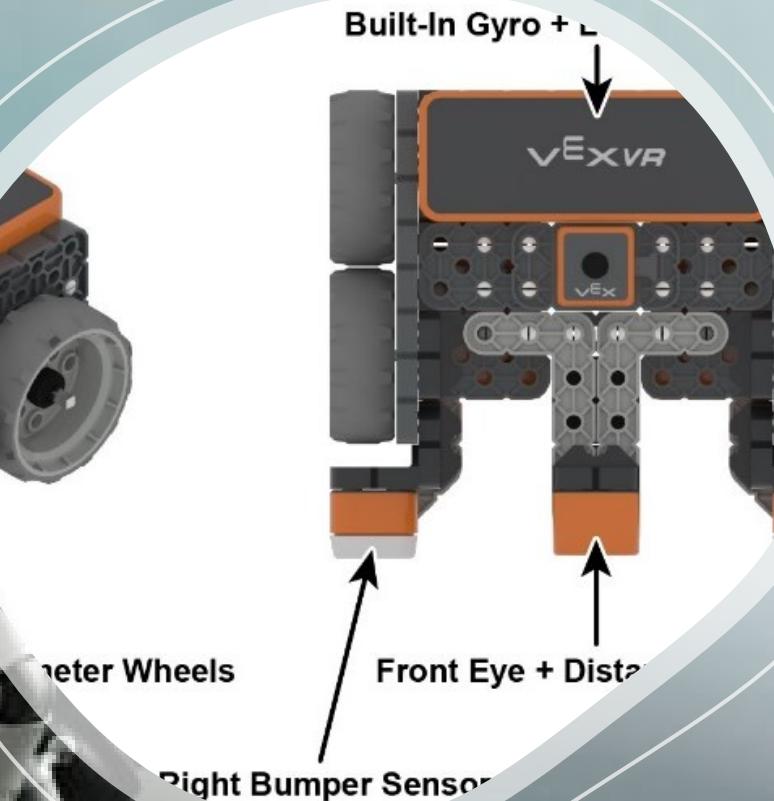


WORKSHOP PEMROGRAMAN VISUAL MENGGUNAKAN VR VEX

SMA SANTA ANGELA
KELAS X DAN XI
9-10 AGUSTUS 2023





Terjadi Perubahan Tren Pekerjaan Dalam 5 Tahun ke Depan

WORLD
ECONOMIC
FORUM

Future of Jobs
Report 2023

Proyeksi Jumlah Pekerjaan 5 Tahun ke Depan



69 Juta
Pertumbuhan
Lapangan Kerja



83 Juta
Hilangnya
Lapangan Kerja



2023/8/2 10:08

The Future is Now



2023/8/2 10:06

**BULKLINE-BUNNAGE
PAKKEPAPER**

Dan kita harus bersiap dengan trend pertumbuhan ekonomi saat ini dan mempersiapkan **bisnis yang berkelanjutan**

Sektor Industri yang berpotensi berkembang



Kesehatan



Industri Kreatif



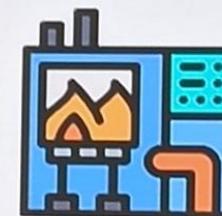
Makanan dan Minuman



Digital



Finansial



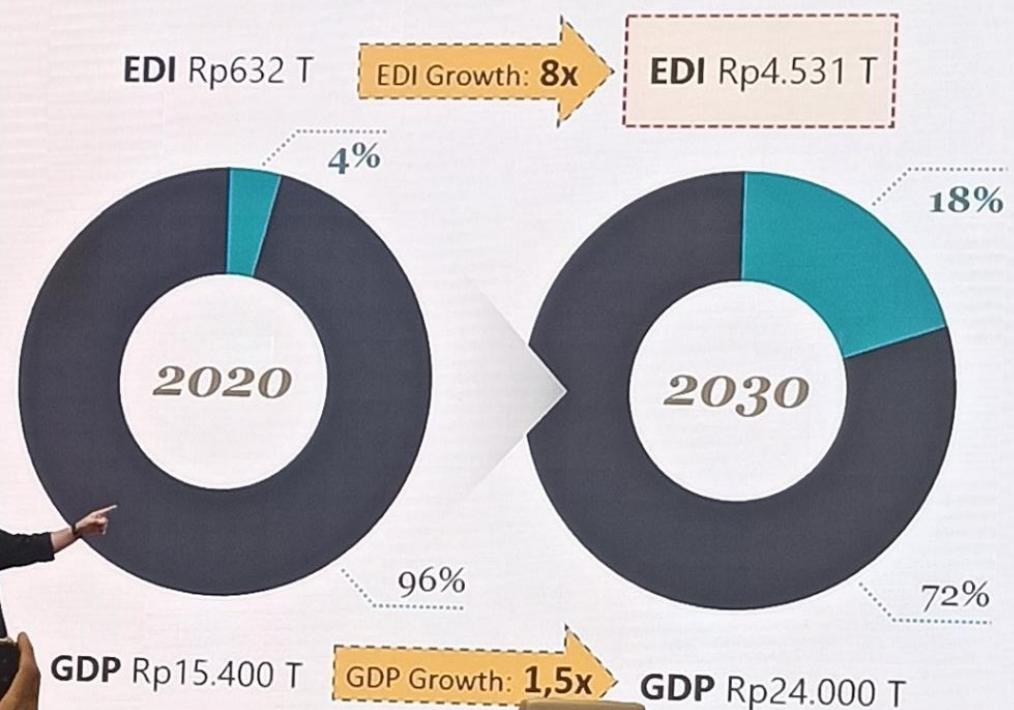
Industrialisasi
Sumber Daya Alam



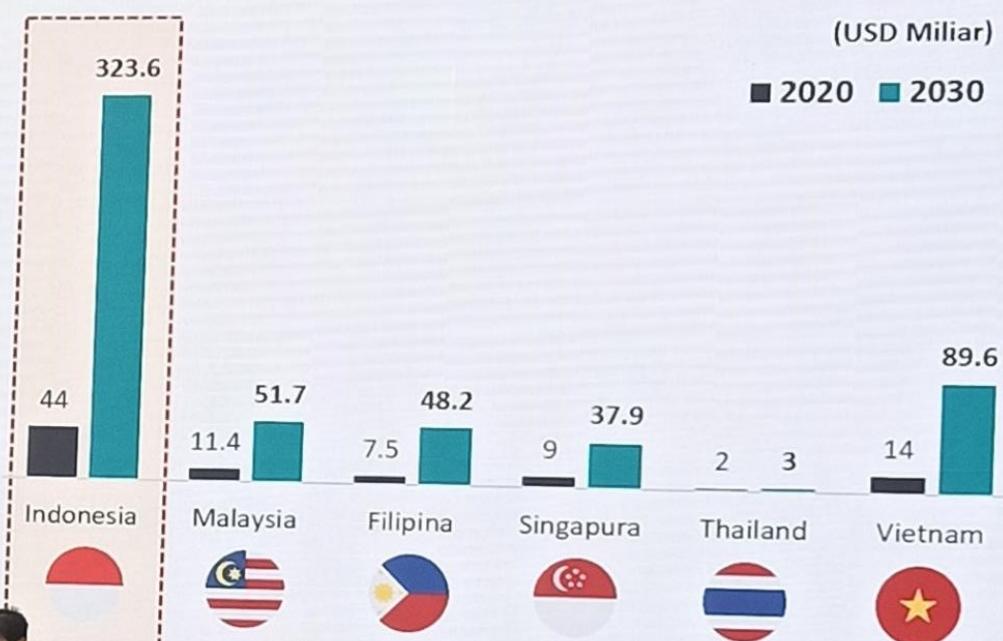
Kita perlu memanfaatkan Potensi Ekonomi Digital Indonesia yang sangat besar

Kontribusi Ekonomi Digital Indonesia (EDI) diproyeksikan menjadi Rp4.531 di Tahun 2030

Pertumbuhan Ekonomi Digital Indonesia



Pertumbuhan Ekonomi Digital Indonesia¹ paling besar dibandingkan negara ASEAN lainnya



1. Sumber: Proyeksi dari Gross Merchandise Value (GMV); 2) Perhitungan BPPP, Bain Analysis, Alphabeta (2020); IMF WEO (2021), Perhitungan BPPP (2021)

