

تم تحميل هذا الملف من موقع المناهج الإماراتية



الملف تشيك بوينت 3 PROJECT ROBOT FOLLOWER LINE

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روابط مواقع التواصل الاجتماعي بحسب الصف الخامس



روابط مواد الصف الخامس على تلغرام

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المزيد من الملفات بحسب الصف الخامس والمادة تصميم في الفصل الثاني

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GRADE 5

DESIGN & TECHNOLOGY

PROJECT : LINE FOLLOWER ROBOT PROJECT

EXPO 2020

Unit 5 Robotics Project



Project brief to know what the project is about

The idea of project

What is a project about ?

[almanahj.com/ae](http://almanahj.com/ae)  
**The line follower robot will be used to guide visitors around the UAE pavilion at Expo 2020.**



You need to understand the project requirements.

Answer the questions below.

Your answers will show that you understand the line follower robot project.

<https://kahoot.it/>



1. You will finish each stage of the development cycle to complete the project.

A. True

B. False

2. In this project, you will program a robot to avoid obstacles?

A. True

B. False

3. In this project, you will program a robot to follow a line?

A. True

B. False

4. Which components will you use to move the robot?

A. remote

C. motors

B. IR sensors

D. distance sensors

5. Which components will help the robot follow the line?

A. remote

C. ambient light sensors

B. IR sensors

D. distance sensors



# Planning

## 2. Planning



### Project planning



You can also think about the tasks in each stage and the time you will need to complete them



### Activity 4



Look at the project stages below. Then, put the stages into the correct order.

This will help you to plan when to complete each stage in the project.

**Development cycle stages**

- 3 Programming
- 4 Testing
- 5 Self-reflection
- 1 Project brief
- 2 Planning

Number	Stage
1.	
2.	
3.	
4.	
5.	

<https://www.mauthor.com/present/5425288037662720>

المناهج الإلكترونية





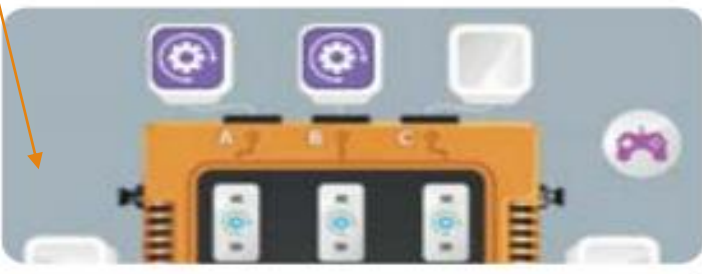
# Planning

## Program planning

You need to create a programming algorithm that will work.

You can create a flowchart algorithm that will work.

Match the requirements to the programming blocks needed to meet them.

Description	Programming blocks
Set the ports for the two motors.	
Set the ports for the two IR sensors.	
Move the robot forwards when no line is detected.	
Move the robot left when a line is detected on the left.	
Move the robot right when a line is detected on the right.	



### Program planning

You need to create a programming algorithm to plan how the program will work.

You can create a flowchart algorithm to plan how the line follower program will work.

Use what you know about the line follower program and your flowchart skills. Create a flowchart algorithm for the line follower program.

