Emilyann's activity

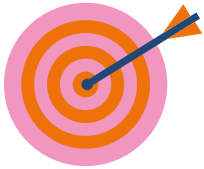# Simon Says and do coding

How to guide

Simon Says and do coding

Aim

Today we will discover engineering by learning how robots are programmed. First, we'll play a game of Simon Says to learn about different programming instructions. Then, you'll get to help your figurine navigate through a Lego maze by programming it yourself!

See suggestions here for different levels of the game in the lesson plan.
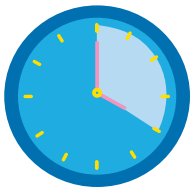
Time required

Prep (~20:00 minutes)
→ Printing, cutting & laminating

Introduction (~10:00 minutes)
→ Maybe start with a few videos to motivate the session or read **NoBot Robot** (a list of videos can be found in the 'Extra Resources' section)

Simon Says (5–10:00 minutes)

Lego Activity (~20:00 minutes)

Materials and equipment

→ **NoBot Robot** by Paul Linnet and Sue Hendra

→ **Simon Says:** just yourselves! Unless you'd like to purchase a small robot to be part of the game – see the 'Extension Ideas' section.

→ **Lego Activity:** resources can be found here. Great introductory video can be found here with some discussion questions.

Instructions

Simon Says

Read NoBot Robot as an introduction to robots and remembering body parts. Play a classic game of Simon Says with the class. You could also play a version similar to how Emilyann uses robots for memory and health – increase the number of commands Simon gives in one go, e.g. Simon Says touch your nose, then your knee then your elbow then your toes… See the 'Extension Ideas' section for ways to make the game more fun!
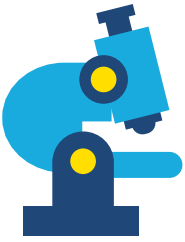
Lego Activity

→ Start with introducing the simplest cards and build up from there, cards can be found <u>here.</u>

→ Example cards can be found <u>here</u>.

→ Video tutorial for teachers found <u>here</u>.

→ You can use a paper version with a Lego/Duplo figure or you could build the maze out of Lego/Duplo as well.

Questions/discussion prompts

1. Are there any ways to make this game easier?

    a. Try to think of ways you can use less cards to reach the end of the maze (you may need a new type of card).

2. After solving your maze, count how many cards you used. Ask a classmate with a different maze how many cards they used.

Simon Says and do coding

    a. Compare your mazes to figure out why one of you needed more cards than the other.

3. What did you learn about the order of commands? (Taken from this [video])

4. Did your robot make it through the maze on it's first try? (Taken from this [video])

How does it work?

→ In the Simon Says game, it's like you are the robot or the figurine in the Lego activity, where you're responding to commands about what you should do. Our engineer Emilyann uses robots to play a game similar to Simon Says with adults to help their memory (see the Nao video below).

→ In the Lego activity, you're the programmer and your cards are the code, or instructions that tell your figurine what to do. Like any programmer, you don't always get it right on the first try. When you try to fix your code to get it working the way you want, this is called debugging. It can be quite a long process, but many times you realise it's a simple fix, like forgetting a card in the Lego game, causing the figurine to walk into a wall, oops!

Extension ideas

Simon Says Activity

→ Try incorporating robot-like movements or voices into the game of Simon Says (e.g., "Simon Says dance like a robot!")

→ If you would like, there are inexpensive programmable robots available in which you can use to facilitate the game (for example [this one]).

→ Some of these robots (like the one listed can programme a series of movements (e.g., slide forward, turn left). Many of these robots also have buttons such as 'music' or 'dance' that can be incorporated into the game.

Lego Activity

→ You can laminate the plain grid paper ([last page](#)) and have the students draw their own mazes using whiteboard markers/build mazes using Legos.

→ The student can customise their maze to whatever theme interests them most (Star Wars, Trolls, etc.). Perhaps have them bring in a small action figure from home too.

→ Students can bring the materials home with them to keep playing.

Extra Resources

Videos

[Memory Game with Nao](#) This demo includes sensory feedback (auditory and haptic (vibration)), so perhaps this would be more suitable for the older students.

[MiRo robot for Fall Assistance](#)

[Heriot-Watt University HRI lab robots](#) (demonstrates some different research projects)

Boston Dynamics Atlas Robot
[Dancing](#) and [Parkour](#)

DARPA Challenge. DARPA holds challenges to aid in defence applications such as rescuing people from a burning building. However, it is not as easy as it looks. [This video](#) shows the Robot 'fails' (quite funny!)

This shows solving a problem that is easy for a human (e.g. opening a door, or even standing on our own two feet), can be extremely difficult for a robot, all the while remembering that these are very expensive pieces of equipment.

More tools to try at home:

[Hopscotch](#)

[Scratch Jr](#) (ages 5-7)