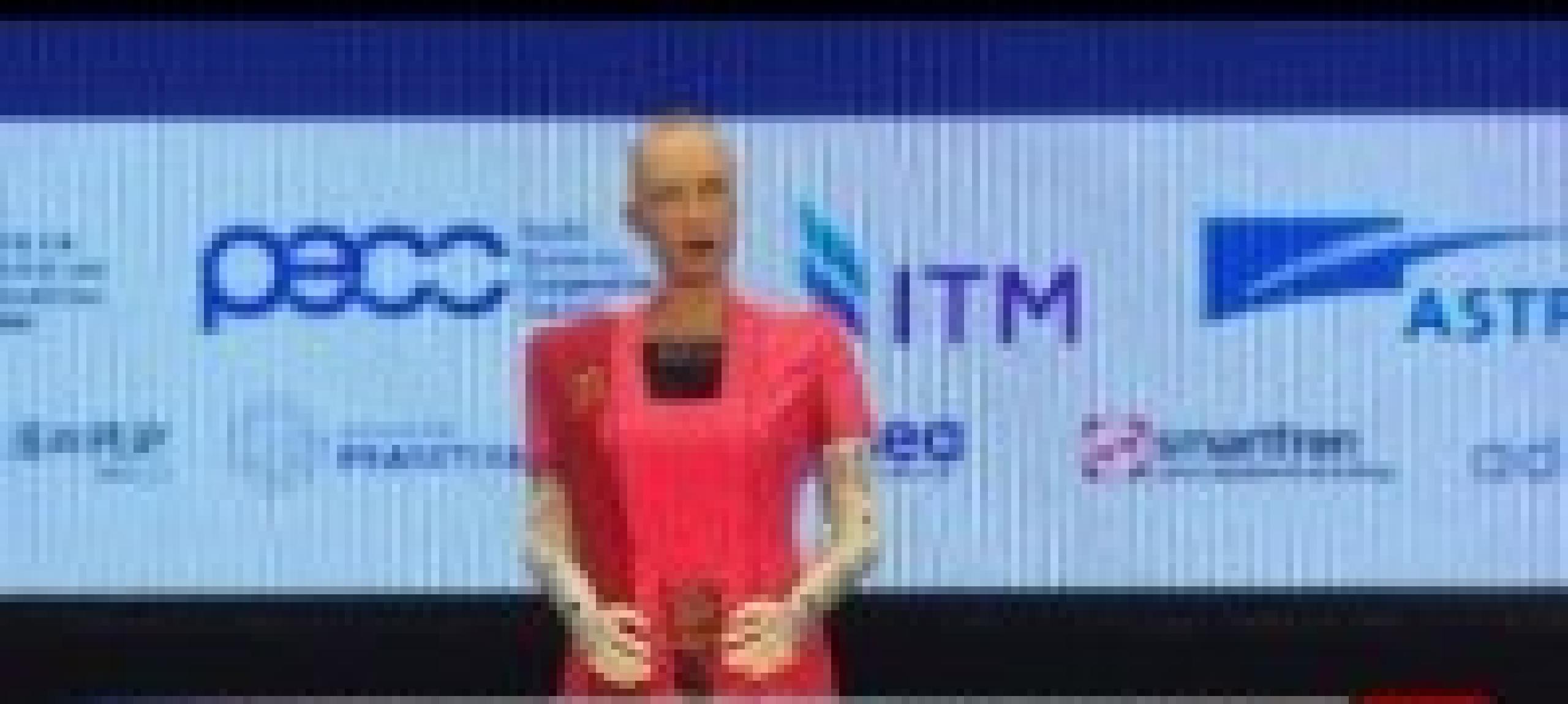
Apa itu Robot?

- Kata robot berdasarkan Kamus Besar Bahasa Indonesia (KBBI) dapat berarti alat berupa orang-orangan dan sebagainya yang dapat bergerak (berbuat seperti manusia) yang dikendalikan oleh mesin.
- Kenyataan robot banyak jenisnya, tidak harus menyerupai orang.

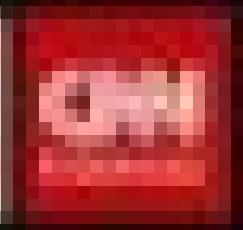
Robot Menyerupai Manusia (Humanoid)



- Robot yang memiliki kemampuan menyerupai manusia dan mampu melakukan interaksi dengan peralatan maupun lingkungan yang dibuat untuk manusia.



KUNJUNGAN ROBOT SOPHIA KE INDONESIA



Robot Tangan (Manipulator)

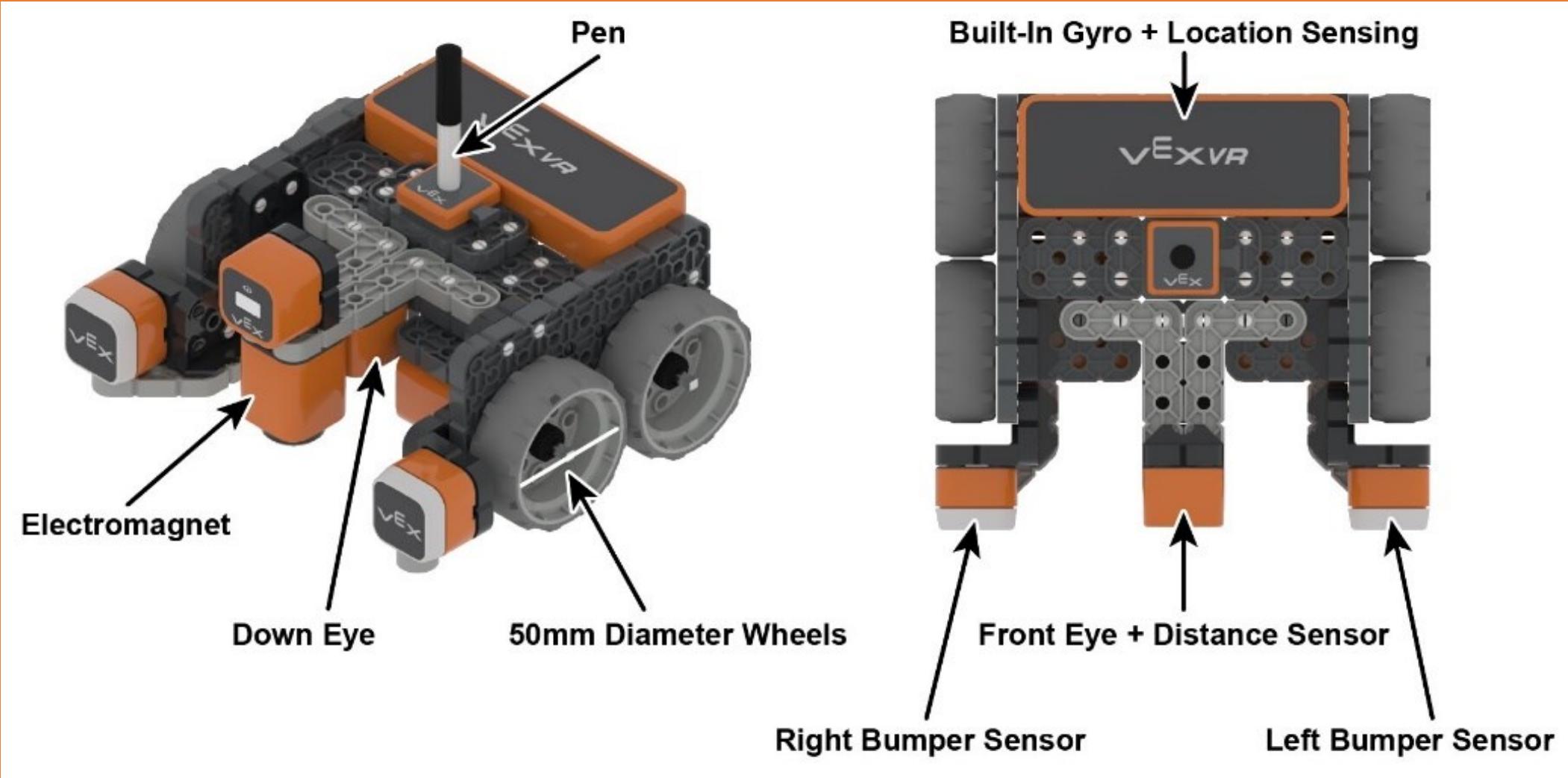


- Robot ini hanya berupa tangan seperti tangan manusia yang fungsinya untuk memegang atau memindahkan barang, contohnya robot las di industri mobil dan robot merakit elektronik.

Robot Bergerak (Mobile)

- Ciri khasnya adalah mempunyai aktuator berupa roda untuk menggerakan keseluruhan badan robot tersebut sehingga robot dalam melakukan perpindahan posisi dari satu titik ke titik yang lain.







Bagaimana memprogram Robot?

VR.VEX.Com.

The image shows a screenshot of the VEXcode VR Enhanced software interface. On the left, there's a sidebar with categories like Drivetrain, Magnet, Looks, Events, Control, Sensing, Operators, Variables, My Blocks, and Comments. The main workspace shows a drivetrain robot on a green field with a castle in the background. A central modal window displays the following information:

Expert professional development for classroom robotics.
Register Today! conference.vex.com

Explore the benefits of VEXcode VR Enhanced

- Python language support with Blocks to Python conversion features.
- Access to more advanced playgrounds with customizable environments for extended learning opportunities.
- Create VR Class Codes to manage student submissions. VR Class Codes allow students to quickly send their projects to you via Dropbox or Google Drive.

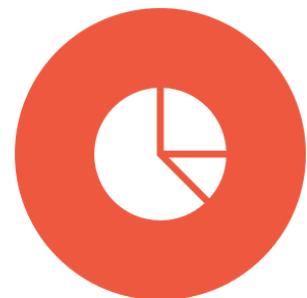
New Playgrounds, Python Coding, and Improved Project Sharing
\$199 / Year Per Educator
Free until Fall 2023

[Learn About Enhanced](#) [Continue to Free](#)

Have a VR Class Code? [Login Here >](#)

LOGIKA PERMROGRAMAN ROBOTIKA

TIGA JENIS BENTUK ALGORITMA



SEQUENCE



SELECTION
(CONDITION)

