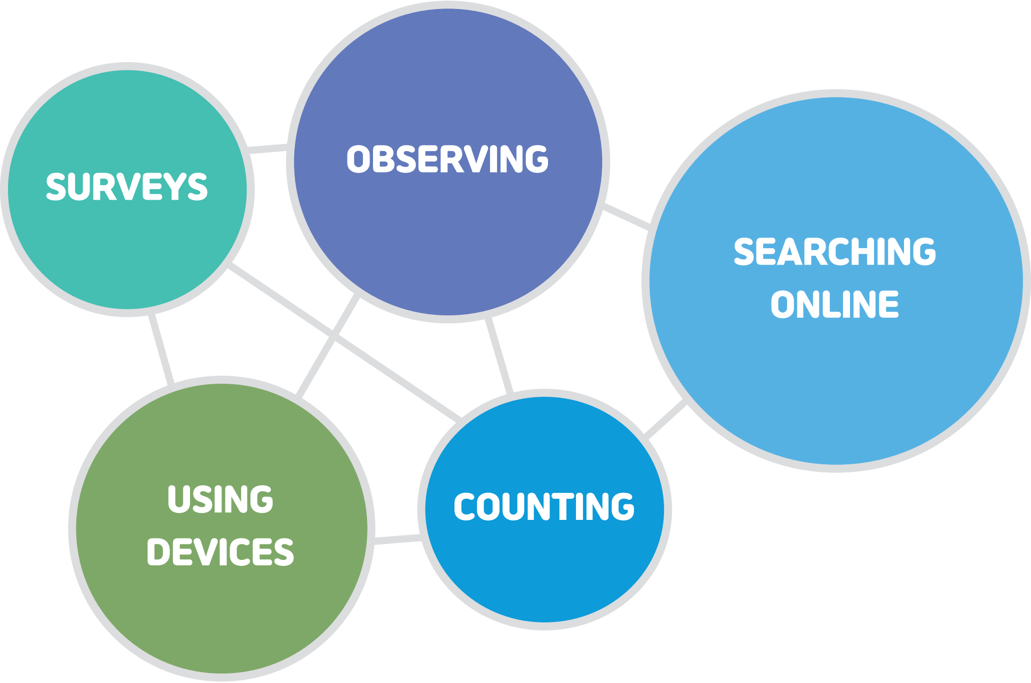
What is a dataset?

A dataset is a collection of data that is organized and structured in a particular way. It can be thought of as a spreadsheet or table that contains rows and columns of information. Each row represents a single data point or observation, while each column represents a specific feature or attribute of that observation.

In the context of AI, datasets are crucial for training and testing machine learning models. The more diverse and representative the dataset, the better the model is likely to perform in the real world. Properly labeled and structured datasets can help ensure that the model is accurate, unbiased, and able to generalize to new situations.

How to collect data?

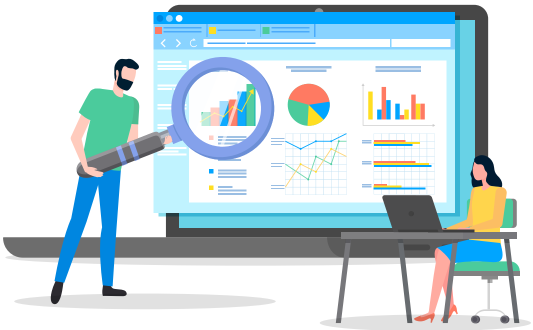
There are many ways to collect data, depending on what kind of data you need and what your goals are. Here are a few common methods:



How to collect data?

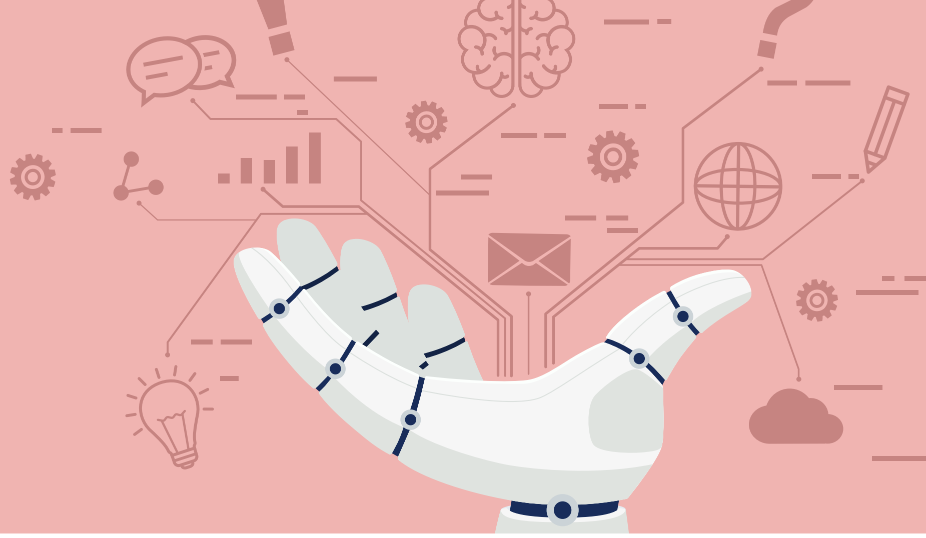
Datasets can be created in a number of ways, such as by collecting data from sensors, surveys, or social media. They can also be generated synthetically, for example, by using computer programs to simulate data for testing or training purposes.

Let’s discuss how we can collect data.



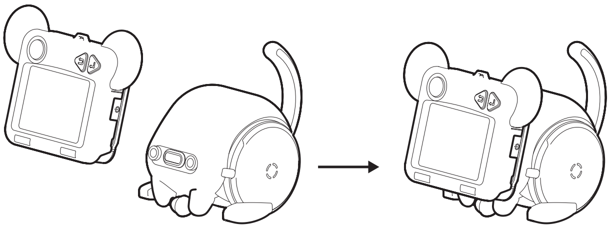
Class
02

Complete R-GEE



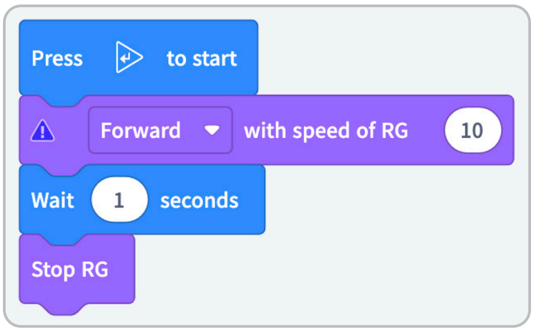
1 Complete R-GEE

When you combine the R-Brain and the body, you can move R-GEE.

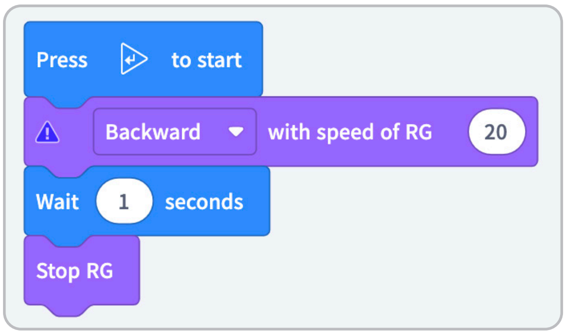


2 Operate R-GEE

You can operate R-GEE by coding each movement as follows:

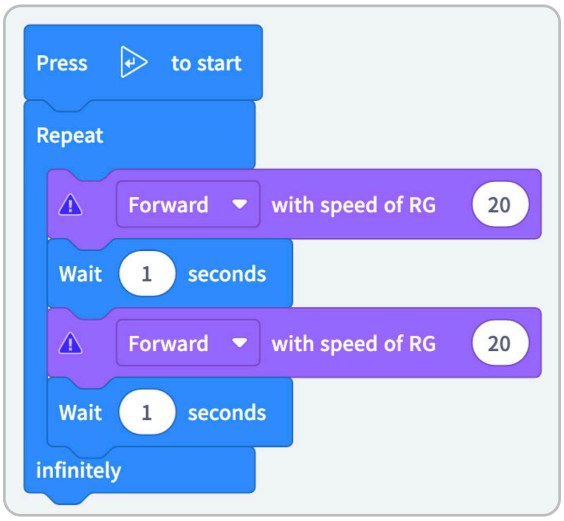


```
Press ▷ to start
⚠ Forward ▾ with speed of RG 10
Wait 1 seconds
Stop RG
```

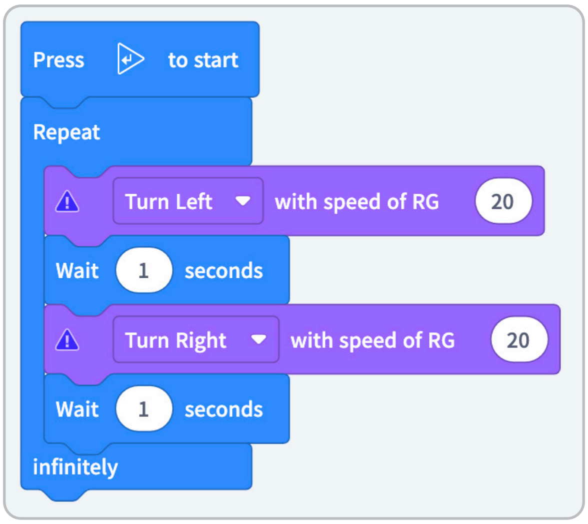


```
Press ▷ to start
⚠ Backward ▾ with speed of RG 20
Wait 1 seconds
Stop RG
```

You can operate R-GEE by coding each movement as follows:



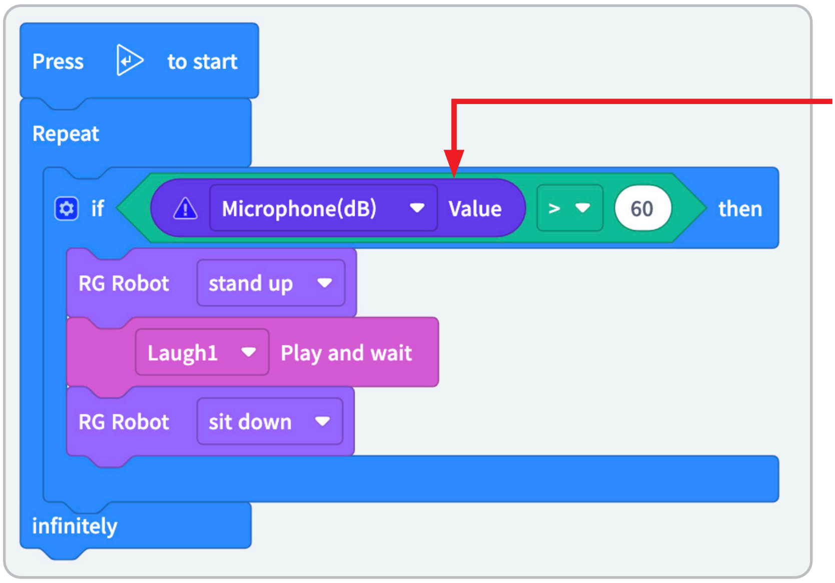
```
Press ▷ to start
Repeat
    ⚠ Forward ▾ with speed of RG 20
    Wait 1 seconds
    ⚠ Forward ▾ with speed of RG 20
    Wait 1 seconds
infinitely
```