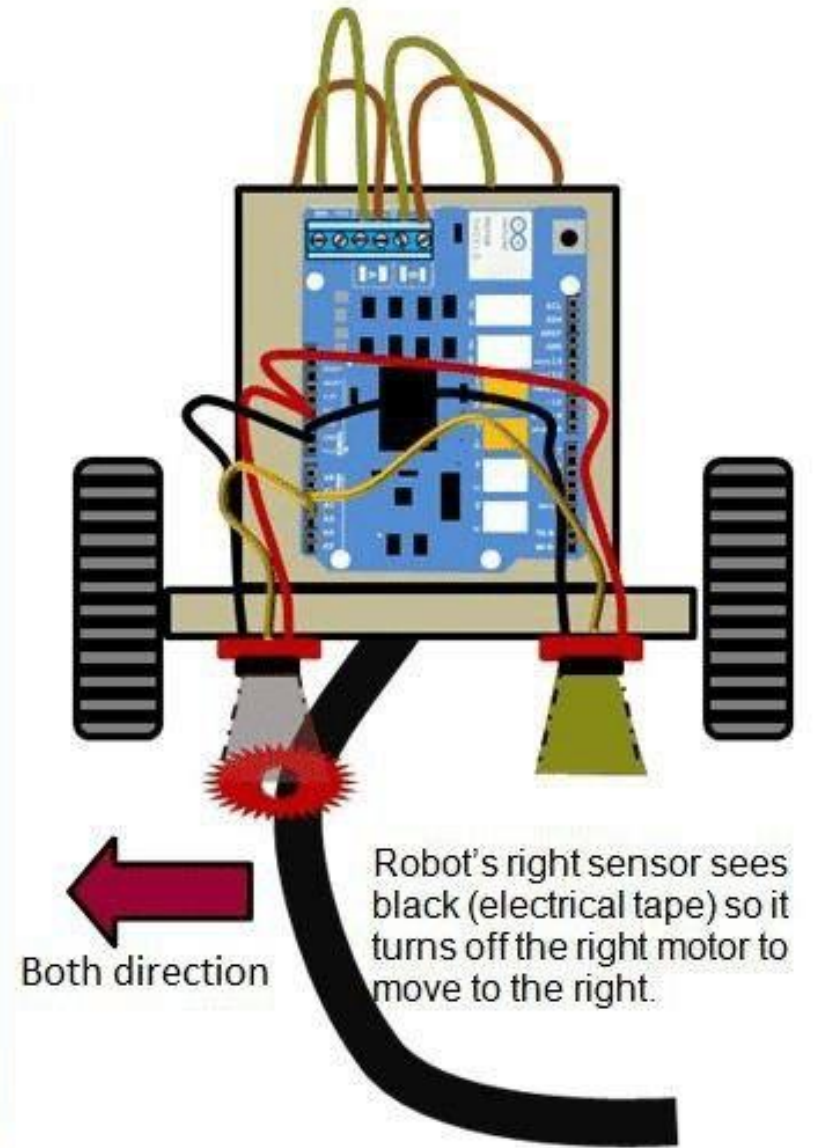
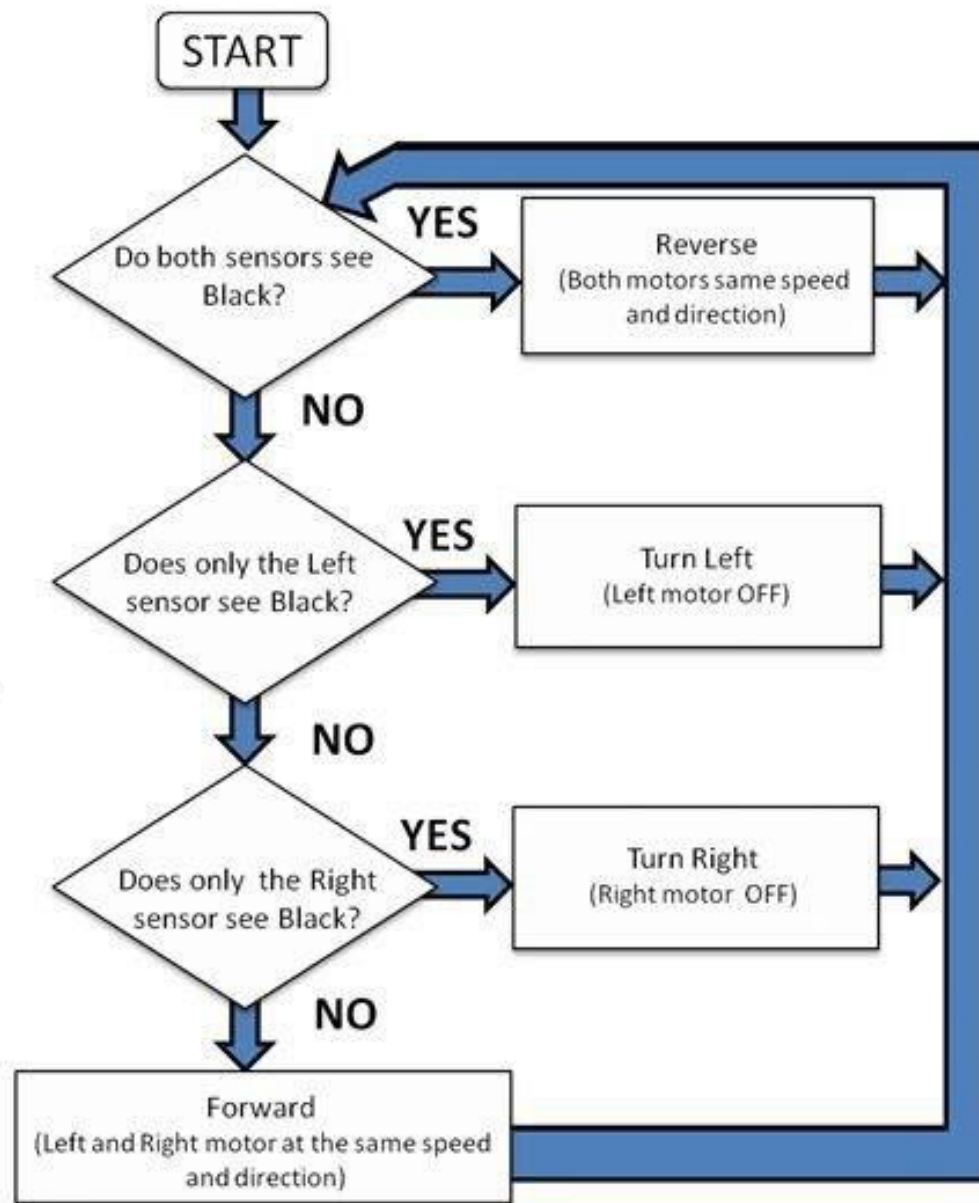
Their program will:

- Set the ports for :
  - two IR sensors
  - two motors
- Input data from the IR sensors.
- Move the robot forwards when no line is detected.
- Move the robot left when a line is detected on the left.
- Move the robot right when a line is detected on the right.
- Move the robot forwards when a line is detected on the left and right.



# Flowchart

you create **step-by-step** instructions.





# Programming

The robot follows lines by looking for changes in infrared light using

IR sensors



## Activity 7 Lab

Before you create the line follower program you must build a robot with the required components.

The robot you build should include:

- A. two IR sensors
- B. two motors
- C. a control unit

Remember, your line follower robot will be used to guide visitors around the UAE pavilion at Expo 2020. Here is an example of a robot with two motors and a control unit:



Mohammed Bin Rashid

Here is an example of two IR sensors on a robot that can be used to detect lines:

# Programming

```
graph TD
    Start([Start]) --> Repeat[repeat forever]
    Repeat --> While1[while 2 is false AND 4 is false]
    While1 --> TurnUp[Turn Up 100 degrees for 0.01s]
    TurnUp --> While2[while 2 is true AND 4 is true]
    While2 --> TurnDown[Turn Down 100 degrees for 0.01s]
    TurnDown --> While3[while 2 is true AND 4 is false]
    While3 --> TurnLeft[Turn Left 100 degrees for 0.01s]
    TurnLeft --> While4[while 2 is false AND 4 is true]
    While4 --> TurnRight[Turn Right 100 degrees for 0.01s]
    TurnRight --> Repeat
```





## 4. Testing



### Activity 9



Test your line follower robot. Does it meet the basic requirements?

If your robot does not meet the basic requirements, go back and try to fix it. Then, write your results.

Test	Result	
Does the robot include: A. two IR sensors B. two motors C. a control unit	No <input type="checkbox"/>	Yes <input type="checkbox"/>
Does the program set the ports for two IR sensors?	No <input type="checkbox"/>	Yes <input type="checkbox"/>
Does the program set the ports for two motors?	No <input type="checkbox"/>	Yes <input type="checkbox"/>
Does the program input data from the IR sensors?	No <input type="checkbox"/>	Yes <input type="checkbox"/>
Does the program the robot forwards when no line is detected?	No <input type="checkbox"/>	Yes <input type="checkbox"/>

Did you answer **No** to any questions? If so, can you change your program to improve your test score?