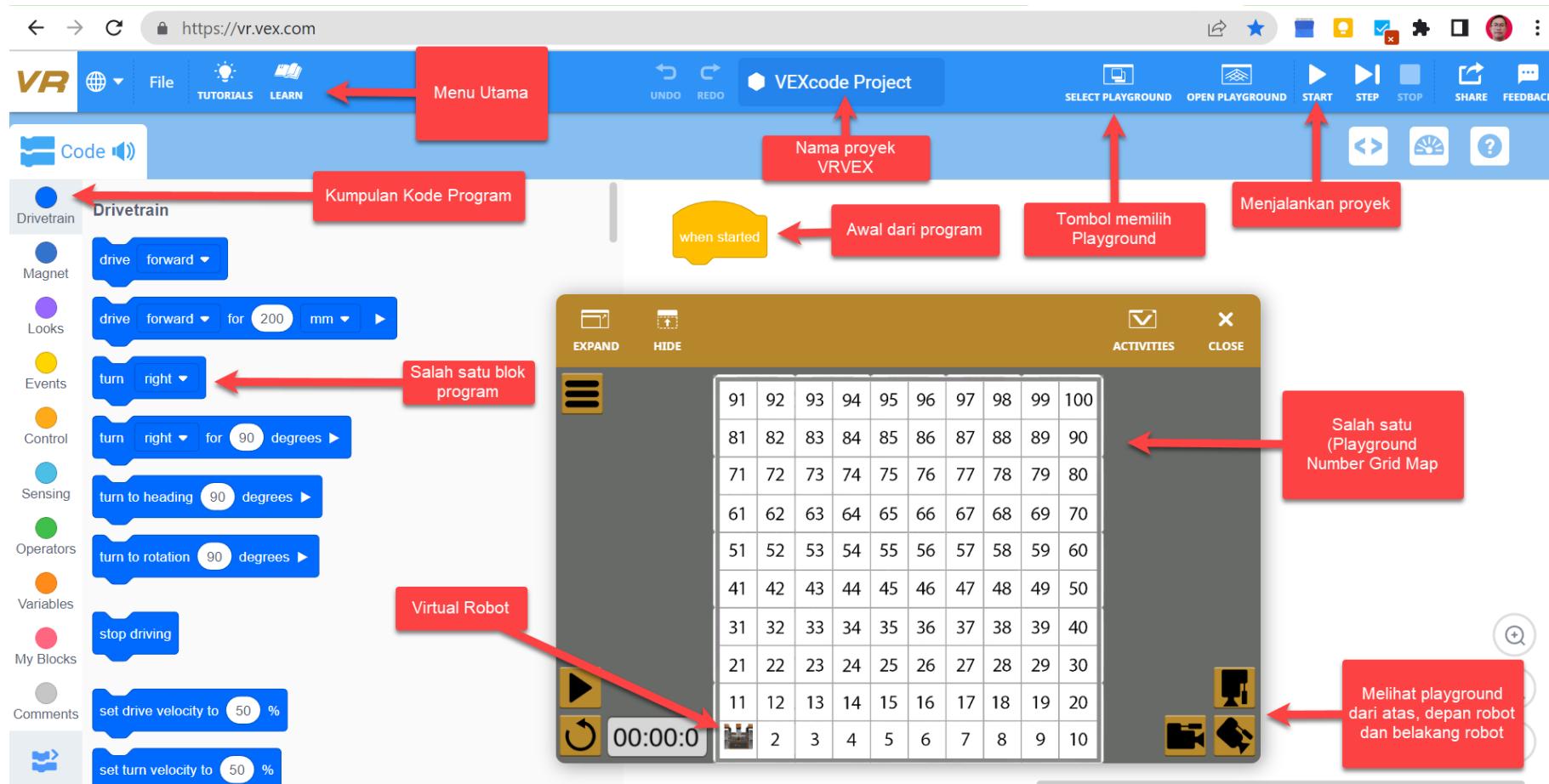


LOOPING

1. Algoritma Sequence

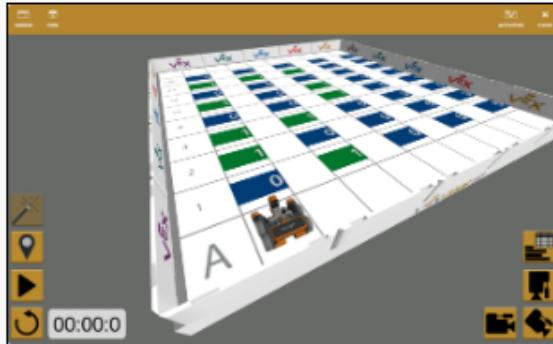


Tataletak fungsi-fungsi pada VRVex (Zakaria, 2023)

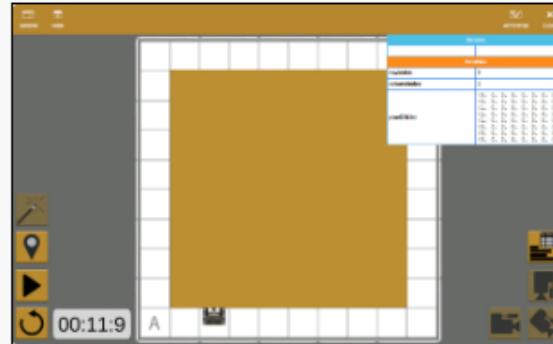


MEMILIH PLAYGROUND

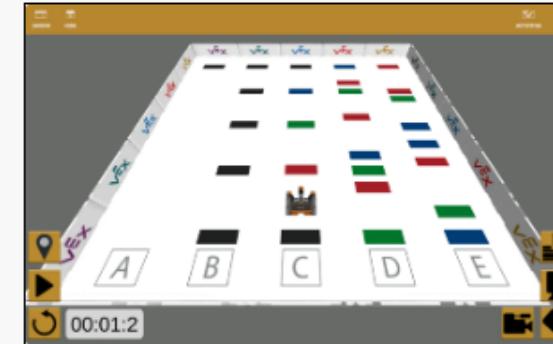
Encoded Message



Hidden Pixel Art



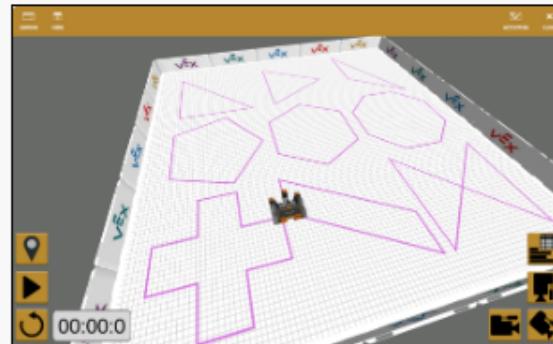
Line Detector



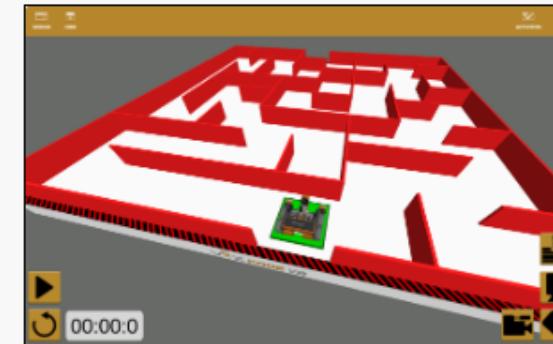
Number Grid Map



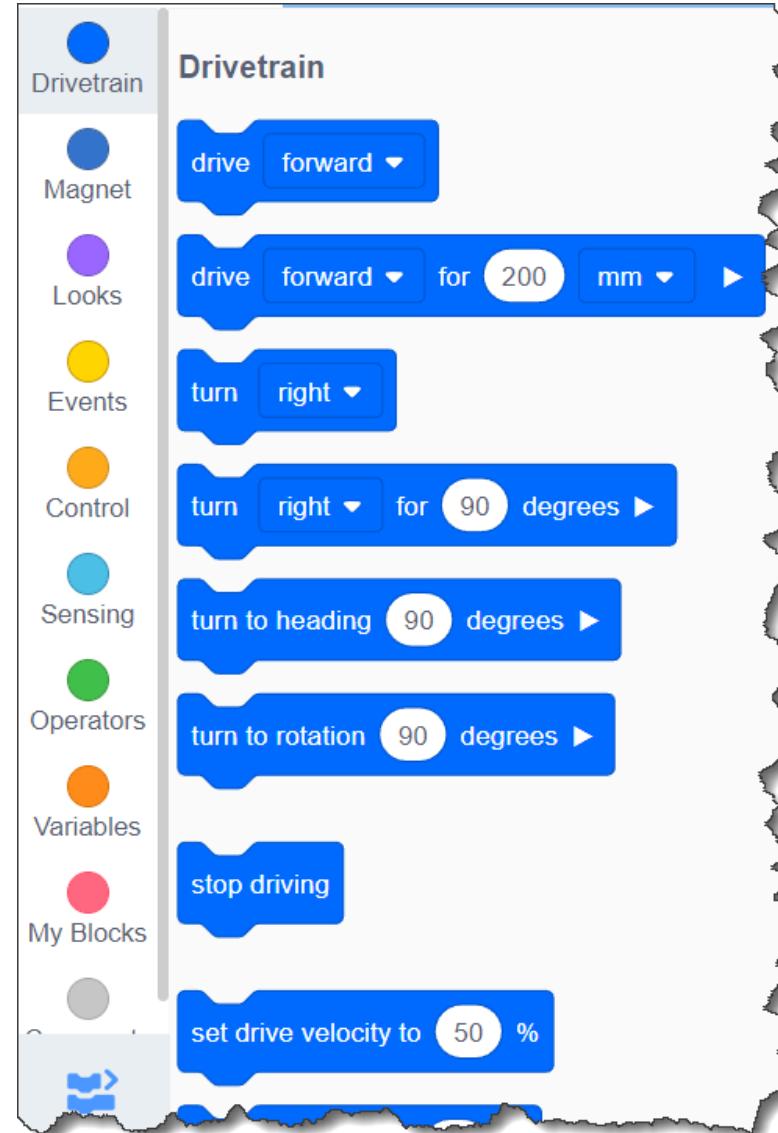
Shape Tracer



Dynamic Wall Maze



Menggerakkan Maju-Mundur, Belok Kiri- Kanan, Berhenti



when started

set drive velocity to 100 %

drive forward ▾ for 600 mm ▶

turn right ▾ for 90 degrees ▶

drive forward ▾ for 600 mm ▶

turn right ▾ for 90 degrees ▶

drive forward ▾ for 600 mm ▶

turn right ▾ for 90 degrees ▶

stop driving

EXPAND HIDE

91 92 93 94 95 96 97 98

81 82 83 84 85 86 87 88

71 72 73 74 75 76 77 78

61 62 63 64 65 66 67 68

51 52 53 54 55 56 57 58

41 42 43 44 45 46 47 48

31 32 33 34 35 36 37 38

21 22 23 24 25 26 27 28

11 12 13 14 15 16 17 18

2 3 4 5 6 7 8

A.LATIHAN MEMBUAT PROGRAM ROBOT SEDERHANA

- Algoritma sebagai berikut :
 1. Mulai
 2. Maju ke depan sejauh 1800 mm
 3. Belok kanan 90 derajat
 4. Maju ke depan sejauh 1800 mm
 5. Belok kanan 90 derajat
 6. Maju ke depan sejauh 1800 mm
 7. Belok kanan 90 derajat
 8. Maju ke depan sejauh 1800 mm
 9. Belok kanan 90 derajat
 10. Berhenti
 11. Selesai

when started

drive forward for 1800 mm

turn right for 90 degrees

drive forward for 1800 mm

turn right for 90 degrees

The screenshot shows the VEXcode Project interface. On the left, there's a sidebar with categories like Drivetrain, Magnet, Looks, Events, Control, Sensing, Operators, Variables, My Blocks, Comments, and a Code tab. The main workspace contains a sequence of blocks under the "when started" event:

- drive forward for 1800 mm
- turn right for 90 degrees
- drive forward for 1800 mm
- turn right for 90 degrees
- drive forward for 1800 mm
- turn right for 90 degrees
- drive forward for 1800 mm
- turn right for 90 degrees
- stop driving

A red box highlights this sequence of blocks, and a red arrow points from it to a red box labeled "Program Lengkap". Another red arrow points from the "START" button in the top toolbar to a red box labeled "Jalankan program".

The bottom right corner shows a 3D simulation of a VEX robot on a competition field, with a timer at 00:00:0.

2. Algoritma Pengulangan (Looping)



Penggunaan [Repeat] Block

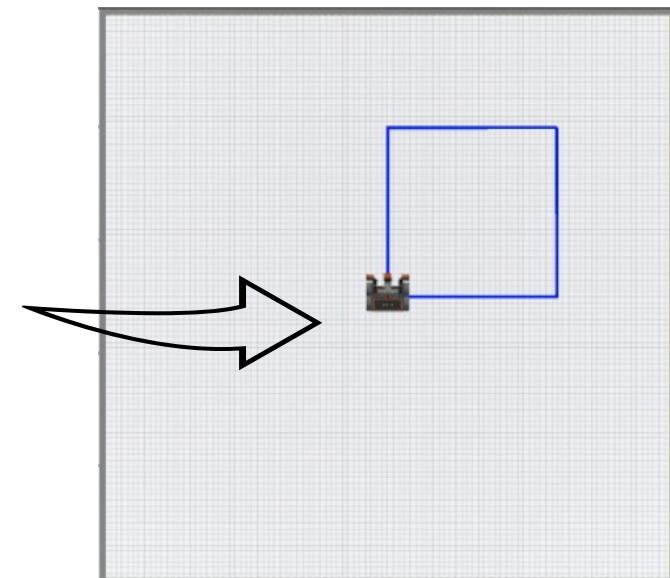
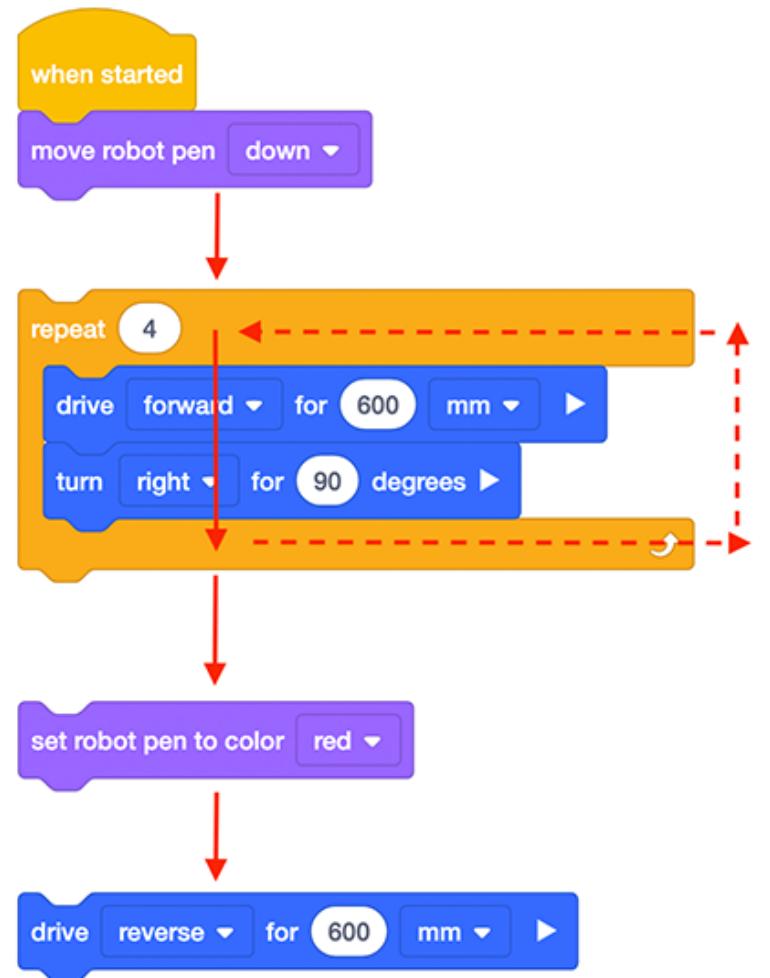
- 1 
- 2 
- 3 
- 4 



Penggunaan [Repeat] Block

The Scratch script starts with an **when started** event. It begins by moving the pen down. Then it enters a **repeat (4)** loop. Inside the loop, the robot drives forward by 600 mm and turns right by 90 degrees. After the loop completes, the pen color is set to red, and the robot drives reverse by 600 mm.

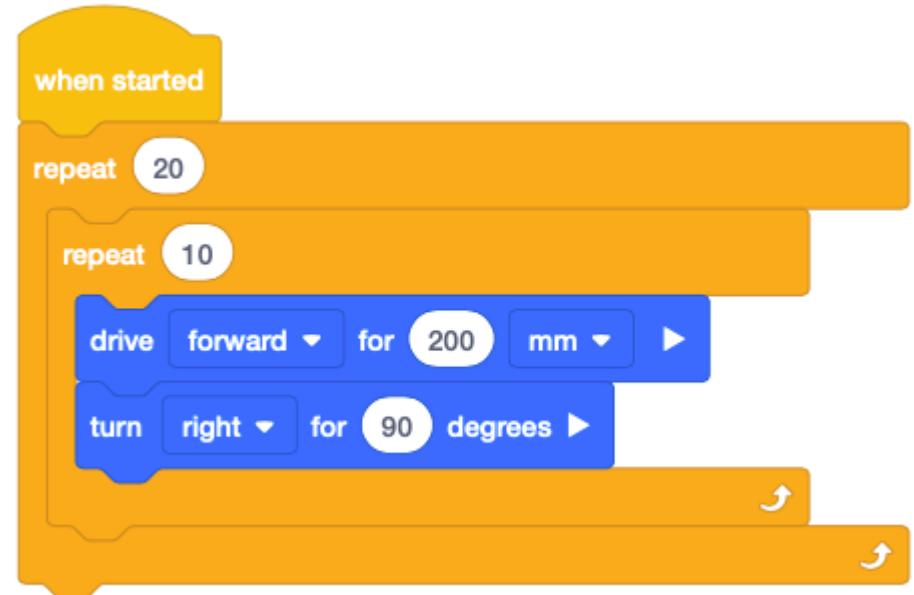
```
when started
move robot pen [down v]
repeat (4)
  drive [forward v] [for (600) [mm v]]
  turn [right v] [for (90) [degrees v]]
end
set robot pen to [red v]
drive [reverse v] [for (600) [mm v]]
```



Using Nested Loops Quiz

1. How many times will the VR Robot turn right during this project?

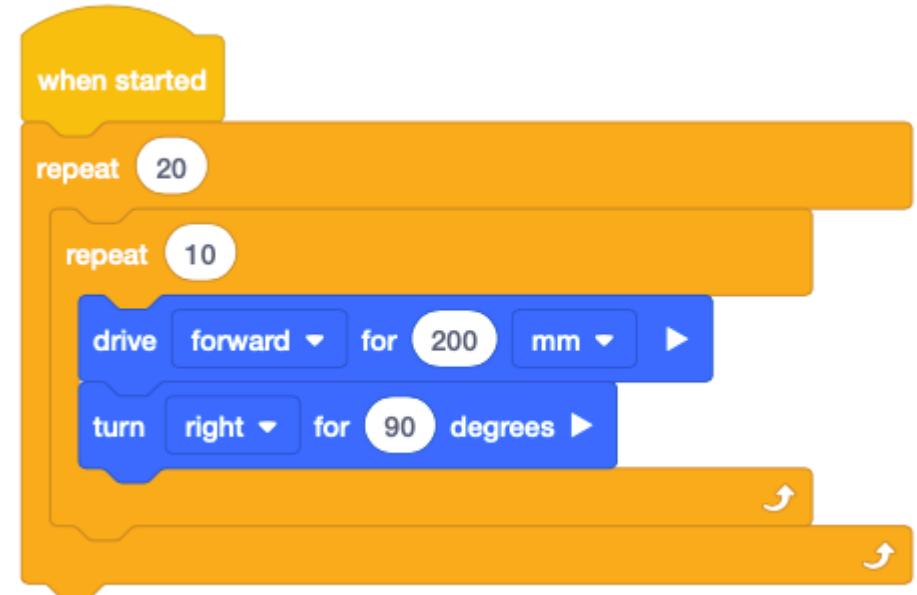
- 1. 10
- 2. 30
- 3. 100
- 4. 200



Using Nested Loops Quiz

2. What is one reason to use nested loops?

1. Creating a larger, more complex project.
2. Creating a smaller, more condensed project.
3. Repeating an action fewer times than needed.
4. To use as many blocks as possible in one project.