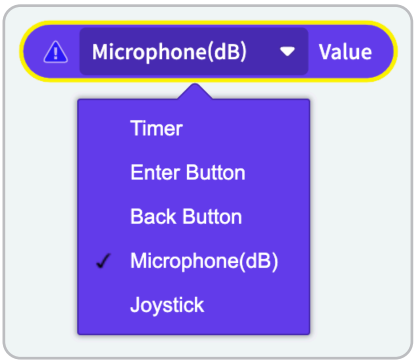
```
Press ▷ to start
Repeat
    ⚠ Turn Left ▾ with speed of RG 20
    Wait 1 seconds
    ⚠ Turn Right ▾ with speed of RG 20
    Wait 1 seconds
infinitely
```

3 Let’s Make R-GEE Move

Let's make R-GEE wake up when we clap our hands.

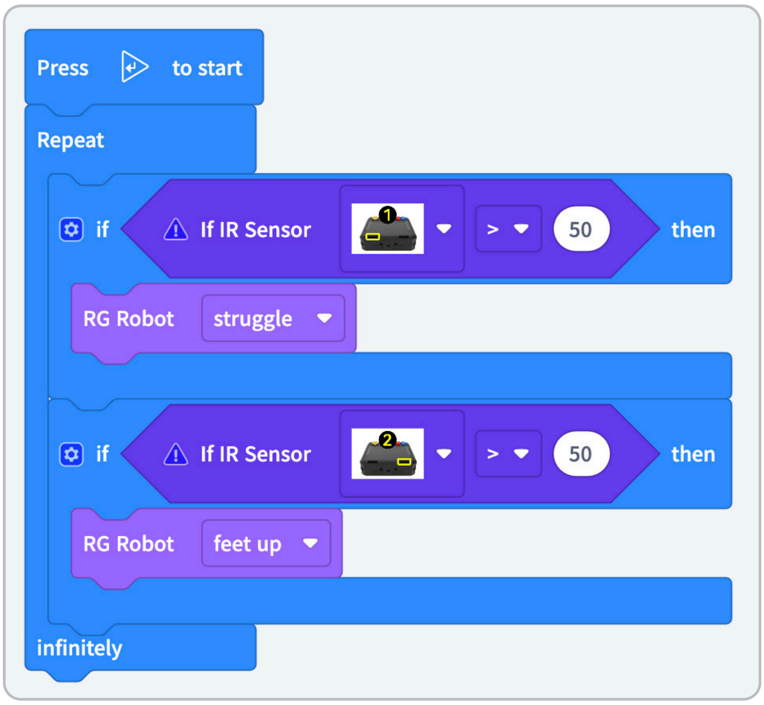


```
Press ▷ to start
Repeat
    if Microphone(dB) Value > 60 then
        RG Robot stand up
        Laugh1 Play and wait
        RG Robot sit down
infinitely
```



Microphone(dB) Value
Timer
Enter Button
Back Button
✓ Microphone(dB)
Joystick

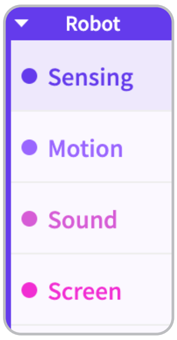
Make it move when the infrared sensor recognizes movement.

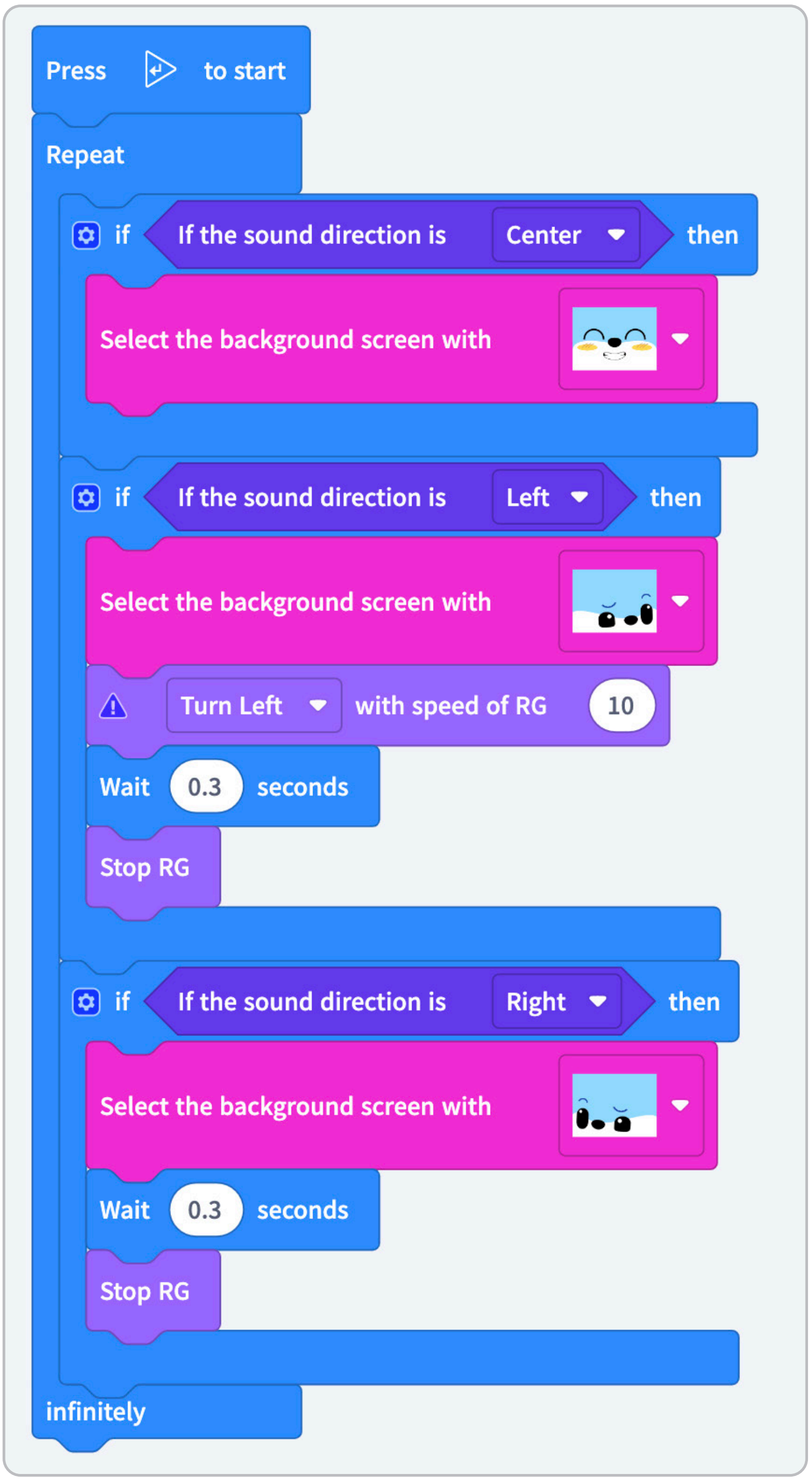


```
Press ▷ to start
Repeat
    if If IR Sensor 1 > 50 then
        RG Robot struggle
    if If IR Sensor 2 > 50 then
        RG Robot feet up
infinitely
```

4 Let's Make R-GEE Detect the Sound Direction

The sound direction detection block can be found under "Detect > More"

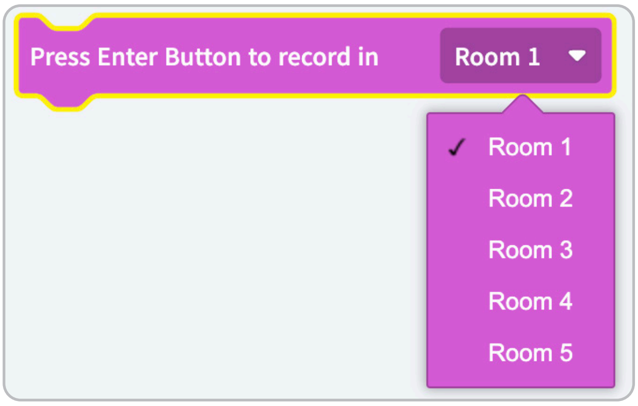


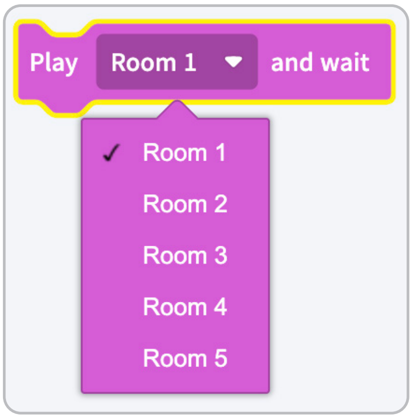


```
Press ▷ to start
Repeat
    if If the sound direction is Center then
        Select the background screen with
    if If the sound direction is Left then
        Select the background screen with
        Turn Left with speed of RG 10
        Wait 0.3 seconds
        Stop RG
    if If the sound direction is Right then
        Select the background screen with
        Wait 0.3 seconds
        Stop RG
infinitely
```

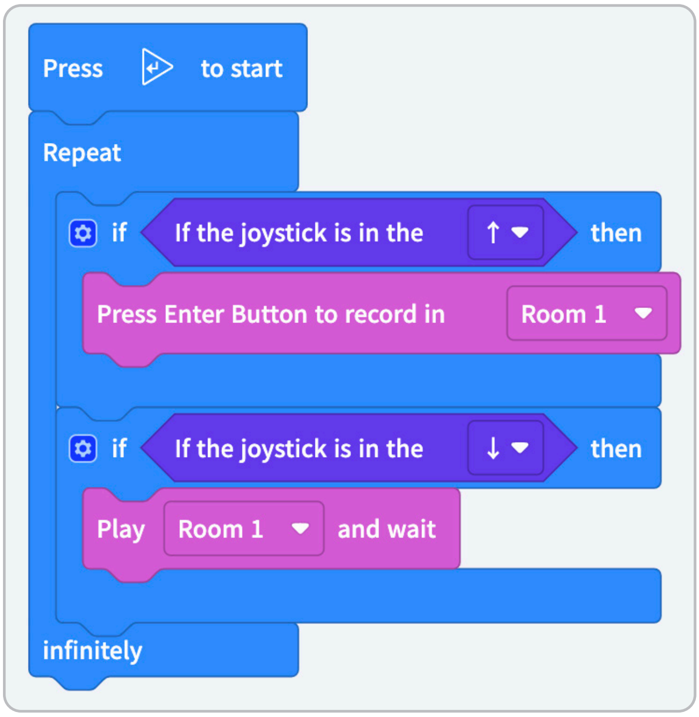
5 Record Your Voice

R-GEE can use the block below to record her voice and play it back.