Explain any changes that you made to your program.

Write your answer below.

Testing is when you check a product, program or system meets its requirements.

, you can make changes to improve the test results.

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مكتبة مناهج

Mohammed Bin Rashid Smart Learning Program

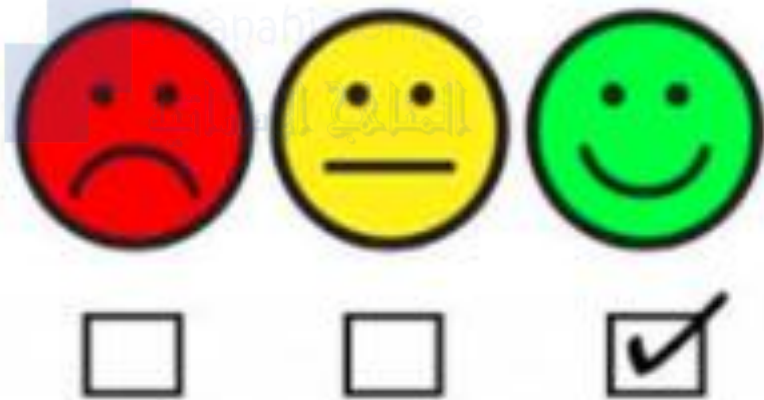


## 5. Self-reflection

Self-reflection is when you review how well you did during a project

Self-reflection can help you get better in the future

Self-reflection to check how well you did.



### Activity 10



Think about how you did. Read the statements below.

Tick the boxes that show how you did [✓].

Statements	I needed help	I improved during the project	I am an expert!
I understood the project brief and answered the questions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I planned the order to finish each stage in the project.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I identified programming blocks needed to meet the requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I created a flowchart for the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I built a robot including the required components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I used graphical programming software to create the program and upload it to the robot.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did my own testing and changed the robot or program (if needed).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Explain any other areas that you think you could do better in.

.....





# The advantages and disadvantages of robots

## Advantages of robots

Robots **help** us in many ways to make jobs easier. They have many **advantages**.

### 1. Robots make fewer mistakes than humans

A human can be **tired** or have **less energy**. This can lead to **mistakes** being made.

Robots **do not** get **tired**. They can do the same job over and over again.



### 2. Robots can produce more than humans

A robot can work **all day and all night** on the same job without stopping. **Humans** need to stop to take **breaks** and to **sleep**.

This means that robots can **produce** more than humans.



### 3. Robots can save us time

Robots can help to make our daily lives **easier**. They can give us **more time** to do other things.

For example, a **robot vacuum** cleaner can clean your home without any help from you.



### 4. Robots can produce things quickly

Robots are **programmed** to do a task, so they don't need to **think**.

This means tasks can be completed **quickly** and **efficiently** **without any delays**.



## Lawyers

**Lawyers** need to be good at changing a situation to suit them.

Robots do not know how to **argue** or **persuade**.



## Graphic designers

**Designers** take their time to **understand** what people want.

Everyone has different **needs** and **tastes**.

A robot does not have the **skills** to communicate with people like a designer would.



Jobs that robots  
cannot do

## Psychiatrist

**Psychiatrists** are a type of doctor that talk to people and **understand** how they are **feeling**.

This lets them help people to **solve** their **problems**.

Robots don't have **feelings** or **understanding** to do this job.



## Writer

**Writers** produce original work. They use their **imagination** and **creativity**.

Robots are **trained** to do everything. They cannot be **original** or **creative**.



# Things that AI do better than humans

## Tasks where AI outperforms humans:

### 1. Processing

A task that requires processing large amounts of information in a short amount of time can be done very quickly by an AI agent. The same task might take a human twice as long to do.

### 2. AI is mostly unbiased

A human's decision can be influenced by their feelings when carrying out a task, whereas an AI system, if programmed properly, is fair and unbiased.



### 3. Consistent

AI systems will always be consistent and stay the same. Humans can change, due to concentration, tiredness, human error etc.