Pen Merah Robot siap menggambar

set print color red

move robot pen down

Nilai Variabel untuk pergerakan robot 1800

set myVariable to 1800

repeat (8)

Membuat 2 garis yang sama

repeat (2)

drive forward for myVariable mm

turn right for 90 degrees

Nilai pergerakan dikurangi 200

change myVariable by -200

stop driving

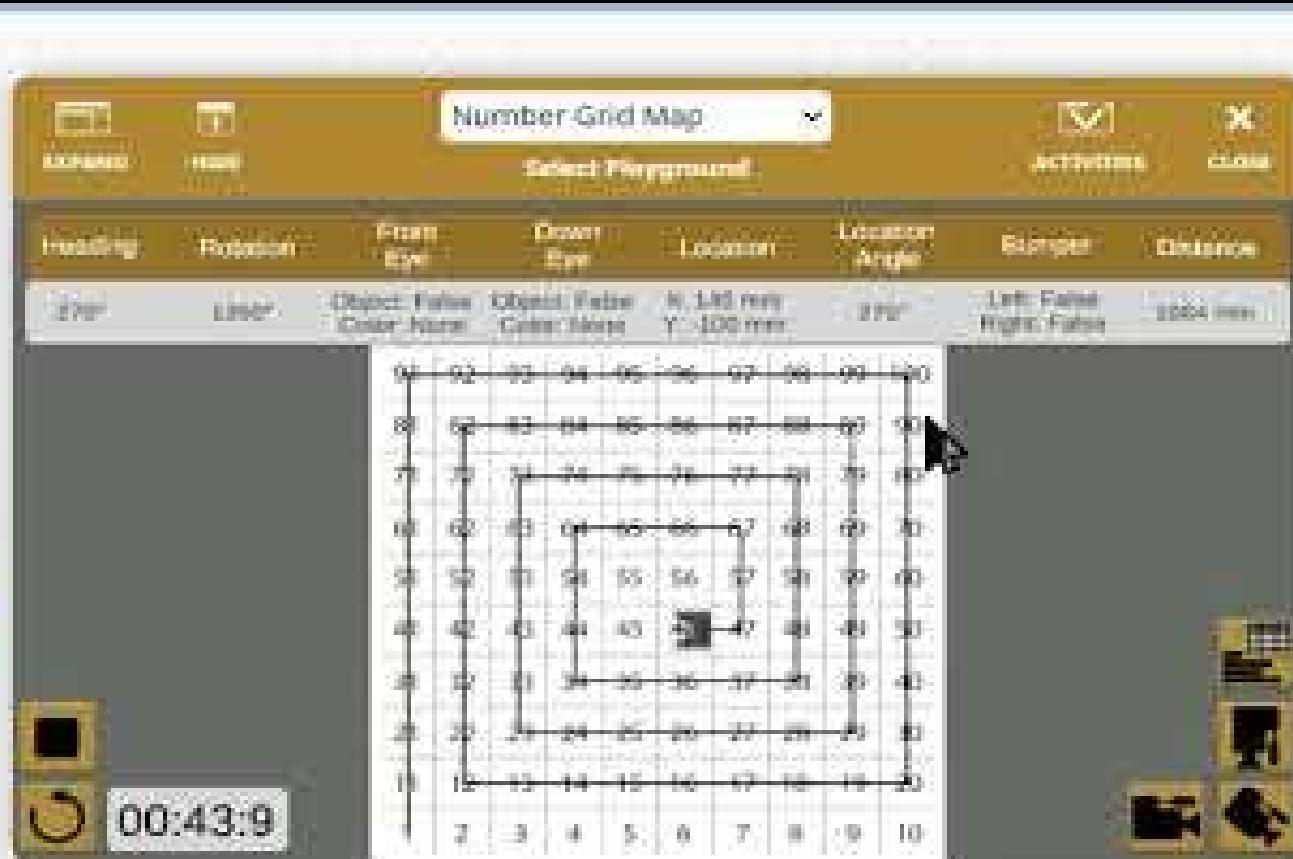
Number Grid Map

EXPAND HIDE Select Playground ACTIVITIES CLOSE

| Heading | Rotation | Front Eye | Down Eye | Location | Location Angle | Bumper | Distance |
|---------|----------|------------------------------|------------------------------|--------------------------|----------------|-----------------------------|----------|
| 0° | 1440° | Object: False Color: None | Object: False Color: None | X: -100 mm Y: -100 mm | 360° | Left: False Right: False | 1045 mm |
| | | | | | | | |

03:52:7

Kotak Spiral



```

when started
  set drive velocity to 100 %
  set turn velocity to 100 %
  drive forward ▾ for 1000 mm ▾
  set print color red ▾
  move robot pen down ▾
  set myVariable to 120
  repeat (3)
    repeat (36)
      drive forward ▾ for myVariable mm ▾
      turn right ▾ for 10 degrees ▾
    change myVariable by -30
  stop driving

```

SHRINK  HIDE 

Number Grid Map 

Select Playground

| Heading | Rotation | Front Eye | Down Eye | Location | Location Angle |
|---------|----------|------------------------------|------------------------------|-------------------------|----------------|
| 0° | 1080° | Object: False Color: None | Object: False Color: None | X: -900 mm Y: 100 mm | 0° |



3
LINGKARAN


00:44:0


| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Scratch script:

```
when green flag clicked
  set [car1 v]
  set [car2 v]
  set [car3 v]
  set [car4 v]
  set [car5 v]
  set [car6 v]
  set [car7 v]
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  set [car490 v]
  set [car491 v]
  set [car492 v]
  set [car493 v]
  set [car494 v]
  set [car495 v]
  set [car496 v]
  set [car497 v]
  set [car498 v]
  set [car499 v]
  set [car500 v]
```

Number Grid Map

| | Front Eye | Down Eye | Location | Location Angle | | | | | |
|---------|-----------|---------------|----------|----------------|----|----|----|----|-----|
| Heading | Rotation | Object | X | Y | | | | | |
| 0° | 1080° | False | -900 mm | 0° | | | | | |
| | | Color: None | 100 mm | | | | | | |
| | | Object: False | | | | | | | |
| | | Color: None | | | | | | | |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

00:44:0



Drivetrain

Magnet

Looks

Events

Control

Sensing

Operators

Variables

My Blocks

Comments



```

when started
  set drive velocity to 100 %
  set turn velocity to 100 %
  set [myVariable v] to 800
  repeat (3)
    drive [forward v] for [myVariable] [mm]
    energize [Magnet v] to [boost]
    drive [reverse v] for [myVariable] [mm]
    energize [Magnet v] to [drop]
    change [myVariable v] by 400
  end
  