Press Enter Button to record in Room 1


Play Room 1 and wait

After writing the code as below, download/execute it.



```
Press ⏎ to start
Repeat
    if If the joystick is in the ↑ then
        Press Enter Button to record in Room 1
    if If the joystick is in the ↓ then
        Play Room 1 and wait
infinitely
```

① Move the joystick up (↑) and press the run button.

② When you hear a ‘beep’ sound, recording starts. (hold button pressed)

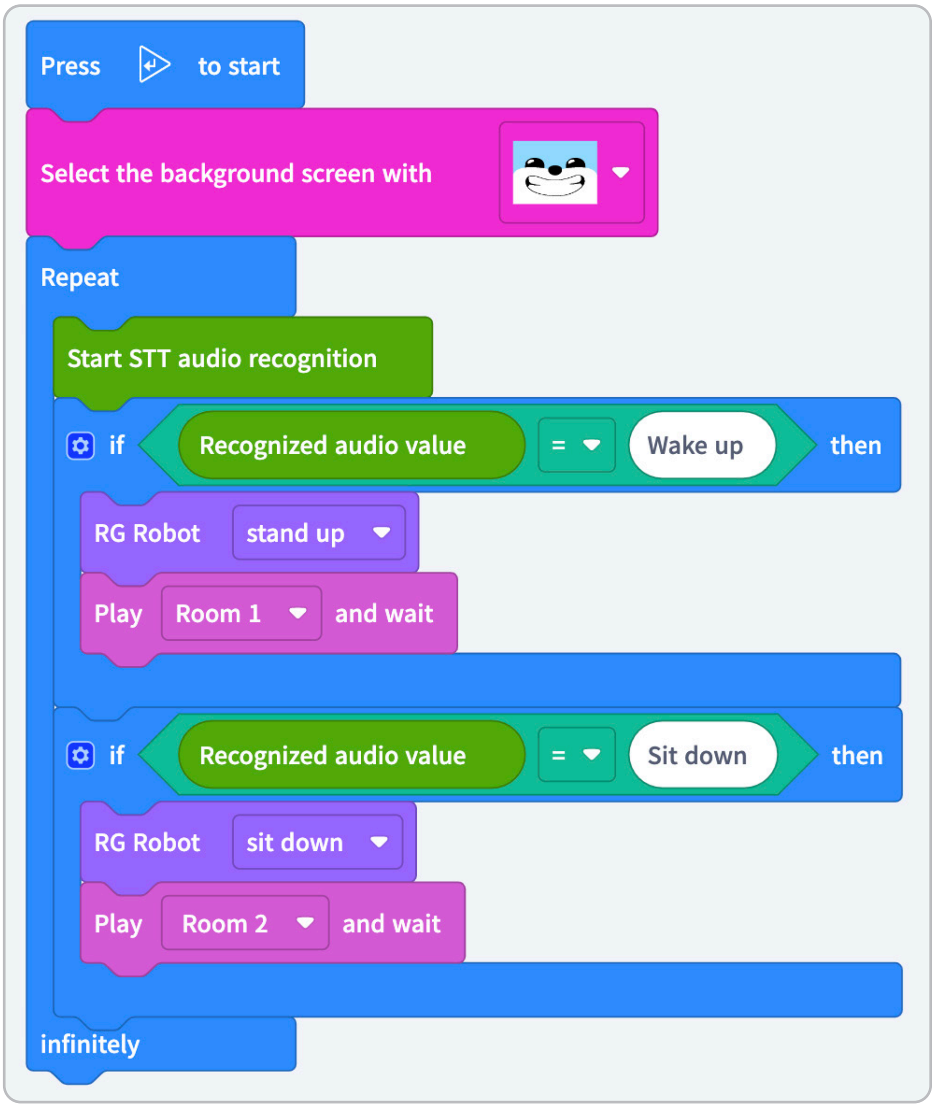
③ If you release your hand from the play button or 4 seconds pass, a ‘beep’ sound will sound and the recording will end.

④ Move the joystick down (↓) to check the recorded sound.

※ You can save 5 recording files from No. 1 to No. 5.

6 Voice Commands

After recording the sound in rooms 1 and 2, let's use the following code to command R-GEE by voice.



```
Press ▷ to start
Select the background screen with [ ▾]
Repeat
    Start STT audio recognition
    if < (Recognized audio value) [= ▾] (Wake up) > then
        RG Robot [stand up ▾]
        Play [Room 1 ▾] and wait
    if < (Recognized audio value) [= ▾] (Sit down) > then
        RG Robot [sit down ▾]
        Play [Room 2 ▾] and wait
infinitely
```

MEMO

Class
03

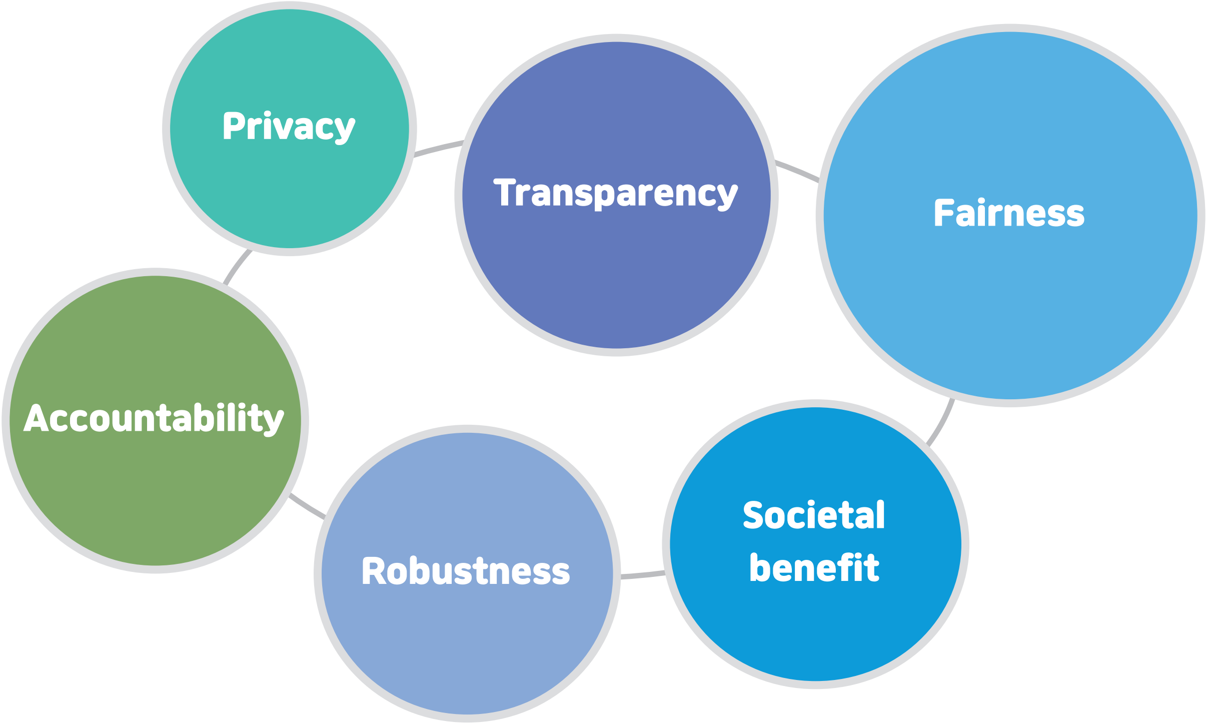
R-GEE Control program

1 Using AI correctly

How to use AI correctly?

We should use AI correctly because it is a powerful tool that can help us do many things faster and better. But just like any tool, we need to be careful how we use it. For example, if we use a hammer to hit things that we shouldn't, we could hurt ourselves or break something important. Similarly, if we use AI in ways that are harmful or unfair, we could cause problems for ourselves and others.

