Compass coding

Overview

This activity fulfills **Stage 1, Requirement 3** of the **Digital Maker Staged Activity Badge** (write clear instructions for a computer or person to follow to complete a task) and **Stage 1, Requirement 3** of the **Navigator Staged Activity Badge** (learn the four cardinal points of a compass). In this activity, young people will learn how to program a ScoutBot character.

Using the four cardinal compass directions (north, east, south, west), they will direct their ScoutBot from the starting location (represented by a triangle), back to camp (represented by a tent).

10-20 minutes

Up to 6 per computer (pairs are ideal)

If you're running this activity without access to wifi, you'll need to download the software and program ahead of time. There are handouts available to print if you want it to be a self-directed activity.

Wherever you have access to computers

You will need:

- Laptops, desktop computers or tablets
- These can be shared between the group, recommend 1 per 2 young people
- Activity handouts

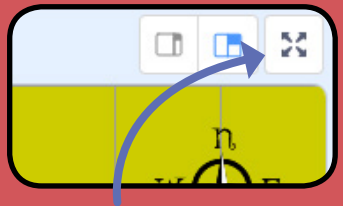
If your meeting place has WiFi

Run Scratch online in a web browser with an Run Scratch online in a web browser with an internet connection and open Compass Coding project using this link **rpf.io/scouts-compass-on**

If your meeting place doesn't have WiFi

- Download the Scratch Desktop application beforehand; refer to the Scratch guide **rpf.io/scouts-scratch**
- Download the Compass Coding project "compass-coding.sb3" from **rpf.io/scouts-compass-go**

When you're ready to run the activity, open Scratch. Then open the project and go into full-screen mode.



Click for full-screen

Key messages

- Computers can't think for themselves, so they will do **exactly** what you tell them to — even if you get it wrong!
- A computer **program** is a sequence of instructions
- To be good at **computer programming** (coding) you need to be able to plan ahead
- Mistakes in computer instructions are called **bugs**. Fixing them is known as **debugging**.

Compass coding

Leader instructions

1 Explain that when we program a computer, we need to give clear instructions. Computers will do exactly what you tell them to (even if you get it wrong).

2 Explain that in this activity, the Scouts will be programming a ScoutBot to get from the starting point (triangle) back to the camp (tent). They can program the ScoutBot using compass directions.

3 Recap/explain the four cardinal compass directions: north, east, south, west.

4 You can either gather the young people around one computer and show them the compass coding project, or give them the handout and leave them to follow the instructions themselves. If you're demonstrating the project:

- **a.** Explain that Scouts should type the instructions into the box. They must type all of the instructions in one go.
- **b.** Show them how this works by typing 'NEES'. Click the tick symbol to run the code.
- **c.** Ask your Scouts if there is a better way to do things. Why is it better? Try it.
- **d.** Drag the START and Camp to a new square. Click START.
- **e.** Ask your Scouts which instructions they'll need to give in order to program the ScoutBot back to camp. Try out their suggestions.
- **f.** **Discuss**: is it better to choose a short route with fewer instructions or a really long route. Why?

Alternatives

There is a **tech-free version** of this activity available in which you can use paper or natural materials instead of computers. You can find this activity on scouts.org.uk/raspberrypi

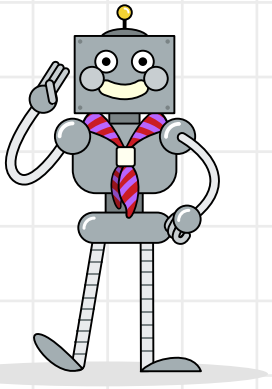
5 Activity

- **a.** Young people program the ScoutBot back to camp in pairs or small groups. You can give them the handout if you haven't demonstrated the activity to them.
- **b.** Partners take turns creating maps for each other to solve.
- **c.** Some young people may need an extra challenge. Explain that they can drag rocks to create obstacles (they may discover this for themselves).
- **d.** When they make mistakes, explain that there is a 'bug' in their code. To resolve the issue, they'll need to 'debug' the code.

Adaptability

To simplify the activity, keep the ScoutBot and camp close together and in a line. To make it more challenging, add multiple rocks to make it harder to reach the camp, or click on the compass to hide the compass directions (to reveal the compass, just click on it again).

Instructions



In this activity, you will be programming a ScoutBot to get back to camp.