```

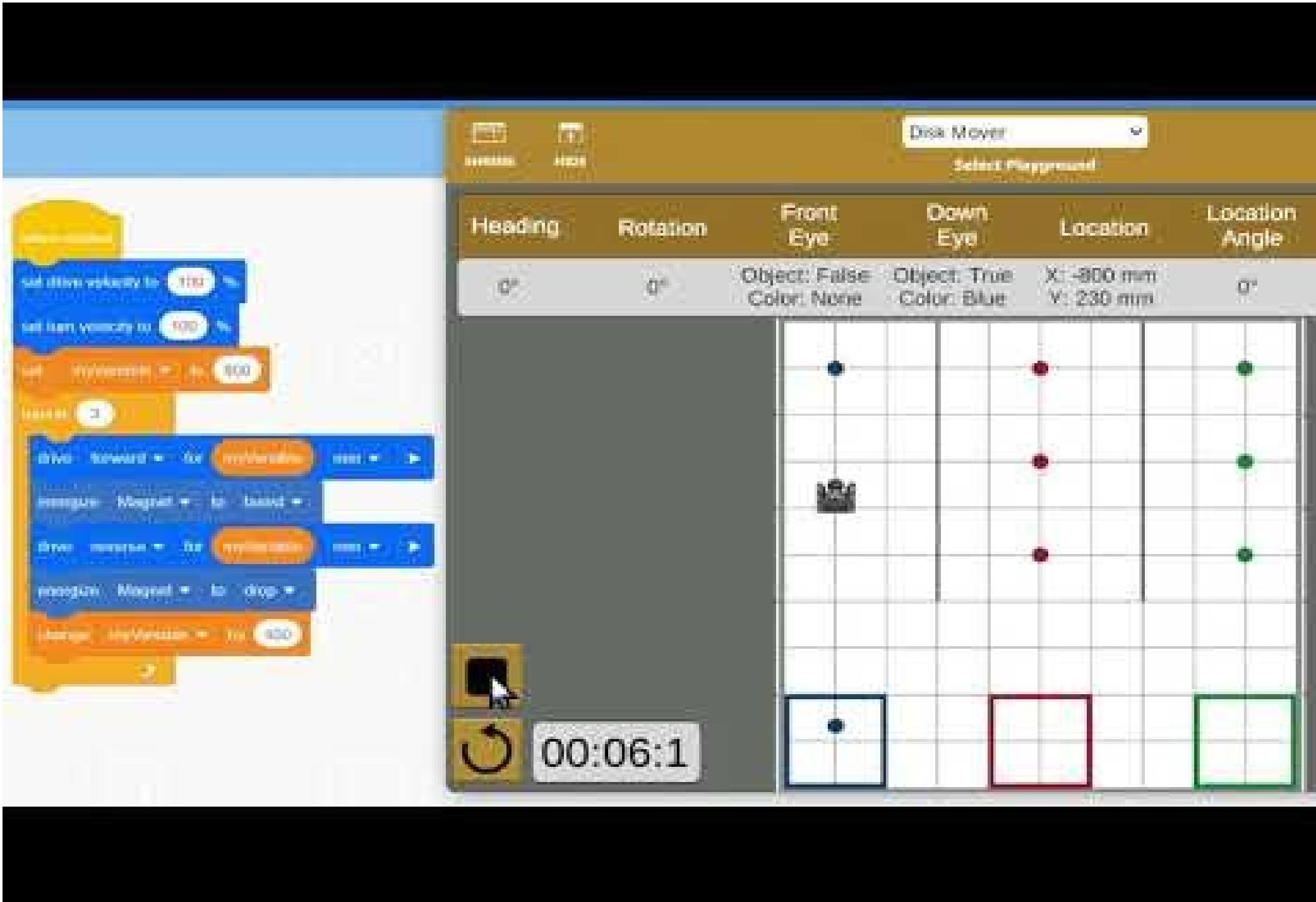
Disk Mover

Select Playground

| Heading | Rotation | Front Eye | Down Eye | Location | Location Angle |
|---------|----------|------------------------------|-----------------------------|--------------------------|----------------|
| 0° | 0° | Object: False Color: None | Object: True Color: Blue | X: -800 mm Y: -800 mm | 360° |