Let’s see the ethical principles for using AI


Privacy
Transparency
Fairness
Accountability
Robustness
Societal benefit

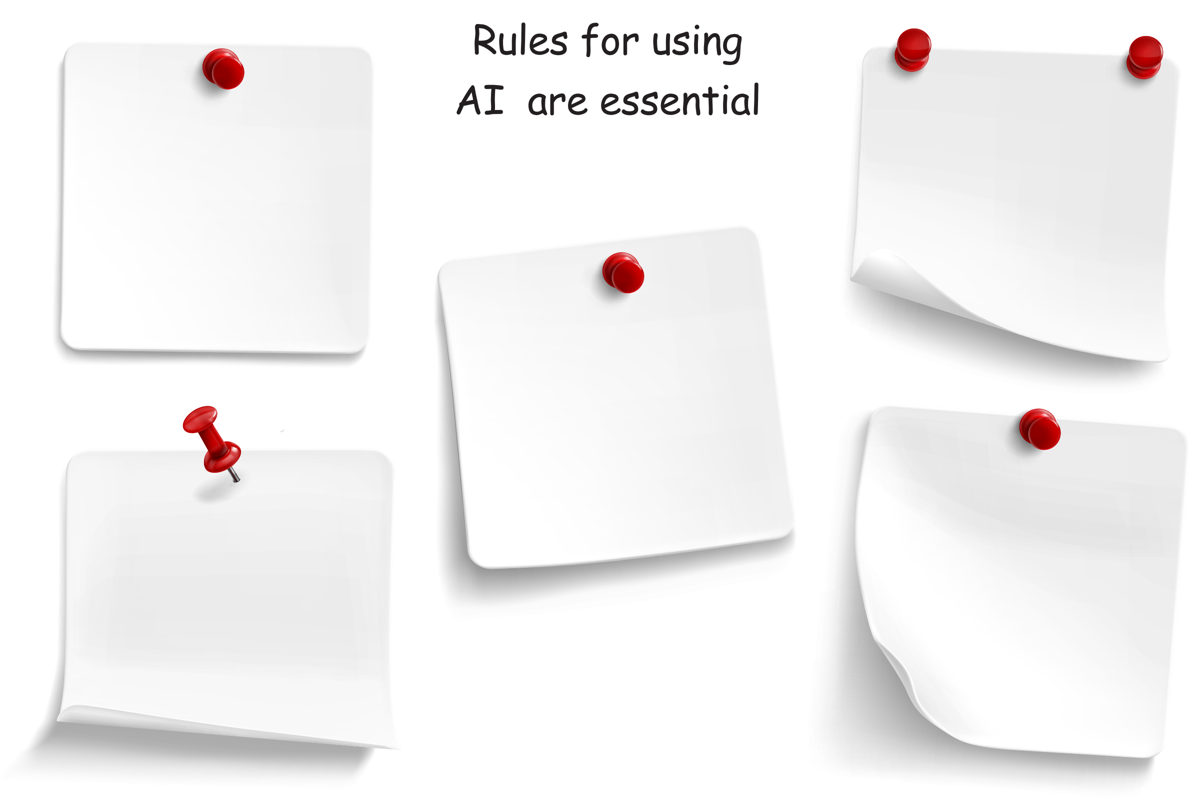
Creating Rules for Using AI

The following are the ethics that should be observed when using AI. Please read them carefully to establish rules for using AI.

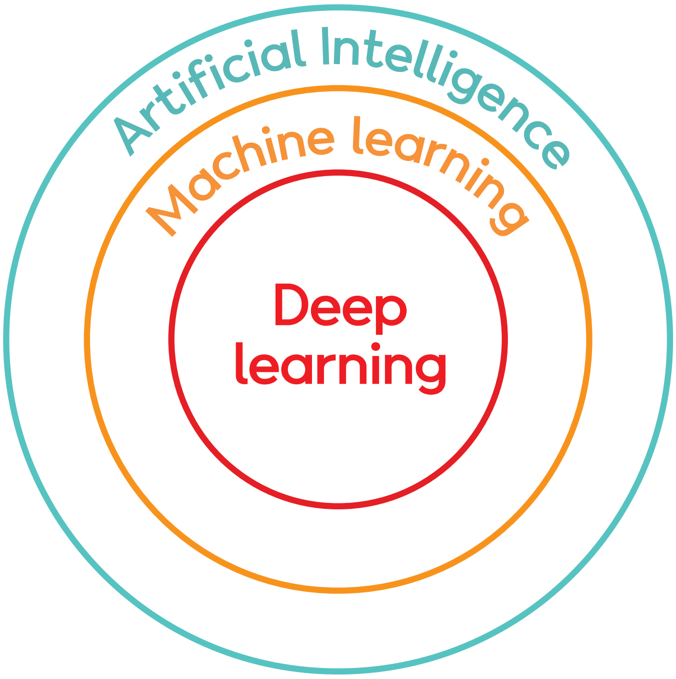
First, the purpose of using AI must be clearly defined. The use of deepfake technology to slander or harm others has become a social problem. This is an example of a problem that occurred because the purpose of using AI was inappropriate. Therefore, it is important to use AI for the right purposes.

Second, AI must be used responsibly. It is essential to keep in mind that depending on how AI is used, it may cause negative consequences. Therefore, we must strive to use AI correctly.

Rules for using AI



2 Learn more about AI



Machine learning is a branch of artificial intelligence that involves teaching computers to learn from data, without being explicitly programmed. In other words, machine learning algorithms can improve their performance over time by learning from new data. Machine learning algorithms can be supervised (where the machine is trained on labeled data), unsupervised (where the machine learns patterns in the data without labels), or semi-supervised (where the machine learns from a combination of labeled and unlabeled data).

Deep learning is a subset of machine learning that involves training artificial neural networks, which are algorithms inspired by the structure and function of the human brain. Deep learning algorithms can automatically learn to recognize patterns and features in data by analyzing multiple layers of information. These algorithms are called "deep" because they often involve many layers of interconnected nodes, each of which performs a specific computation on the input data.

Let’s discuss how we can utilize AI

How is AI being used in various fields?

AI is being used in many different fields, such as healthcare, transportation, and entertainment. In healthcare, doctors and scientists use AI to help them diagnose diseases and find new treatments. In transportation, engineers use AI to help design safer cars and planes that can drive or fly by themselves. And in entertainment, game developers use AI to create more realistic characters and develop better game features.

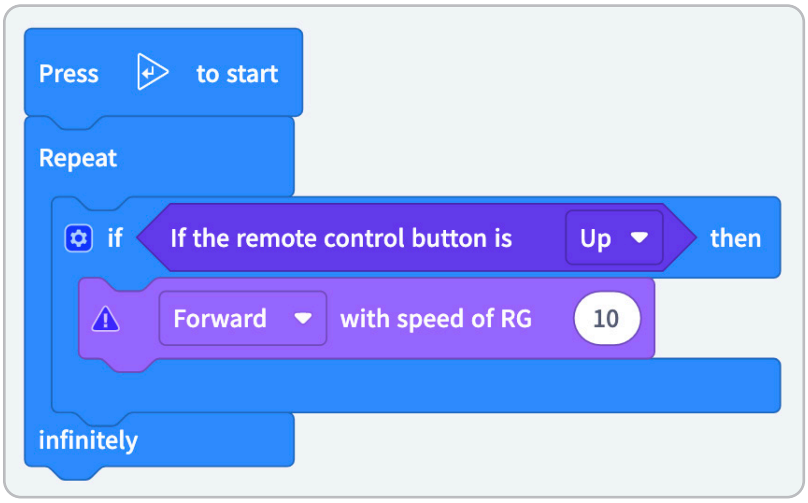
Let’s discuss how we can utilize AI in the fields below

Education **Finance** **Arts & Culture** **Food**

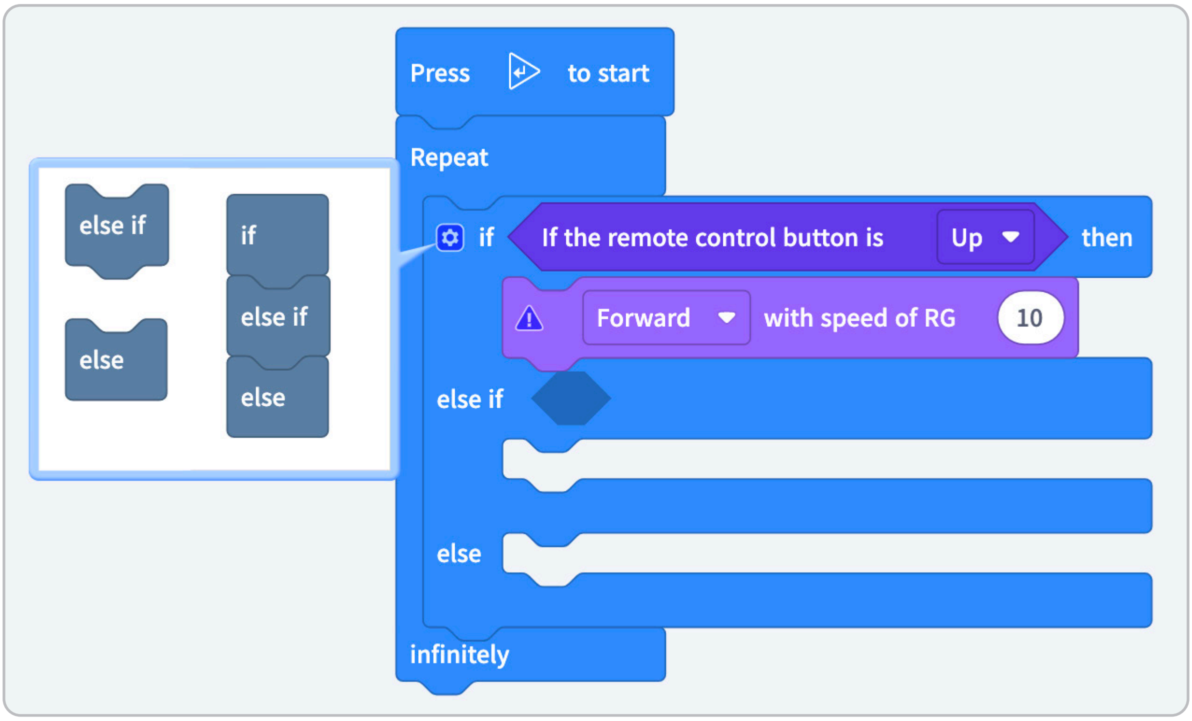
3 Controlling R-GEE

Let's code the method below to control the R-GEE

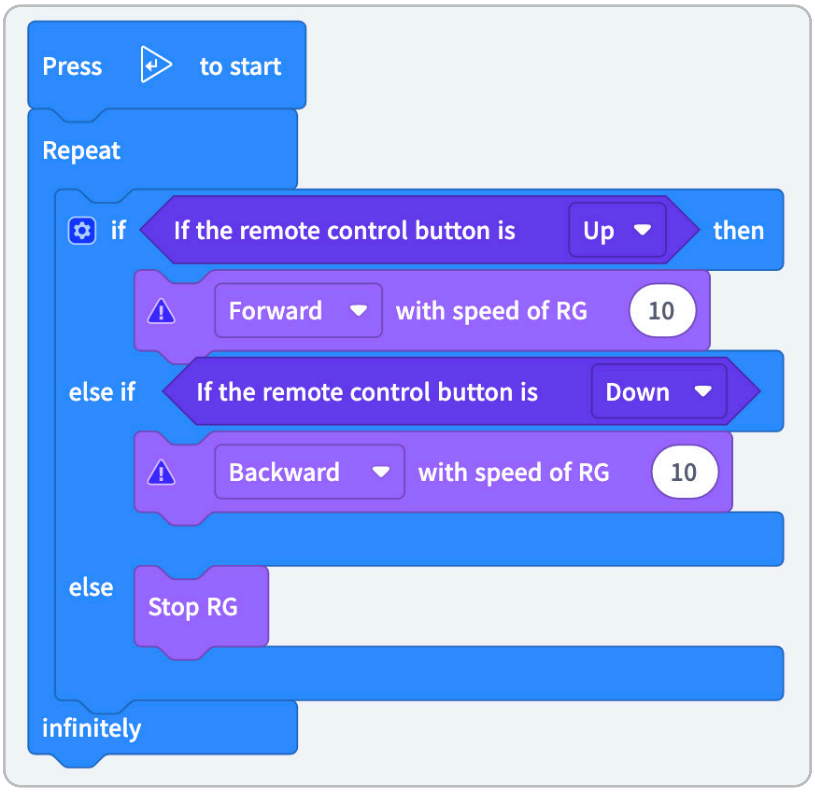
① Code as follows.


