

LEGO ROBOTS — ACTIVITIES AND GRADING GRID

You have up to Thursday, February the 8th to complete the following tasks, that will lead to a mark. For every lego construct, there are marks :

- on actually making the construct and showing me that everything works, and
- on writing detailed answers on the question on paper (paper has to be given next week completed).

1 Grading grid for Lego Robots

Category	Total Points	Score
Dancing Birds	2	
Airplane Rescue	2	
Hungry Alligator	2	
Roaring Lion	2	
Lego box given back with no parts missing	1	
Quality of the language level for the answers	1	
Total Points	10	

We use the LEGO WEDO robots, instruction to build them are on the following webpage : <https://education.lego.com/en-us/product-resources/retired-products/wedo/getting-started/>

2 Dancing Birds

Instructions for Dancing Birds : <https://assets.education.lego.com/v3/assets/blt293eea581807678a/blte1f48277efac5182/5f8804d769efd81ab4debf5a/9580-dancing-birds.pdf?locale=en-us>

Please construct the Dancing Birds, and answer the following questions :

1. What makes the birds rotate?
2. Can you make the birds rotate in the same direction? (both clockwise, or both anti-clockwise)
Can you make the birds rotate in two opposite directions? (one clockwise, the other anti-clockwise)
Explain what you need to do for each of the two previous situations (draw the differences on your paper)
3. Can you make one of the birds rotate faster than the other? Explain what you need to do (draw the differences on your paper). When you make this modification, how much faster does the fast bird rotate, with respect to the other? (how many turns does the fast bird do while the other makes one turn)
4. Write in Scratch a little program that :
 - makes the birds dance in one direction for 10 seconds, then
 - makes them dance in the other direction for 7 seconds.

Explain your program.

3 Airplane Rescue

Instructions for Airplane Rescue : <https://assets.education.lego.com/v3/assets/blt293eea581807678a/blt9551c402bd70f674/5f8804d63b19d21d4a608625/9580-airplane-rescue.pdf?locale=en-us>

Please construct the Airplane Rescue, and answer the following questions :

1. The Airplane Rescue uses a “tilt sensor”. Please explain the general purpose of this sensor.
2. With the help of Scratch, what are the values that the sensor can produce? Explain which values correspond to which real-life situation.
3. Write in Scratch a little program that :
 - starts rotating the airplane propeller,
 - opens an “infinite loop”, and inside this loop, makes the propeller turn faster when the plane’s nose is going up (and slower if the plane is horizontal). This can be done by checking the value of the tilt sensor.

Explain your program.

4 Hungry Alligator

Instructions for Hungry Alligator : <https://assets.education.lego.com/v3/assets/blt293eea581807678a/blt08cb577ce2596b88/5f8804dc30c48e7ee7c0633d/9580-hungry-alligator.pdf?locale=en-us>

Please construct the Hungry Alligator, and answer the following questions :

1. The Hungry Alligator uses a “distance sensor”. Please explain the general purpose of this sensor.
2. With the help of Scratch, what are the values that the sensor can produce? Explain which values correspond to which real-life situation.
3. Write in Scratch a little program that opens an “infinite loop”, and inside this loop, makes the alligator “chew” the objects that are thrown inside its jaws, when there is indeed an object there (if there is no object in its jaws, the jaws should not move). This can be done by checking the value of the distance sensor.

Explain your program.

5 Roaring Lion

Instructions for Roaring Lion : <https://assets.education.lego.com/v3/assets/blt293eea581807678a/blt80bf1fe173624eb3/5f8804db2c58c80ec02e1e6a/9580-roaring-lion.pdf?locale=en-us>

Please construct the Roaring Lion, and answer the following questions :

1. With the lion initially lying on the floor (all his paws horizontal on the ground), write in Scratch a little program that makes the lion stand up on its front paws.
2. Modify the Scratch program to be able to control the lion (you’re not allowed to touch the keyboard or the mouse to do so, only to manipulate lego parts). The Scratch program should contain an “infinite loop”, and inside this loop, should make the lion stand up on its paws or stand down lying depending on the external control.

Explain your program, especially explain what is the link between your control device and the motor that makes the lion stand up or down.