DISK MOVER

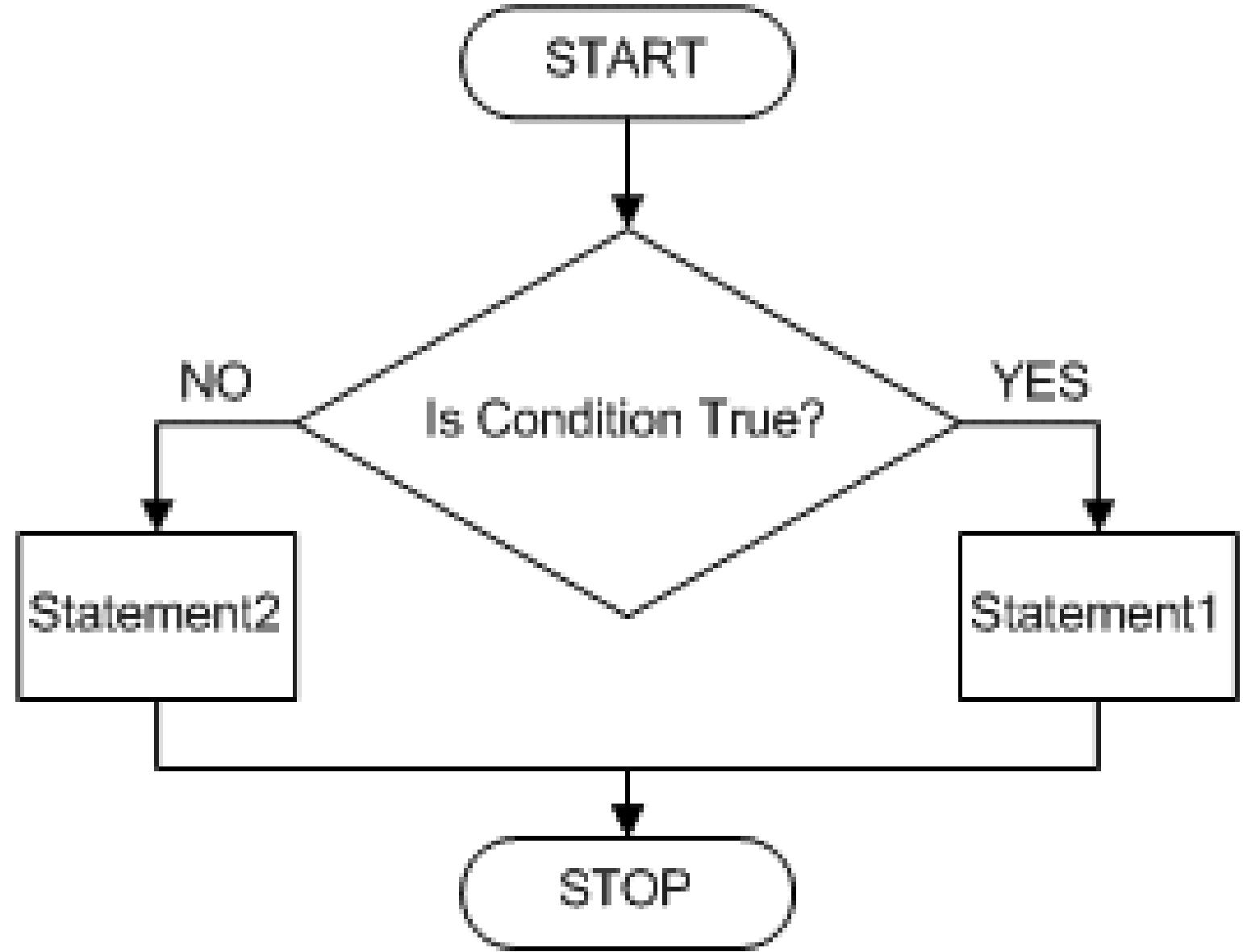
01:07:1



2. Algoritma Pencabangan (Condition)

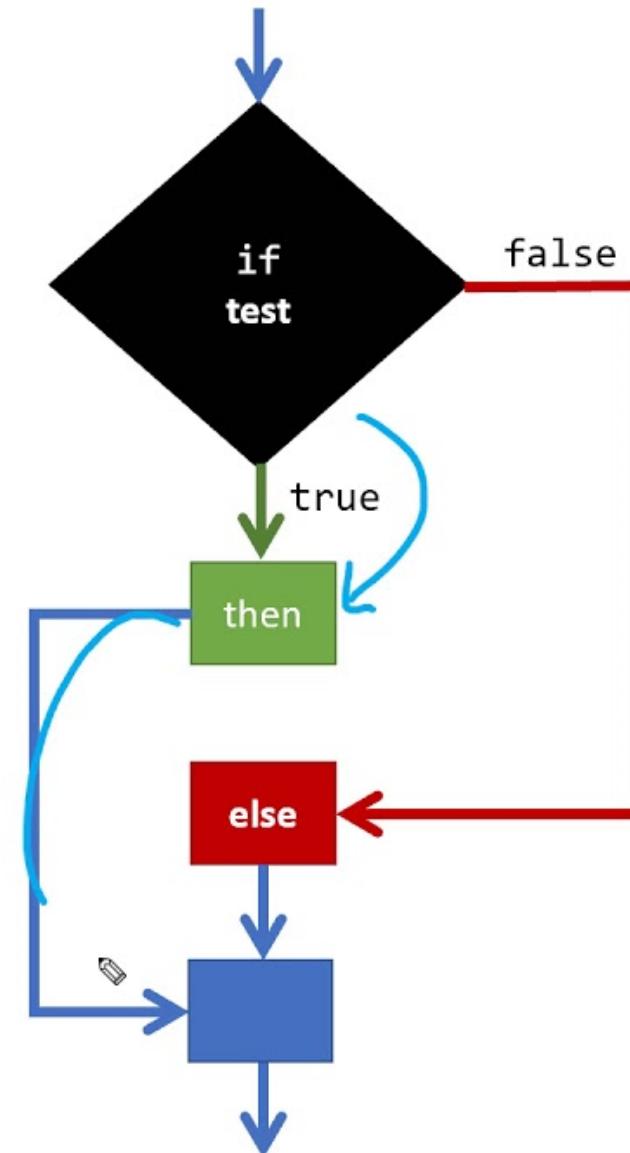


Struktur IF- THEN-ELSE

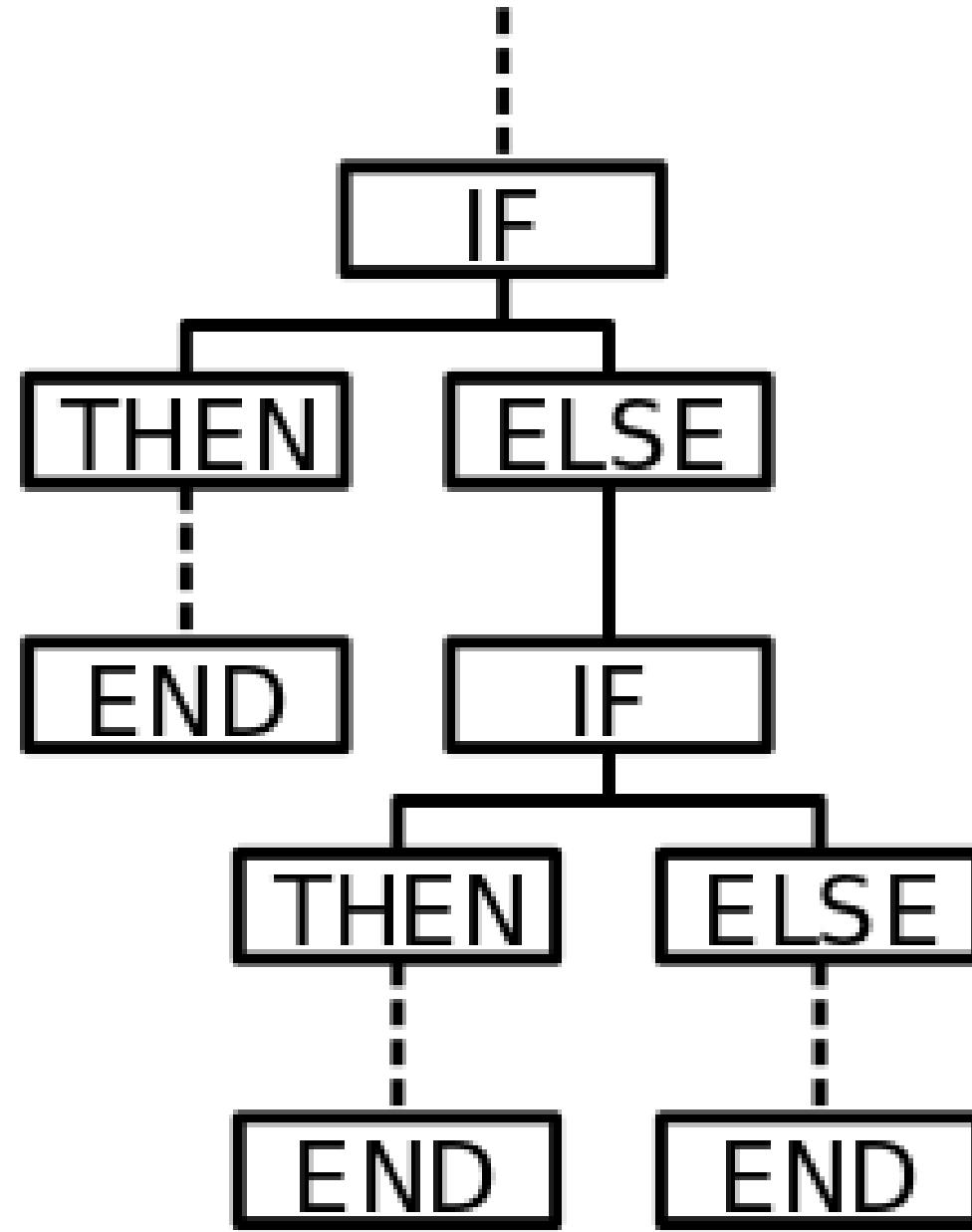


if-then-else Statements

- Notice, like the if-then statement, the then block runs **only** when the test condition is **true**
- Unlike the if-then statement, the else block runs **only** when the test condition is **false**
- After *either* the then-block or else-block complete, they both continue to the same next step



Struktur IF-
THEN-ELSE
(dengan 3
kemungkinan)

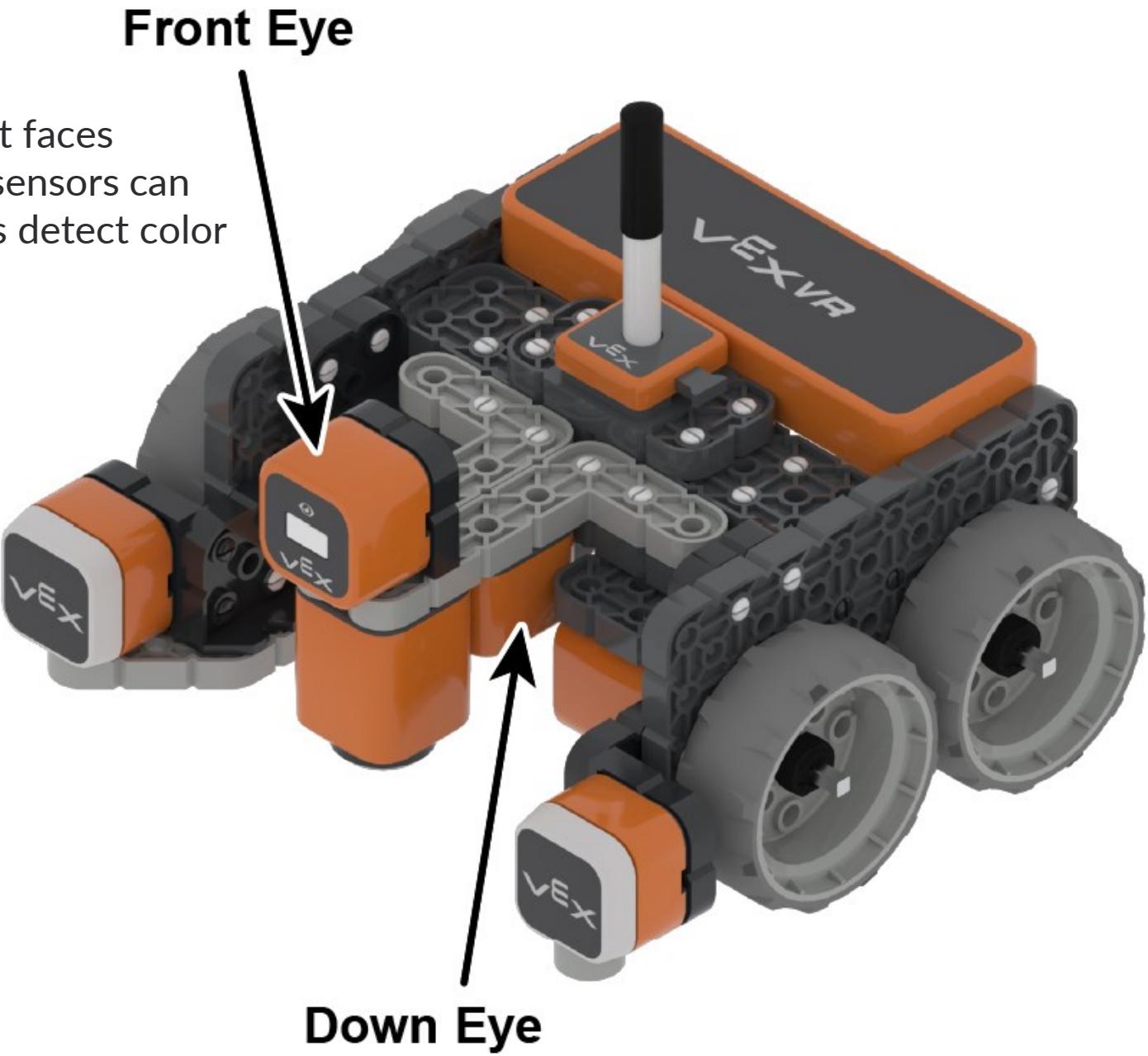


MENGENAL SENSOR

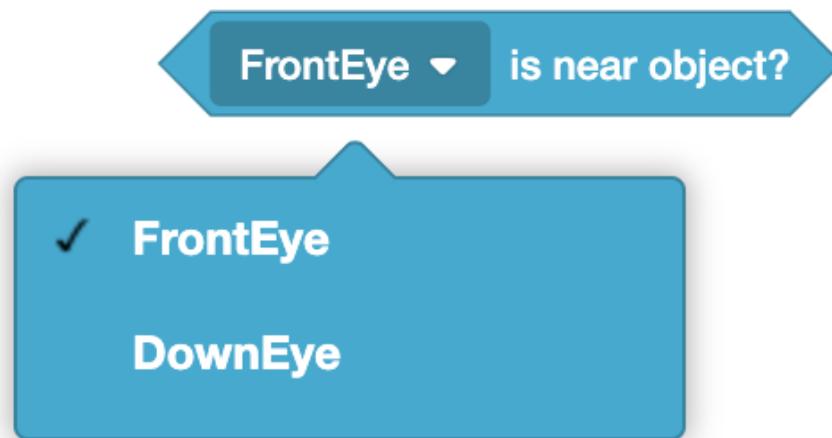
Introduction to Robotic #3

Teddy Marcus Zakaria

The [VR Robot](#) has two Eye Sensors, one that faces forward, and another that faces down. The sensors can detect if there is an object present as well as detect color (red, green, blue, none).



VEXcode VR Blocks Used with the Eye Sensors



when started

forever

if **FrontEye** detects **green** ? then

turn **right** for **90** degrees ▶

else if **FrontEye** detects **blue** ? then

turn **left** for **90** degrees ▶

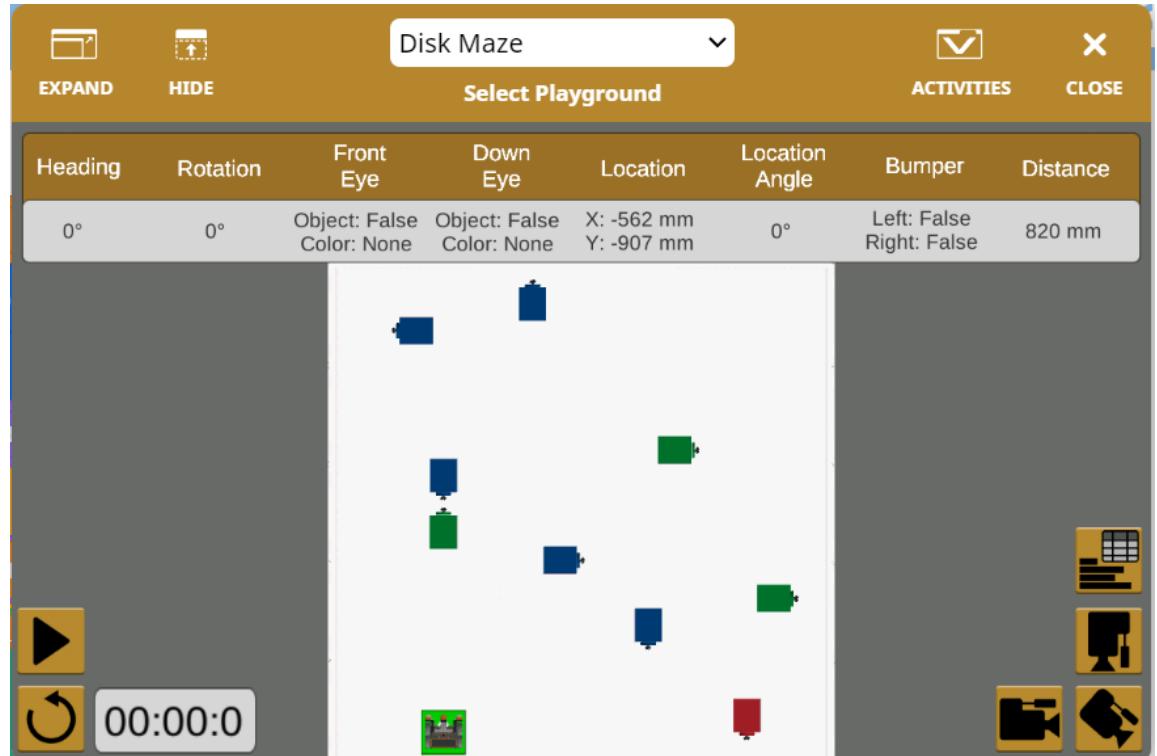
else if **FrontEye** detects **red** ? then