Press
to start
Repeat
if
If the remote control button is
Up
then
Forward
with speed of RG
10
infinitely

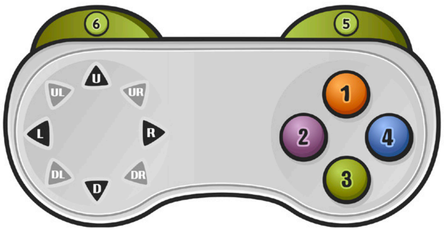
② Press the setting icon of the conditional command to add 'if' or 'if not'. (drag & drop)


else if
else
if
else if
else
Press
to start
Repeat
if
If the remote control button is
Up
then
Forward
with speed of RG
10
else if
else
infinitely

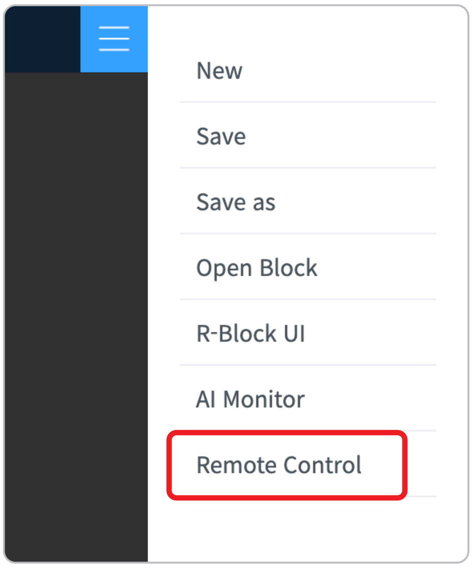
③ After arranging the blocks as shown below, download/execute them.



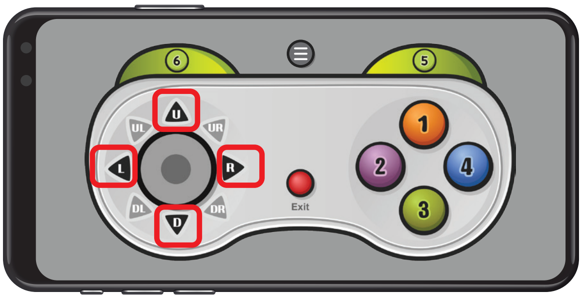
```
Press ▷ to start
Repeat
  if If the remote control button is Up ▾ then
    ⚠ Forward ▾ with speed of RG 10
  else if If the remote control button is Down ▾
    ⚠ Backward ▾ with speed of RG 10
  else
    Stop RG
infinitely
```


6
5
U
UL
UR
L
R
DL
D
DR
1
2
4
3

④ Press the 'Menu' icon on the top right of R-Block and select 'Remote Control'.

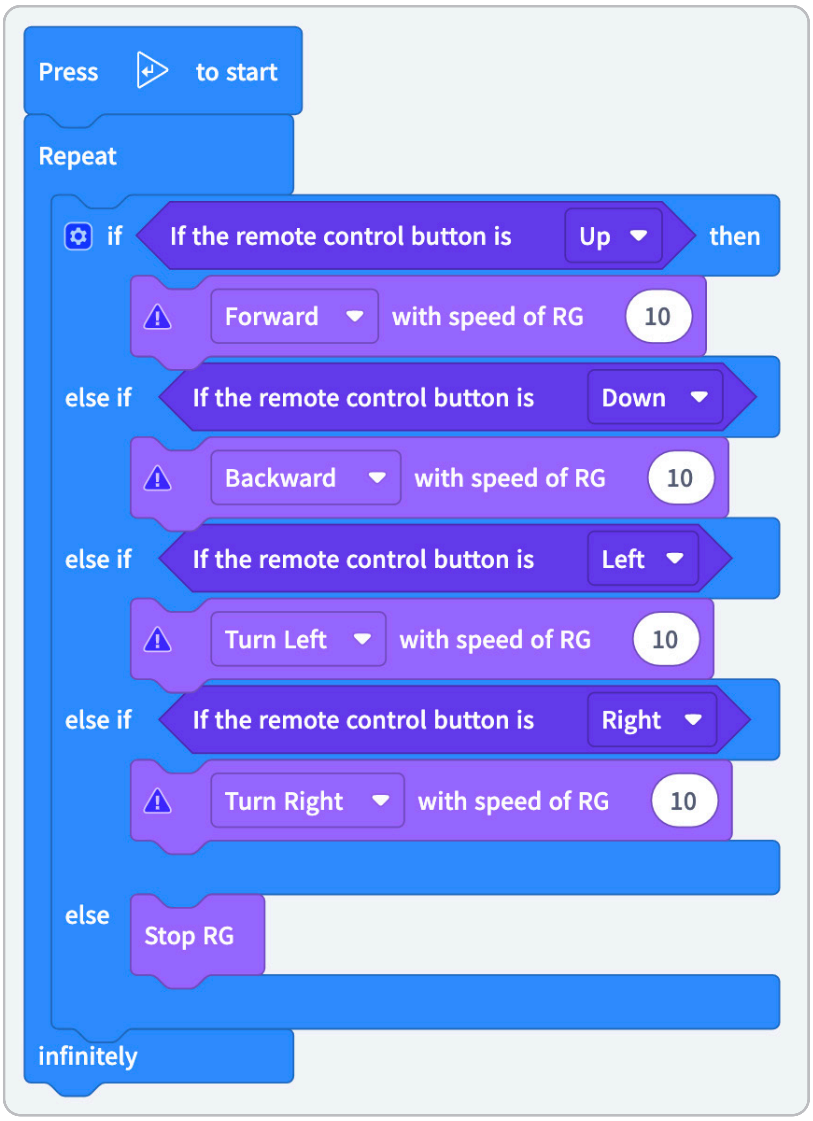

New
Save
Save as
Open Block
R-Block UI
AI Monitor
Remote Control

⑤ Press the U and D buttons on the remote control to move R-GEE forward and backward.


6
5
U
UL
UR
L
R
DL
D
DR
Exit
1
2
4
3

4 Completion of the Control Program

Let's complete the steering program by adding left and right turns.

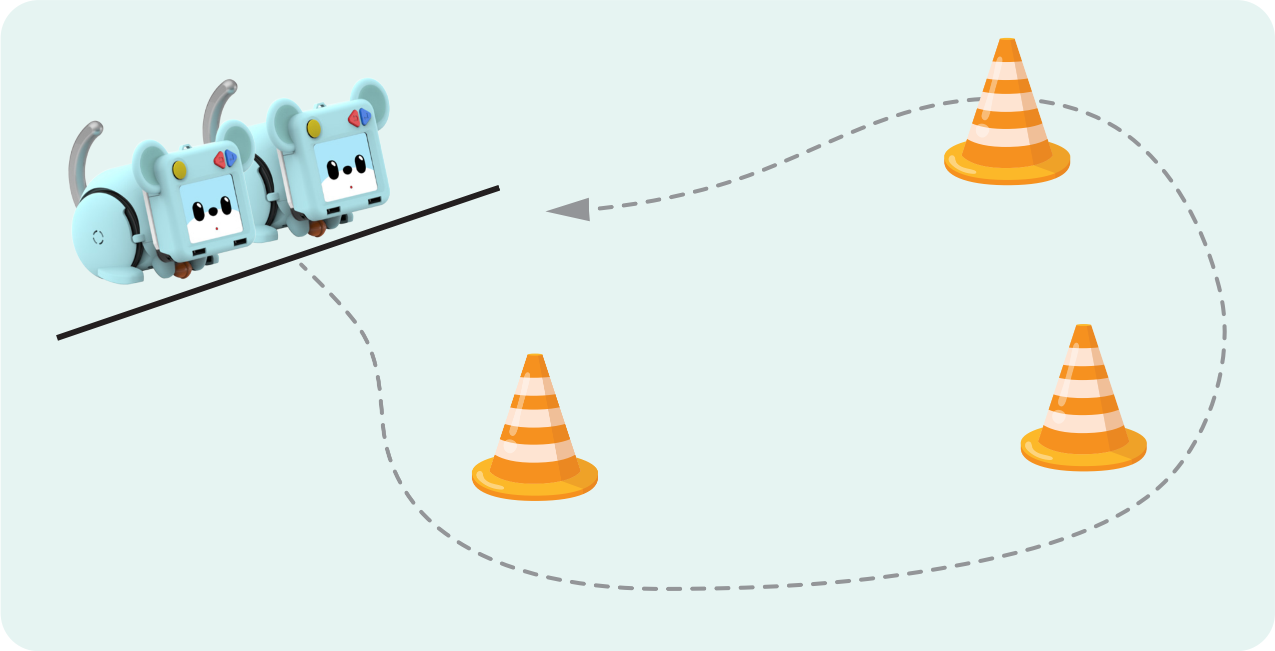


```
Press ▷ to start
Repeat
    if If the remote control button is Up ▾ then
        Forward ▾ with speed of RG 10
    else if If the remote control button is Down ▾
        Backward ▾ with speed of RG 10
    else if If the remote control button is Left ▾
        Turn Left ▾ with speed of RG 10
    else if If the remote control button is Right ▾
        Turn Right ▾ with speed of RG 10
    else
        Stop RG
infinitely
```

After downloading the control program, run the remote control to control it.

5 R-GEE Racing

Let's use the objects around us to create a racing arena to run the race.



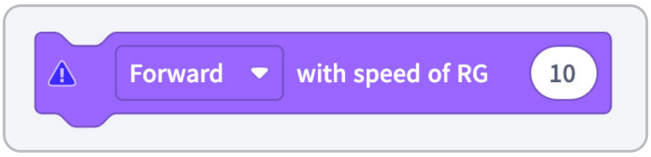
① One player from each team is selected and two players compete.

※ If you are alone, the record is measured by the time you return to the track and arrive.

② Selected players prepare their eggs and move to the front of the field.

