

# 1001-act1 Introduction to Electronics

<b>Activity</b>	Robot Tasks
<b>Student Guide</b>	<a href="#">1001-act1-stg-pdf</a> tmt3NngP <b>Note:</b> Student version is optional. Mainly useful for remote students.
<b>Teacher Guide</b>	<a href="#">1001-act1-tcg-pdf</a> tmt3NngG
<b>Summary</b>	<p>This activity allows students to explore the reality that most of the things they take for granted as humans are, in reality, extremely complex and impossible for even the very best robots of today to comprehend.</p> <p>In this activity, students have an imaginary robot that will only follow instructions given to it. They break into small groups and draw random tasks from a container, they must create the steps their imaginary robot should undertake to accomplish the allotted task.</p>
<b>Principles Covered</b>	<ul style="list-style-type: none"><li>• Tasks are composed of discrete steps which are undertaken to accomplish a given outcome.</li><li>• Preparation of task steps for an imaginary robot.</li><li>• Explores the ways in which humans and robots perceive the world.</li><li>• Ideas such as “catching a bus” can also mean physically trying to catch a bus instead of taking a ride on one.</li></ul>
<b>Learning Outcomes</b>	<ul style="list-style-type: none"><li>• Understand how robots perceive their environment.</li><li>• Learn to break down a task into the required steps.</li><li>• Detect human assumptions and allow for them.</li><li>• Be able to add constraints to a task definition that clarify a task. For example, instead of saying, “catch a bus” (which could involve physically catching a bus), say, “take a bus ride to a specific destination”.</li><li>• Account for the inability of robots to perceive things the way humans do.</li></ul>
<b>Achievement Standards</b>	
<b>Equipment/ Resources</b>	<ul style="list-style-type: none"><li>• Strips of paper with the robot tasks on them, see below.</li><li>• Container from which students can draw task strips.</li><li>• Student guide (optional).</li></ul>
<b>Preparation</b>	<ul style="list-style-type: none"><li>• Print the Robots Task Strips sheet below, and cut the tasks into strips.</li><li>• Place the strips in a container from which they can be drawn.</li></ul>
<b>Instructions</b>	<p><b>1. Introduce the Activity</b> The purpose of the activity is to have students realise that even the most basic tasks in their lives, e.g., simple things like walking, cleaning their rooms, doing homework, are in fact extremely complex and beyond even the most advanced of today's robots.</p> <p>Have the students name some common tasks they think would be easy for a robot and say why they think the robot would find it easy. Then have them name some tasks they think would be hard for a robot and say why.</p> <p><b>2. Imagine a Robot</b> Ask students to imagine they have a robot that knows nothing and will follow any instructions literally. It has no imagination.</p> <p><b>3. Divide the Students into Groups of About Two</b></p> <ul style="list-style-type: none"><li>• Each group selects a Robot Task Strip from the container.</li><li>• Each group writes down the list of steps their robot should follow to complete the task. Allow about 10-15 mins.</li><li>• There should be about 5 to 15 steps, depending on the task.</li></ul>

	<ul style="list-style-type: none"> <li>Once the groups are ready, have each group present their task and the steps they created to achieve it.</li> </ul> <p><i>As each group presents their list, think about the task and how well their instructions fit the task. For example, if the task was “protect Sally from the crane” they need to decide what Sally is, i.e., a person or, say, an elephant? Then they need to specify what the crane is, i.e., a bird or a machine? And so on.</i></p> <ul style="list-style-type: none"> <li>After the first run, and if there is time, do a second round and see if the lists improve</li> </ul>
<p><b>Notes</b></p>	<p><b>Example Tasks and Some Potential Problems:</b>  These are some example tasks along with the common mistakes that students often make. These mainly arise from students making assumptions.</p> <p><b>1. Task:</b> Take the dog for a walk around the block</p> <ul style="list-style-type: none"> <li>How fast can the dog move? Need to define the speed.</li> <li>Does the dog need to come home? Specify that the dog must return.</li> <li>How long should the walk be? E.g. 1 hour’s duration? Or a specified distance?</li> </ul> <p><b>Fixes:</b></p> <ul style="list-style-type: none"> <li>Specify the type of dog.</li> <li>How fast can it walk in km/h?</li> <li>How long should the walk be?</li> <li>The fact the dog needs to be alive when it returns</li> </ul> <p><b>2. Task:</b> I am hungry. Go to the supermarket and get me some chicken.</p> <ul style="list-style-type: none"> <li>Does the chicken need to be dead?</li> <li>The question says nothing about the chicken being cooked.</li> </ul> <p><b>Fixes:</b></p> <ul style="list-style-type: none"> <li>Chicken must be cooked for human consumption.</li> <li>It needs to be paid for.</li> <li>Will the robot frighten the shopkeeper? It needs to look normal.</li> </ul> <p><b>3. Task:</b> Take the car to the football game and pick up Sally.</p> <ul style="list-style-type: none"> <li>Can be read as the robot needs to physically carry the car to the football game.</li> <li>It’s valid for the robot to go to the game and simply pick Sally up and hold her in the air.</li> <li>No mention of the fact the robot has to bring her home.</li> <li>What is Sally? Could be a large elephant! The task does not specify.</li> </ul> <p><b>Fixes:</b></p> <ul style="list-style-type: none"> <li>The robot needs to drive the car to the game.</li> <li>Sally is a small girl, maybe need a picture of her.</li> <li>Specify the robot leaves from Sally’s home and needs to return her there.</li> </ul> <p><b>4. Task:</b> Protect Sally from the crane.</p> <ul style="list-style-type: none"> <li>What is Sally? Human, elephant, a big truck called Sally?</li> <li>What type of crane? A bird? Or a machine?</li> </ul> <p><b>Fixes:</b></p> <ul style="list-style-type: none"> <li>Specify that Sally is a small human girl.</li> <li>Specify the crane is a bird.</li> </ul>
<p><b>Extension</b></p>	<ul style="list-style-type: none"> <li>Once the students have seen the various sets of instructions from the teams, have them select a new task and repeat the activity.</li> <li>Have each team create a new task and then they can swap tasks and produce the steps required.</li> </ul>

**Robot Task Strips:**

Cut the tasks below into strips and these will be drawn from the container by the students.

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1. Run a hot bath.

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2. Take the dog for a walk round the block.

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3. Go and make a cup of tea with milk and sugar.

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4. Go to the Dairy and get some bacon and eggs.

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5. I am hungry. Go to the supermarket and get me some chicken.

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6. I want my Wellingtons next door.

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7. Take the car to the football game and pick up Sally.

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8. I'm hungry, please feed me.

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9. Clean the house.

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10. Air the sheets outside.

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11. Give the dog a bone.

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12. Go and catch the bus.

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13. Take the train to Wellington.

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14. Protect Sally from the crane.

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15. See what the neighbour's beef is about?

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16. I want to go clubbing in the city.

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17. Go to the shop and get me a magazine.

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18. Stop that boy being killed by the car.