stop driving

else

drive **forward**

Disk Maze Playground



Jika mendeteksi hijau, maka belok kanan 90 derajat

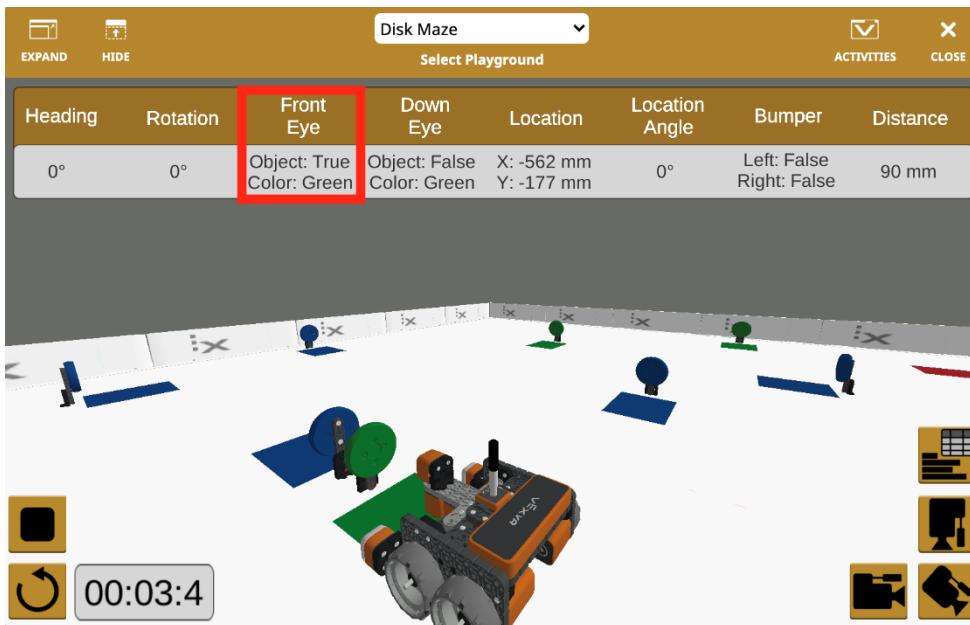
Jika mendeteksi biru, maka belok kiri 90 derajat

Jika mendeteksi merah, maka berhenti

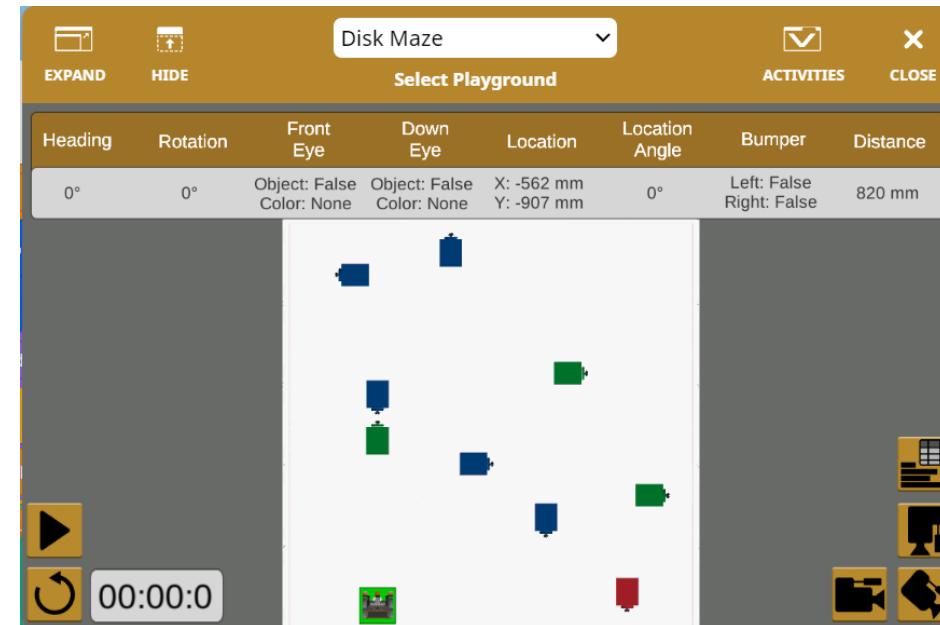
Jika tidak mendeteksi, maka maju

Using the Down Eye Sensor in a VEXcode VR Project

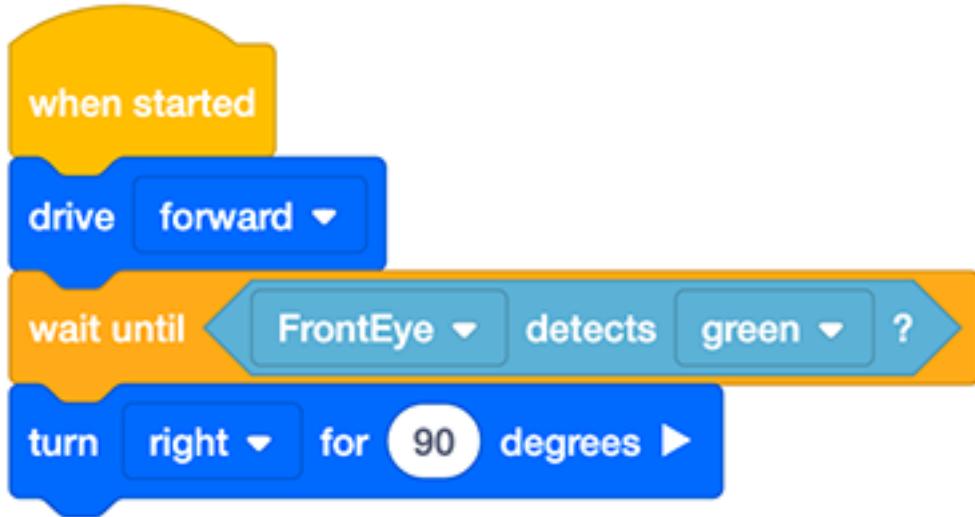
Disk Maze Playground



Disk Maze Playground



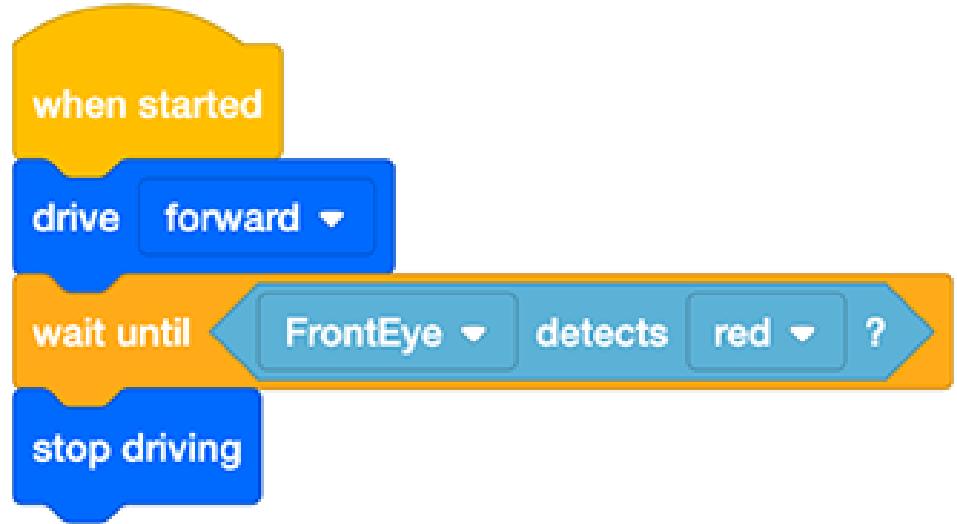
Using the Front Eye Sensor with [Wait until] Quiz



What will happen if the Front Eye Sensor detects green in this project?

1. The VR Robot will turn right for 90 degrees.
2. The VR Robot will turn left for 90 degrees.
3. The VR Robot will turn drive forward.
4. The VR Robot will turn stop driving.

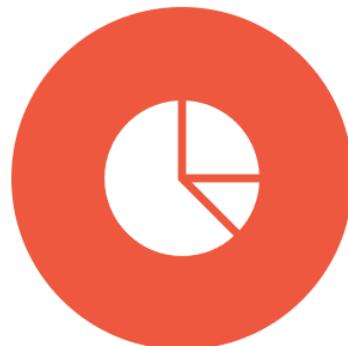
Using the Front Eye Sensor with [Wait until] Quiz



What will happen when the Front Eye Sensor detects red in this project?

1. The VR Robot will stop driving.
2. The VR Robot will turn left for 90 degrees.
3. The VR Robot will drive forward.
4. The VR Robot will check the Front Eye Sensor repeatedly.

TIGA JENIS BENTUK ALGORITMA



SEQUENCE



SELECTION

(CONDITION)



LOOPING

LOGIKA PERMROGRAMAN ROBOTIKA