③ Return to the return point by maneuvering each with the start signal.

④ The one who arrives first wins and advances to the next round. (Tournament)



Forward ▾ with speed of RG 10

By changing the number in the fill control R-GEE's speed.

The speed limit is 0 to 100

*If R-GEE's speed is too high, you will have difficulty maneuvering

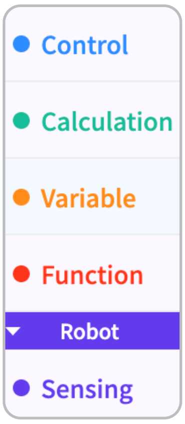
Class
04

R-GEE Operation

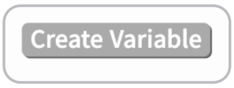
1 Create a Variable

A variable means a number that changes, and in coding, it is understood as a space that stores values.

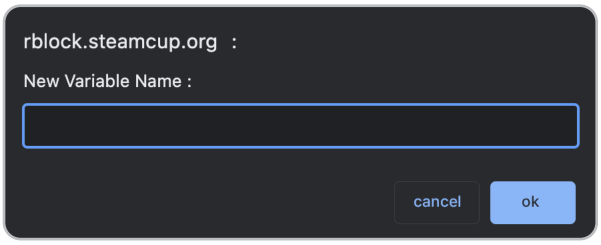
Let's create a variable in AI block.
In the variable category, click ‘Create variable’ to name the variable.



Control
Calculation
Variable
Function
Robot
Sensing



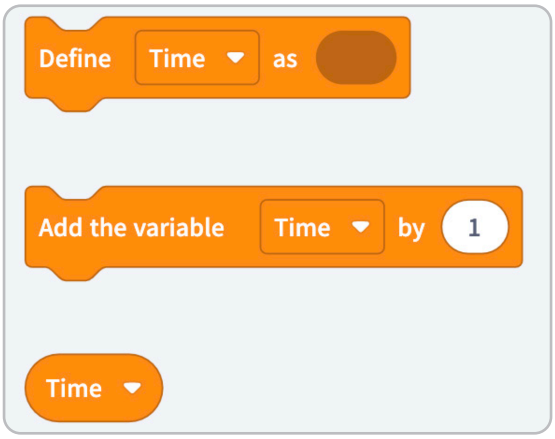
Create Variable



rblock.steamcup.org :

New Variable Name :

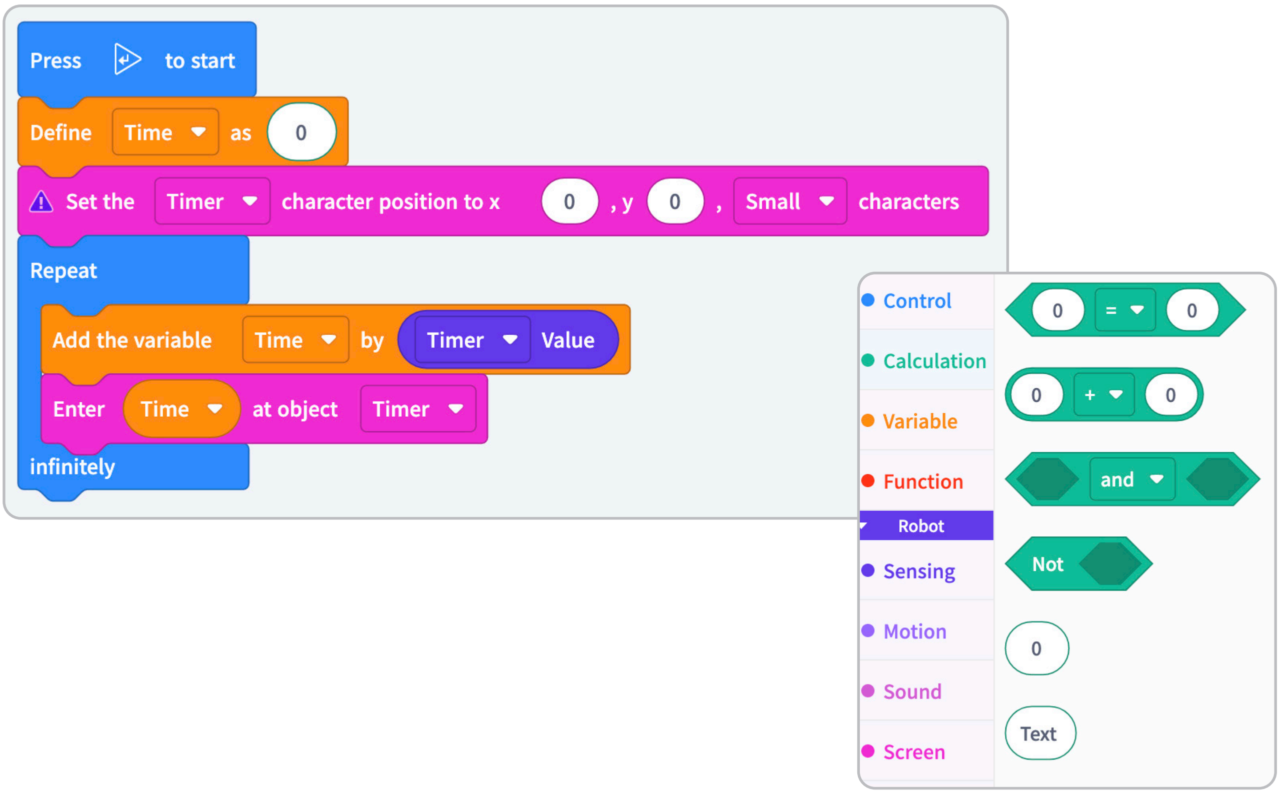
When a variable is created, the blocks below are added.



Define
Time
as
Add the variable
Time
by
1
Time

2 Time Display

Let's display the time on the screen using a text object.

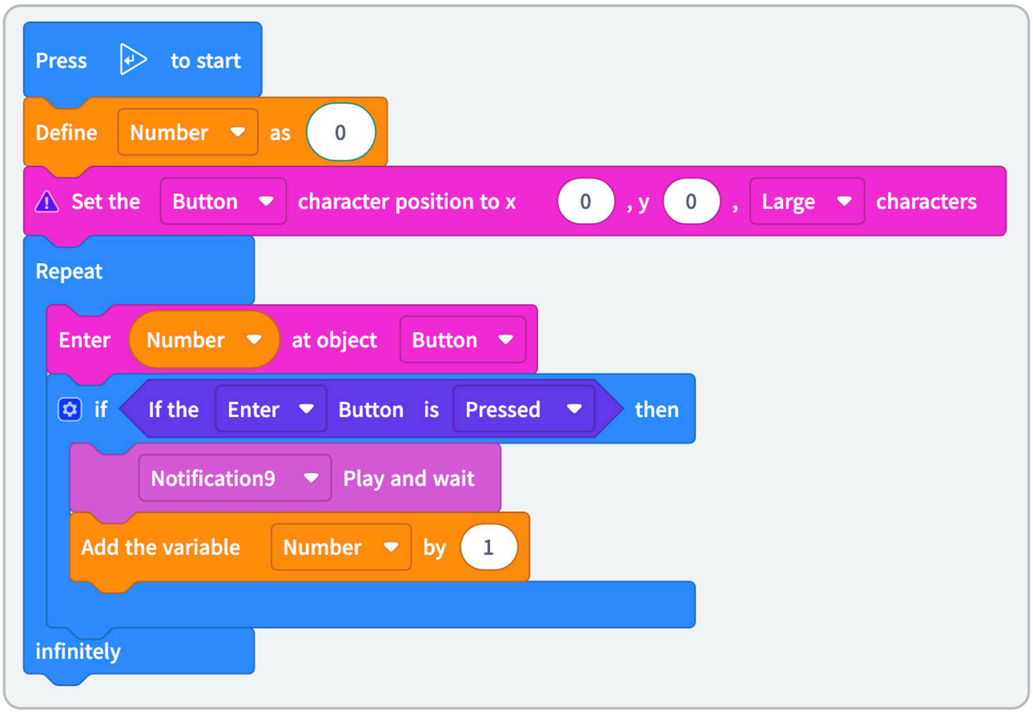


```
Press ▷ to start
Define Time ▾ as 0
⚠ Set the Timer ▾ character position to x 0 , y 0 , Small ▾ characters
Repeat
    Add the variable Time ▾ by Timer ▾ Value
    Enter Time ▾ at object Timer ▾
infinitely
```

Control
Calculation
Variable
Function
Robot
Sensing
Motion
Sound
Screen
0 = 0
0 + 0
and
Not
0
Text

3 Number Increase

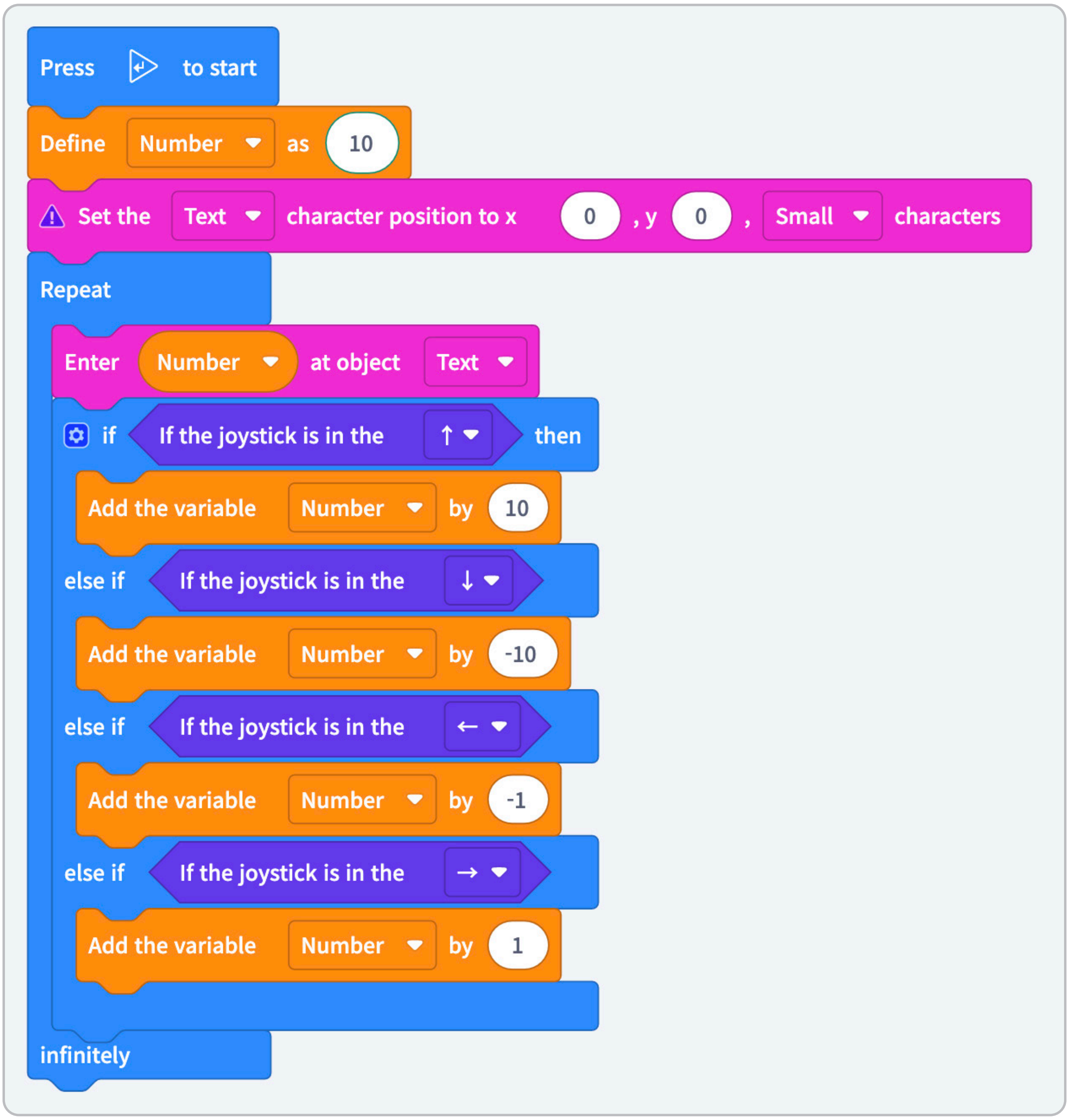
Let's code the number to increase by 1 each time the Run button is clicked.



```
Press ▷ to start
Define Number ▾ as 0
⚠ Set the Button ▾ character position to x 0 , y 0 , Large ▾ characters
Repeat
    Enter Number ▾ at object Button ▾
    if If the Enter ▾ Button is Pressed ▾ then
        Notification9 ▾ Play and wait
        Add the variable Number ▾ by 1
infinitely
```

4 Number Increase · Decrease with Joystick

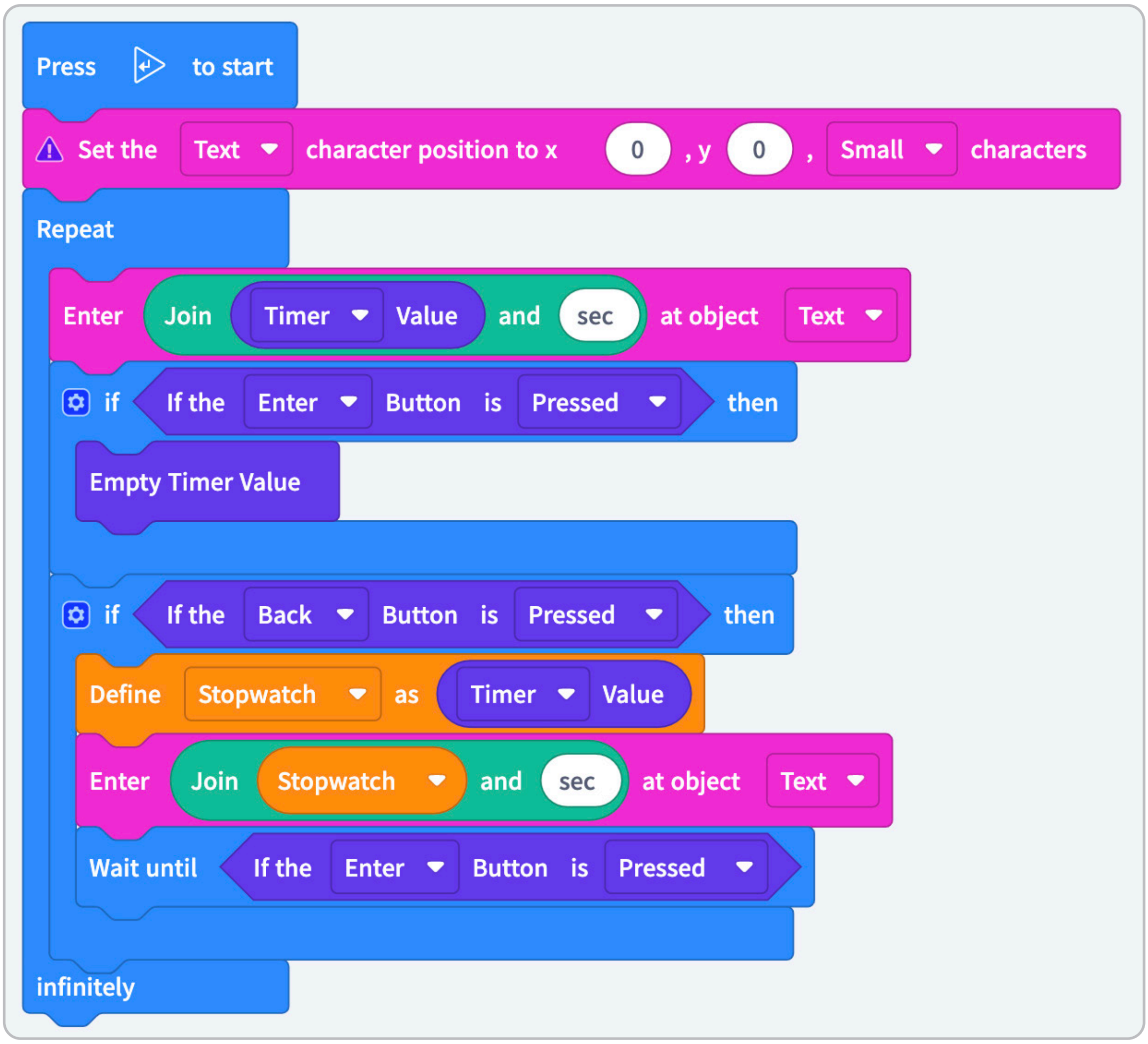
This program changes the numbers displayed on the screen according to the direction of the joystick.



```
Press ▷ to start
Define Number ▾ as 10
⚠ Set the Text ▾ character position to x 0 , y 0 , Small ▾ characters
Repeat
    Enter Number ▾ at object Text ▾
    if If the joystick is in the ↑ ▾ then
        Add the variable Number ▾ by 10
    else if If the joystick is in the ↓ ▾
        Add the variable Number ▾ by -10
    else if If the joystick is in the ← ▾
        Add the variable Number ▾ by -1
    else if If the joystick is in the → ▾
        Add the variable Number ▾ by 1
infinitely
```

5 Stopwatch

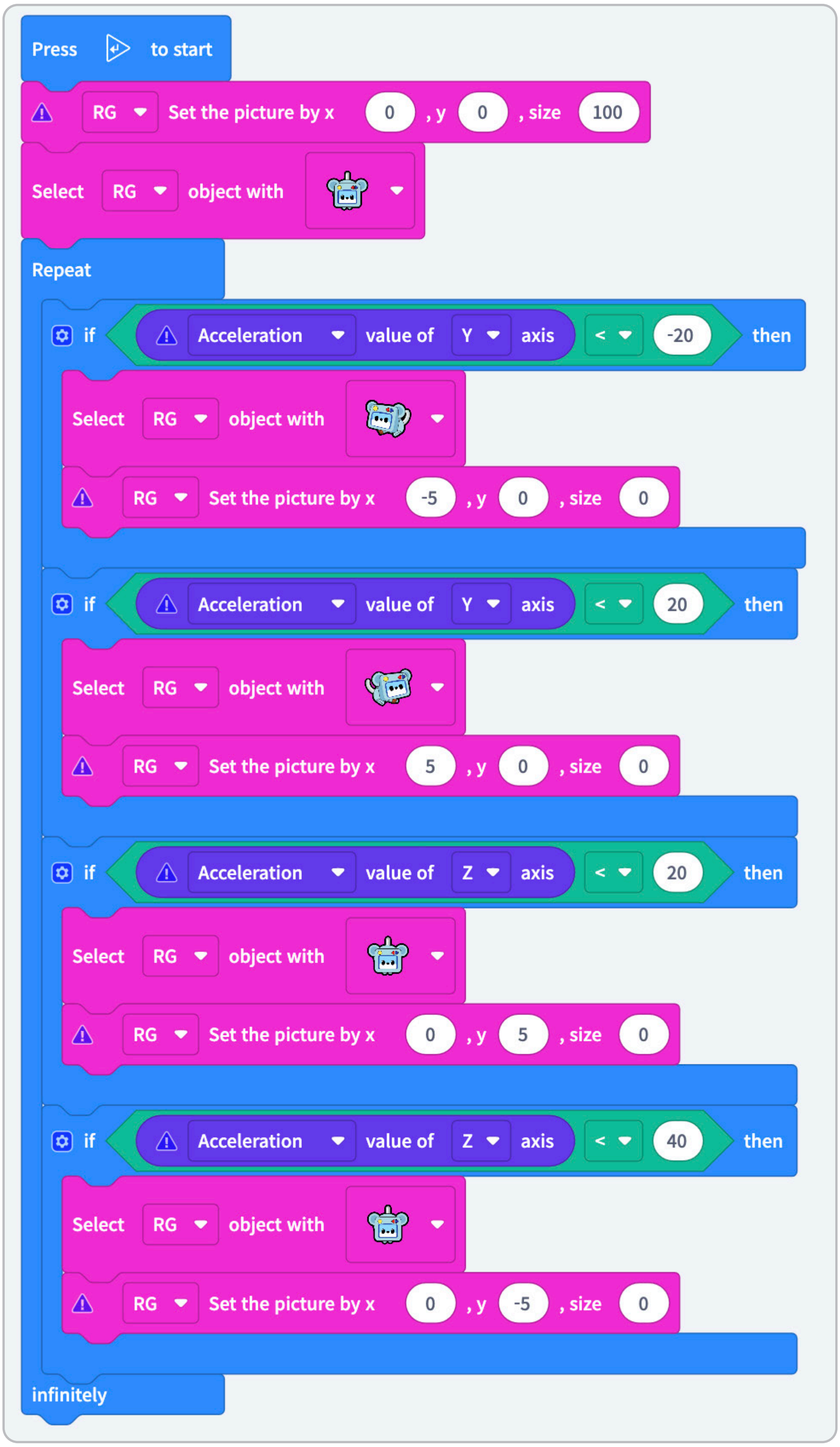
This is a stopwatch program. ‘Start’ with the Run button and ‘Stop’ with the Cancel button.



```
Press ▷ to start
Set the Text ▾ character position to x 0 , y 0 , Small ▾ characters
Repeat
  Enter Join Timer ▾ Value and sec at object Text ▾
  if If the Enter ▾ Button is Pressed ▾ then
    Empty Timer Value
  if If the Back ▾ Button is Pressed ▾ then
    Define Stopwatch ▾ as Timer ▾ Value
    Enter Join Stopwatch ▾ and sec at object Text ▾
    Wait until If the Enter ▾ Button is Pressed ▾
infinitely
```

6 Maneuver R-GEE with Tilt

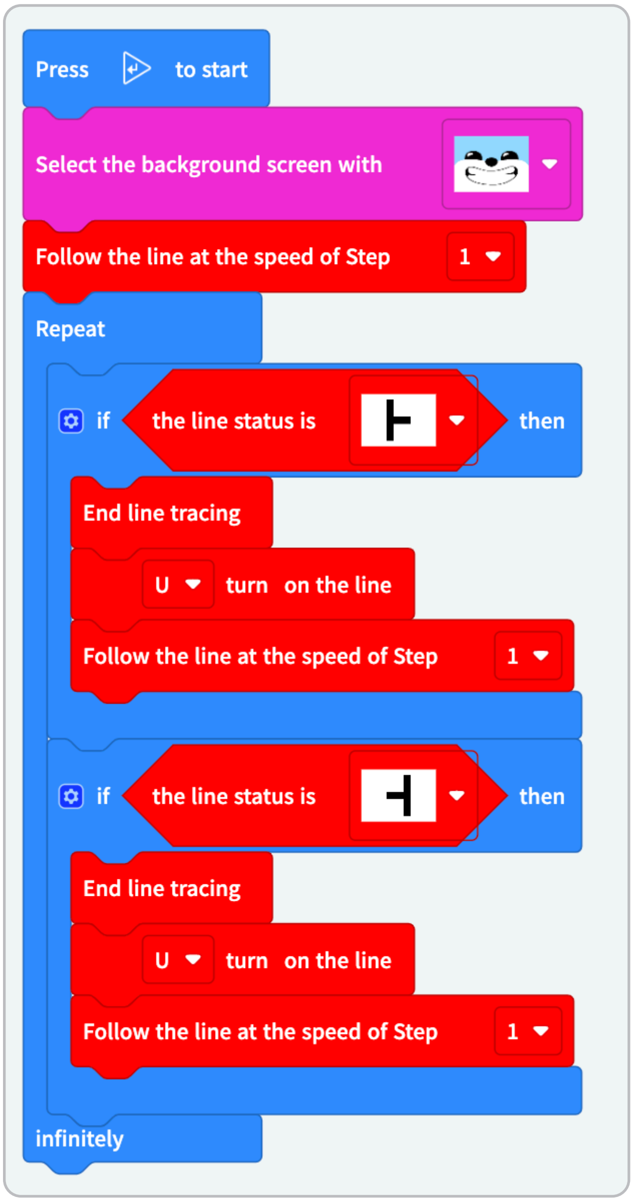
This is a program that moves the R-GEE on the screen when the R-GEE is tilted.



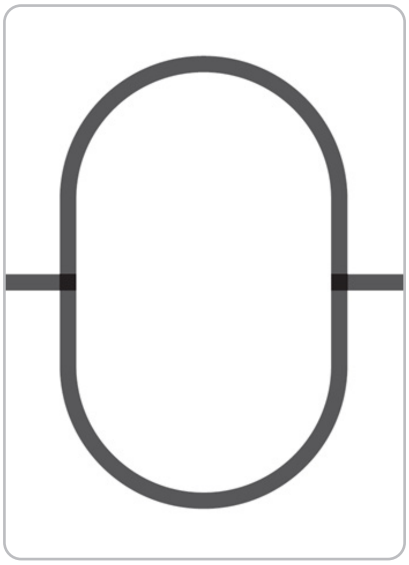
```
Press ▷ to start
⚠ RG ▾ Set the picture by x 0 , y 0 , size 100
Select RG ▾ object with ▾
Repeat
    if ⚠ Acceleration ▾ value of Y ▾ axis < ▾ -20 then
        Select RG ▾ object with ▾
        ⚠ RG ▾ Set the picture by x -5 , y 0 , size 0
    if ⚠ Acceleration ▾ value of Y ▾ axis < ▾ 20 then
        Select RG ▾ object with ▾
        ⚠ RG ▾ Set the picture by x 5 , y 0 , size 0
    if ⚠ Acceleration ▾ value of Z ▾ axis < ▾ 20 then
        Select RG ▾ object with ▾
        ⚠ RG ▾ Set the picture by x 0 , y 5 , size 0
    if ⚠ Acceleration ▾ value of Z ▾ axis < ▾ 40 then
        Select RG ▾ object with ▾
        ⚠ RG ▾ Set the picture by x 0 , y -5 , size 0
infinitely
```

7 Line Tracing

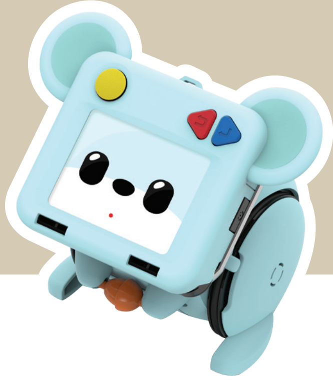
After placing the R-GEE on the map included in the product, write the code as shown below and download/execute the R-GEE to move along the line.



```
Press ▷ to start
Select the background screen with
Follow the line at the speed of Step 1
Repeat
    if the line status is ├ then
        End line tracing
        U turn on the line
        Follow the line at the speed of Step 1
    if the line status is ┤ then
        End line tracing
        U turn on the line
        Follow the line at the speed of Step 1
infinitely
```



Let's raise R-GEE !

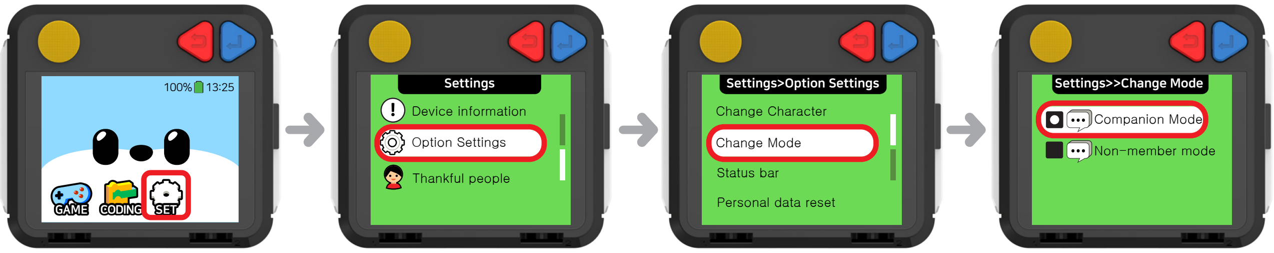


After switching R-GEE to companion mode and registering in the STEAMCUP APP, you can grow R-GEE into a companion robot.

⚠ When in companion mode, R-GEE must be raised from [Baby] to [Child] so that he can perform various reactions and movements using the body.

Switch to Companion Mode

On the screen, select 'Settings> Option Settings> Change Mode > Return Mode' and press the cancel button (◀) to exit the menu.


100% 13:25
GAME
CODING
SET
Settings
Device information
Option Settings
Thankful people
Settings>Option Settings
Change Character
Change Mode
Status bar
Personal data reset
Settings>>Change Mode
Companion Mode
Non-member mode

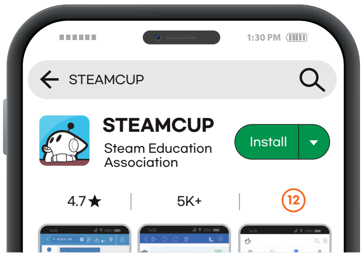
Install STEAMCUP APP and Connecting the Robot

⚠ After installing STEAMCUP APP, please sign up and log in according to the instructions.

Install APP

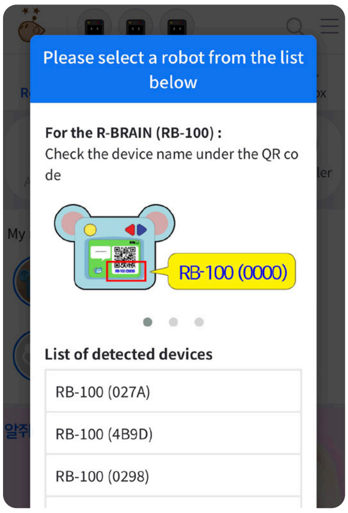
STEAMCUP
Steam Education Association

GET IT ON Google Play
App Store


1:30 PM
STEAMCUP
STEAMCUP
Steam Education Association
Install
4.7★
5K+
12

APP Installation QR code

Connect Robot



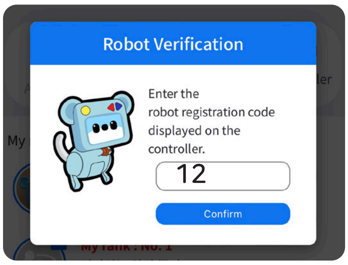
Please select a robot from the list below

For the R-BRAIN (RB-100) :
Check the device name under the QR code

List of detected devices

RB-100 (027A)
RB-100 (4B9D)
RB-100 (0298)

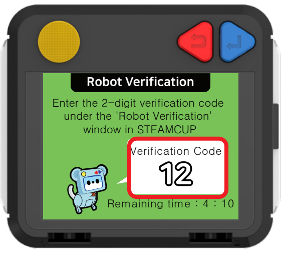
Enter Verification Code



Robot Verification

Enter the robot registration code displayed on the controller.

12



Robot Verification

Enter the 2-digit verification code under the 'Robot Verification' window in STEAMCUP

Verification Code
12
Remaining time : 4 : 10

R-GEE Circle

STEAMCUP has a circle that helps R-GEE grow. For details, please check QR codes below.

R-GEE Brain Hints

R-GEE Growth Mission Hints

R-GEE Coding

R-GEE Coding Resource Room