You program the ScoutBot using compass directions:

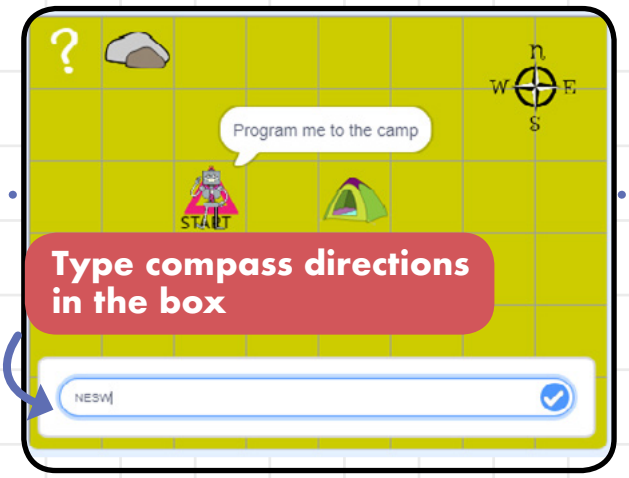
N – move one square north
S – move one square south
E – move one square east
W – move one square west

Your code is a sequence of compass directions. For example, the code NEES would indicate that you need to go one square north, then two squares east, and then one square south.

1 If you're online, open the compass coding project at rpf.io/scouts-compass-on. If you're offline, use the program provided.

2 Click the green flag symbol to start. You can click the question mark symbol to get help.

3 Give the ScoutBot instructions to get back to camp (the tent). You can use the four cardinal compass points north, east, south, and west to do this. You can use the **CAPSLOCK** key on the keyboard to type capital letters, but lower-case letters also work.



4 Click the tick symbol, or type 'return' or 'enter' to run your code. If you find a bug (a mistake that means the ScoutBot doesn't reach the Camp), you can change the code and click **START** to try again.

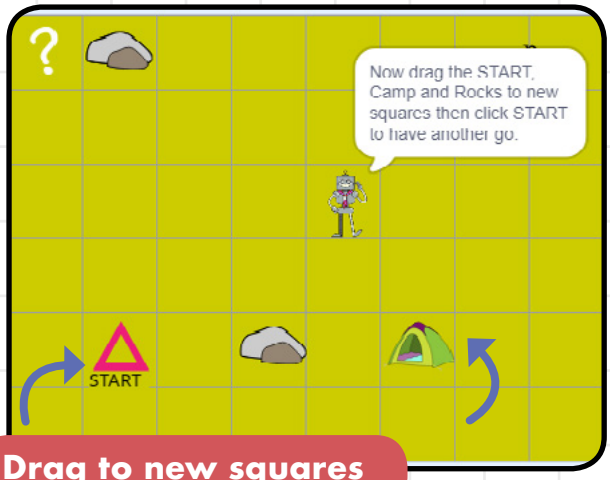
Scouts Raspberry Pi

Instructions

Tip

Click the green flag symbol to reset the project back to its starting position for a new group. You can click on the compass to show or hide the compass directions

5 Now drag the **START** and the camp to different squares to create a new map. You can also drag rocks, the rocks are obstacles for the ScoutBot.



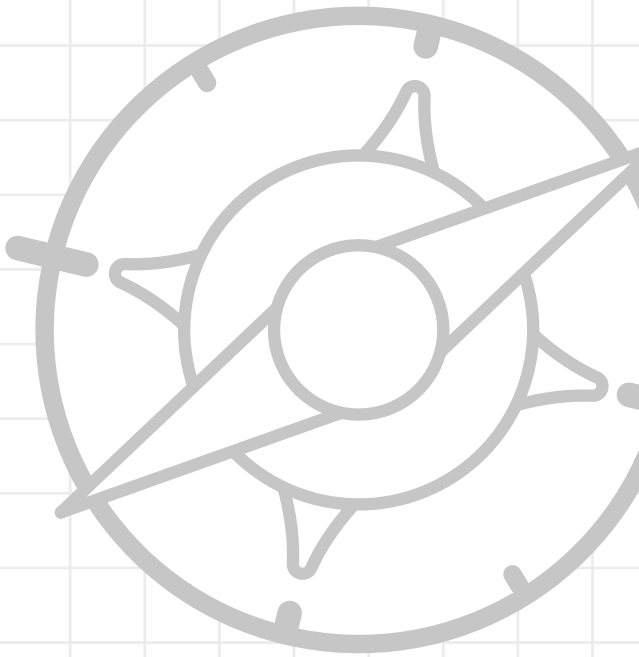
Drag to new squares

6 Click **START**. The ScoutBot will go to the **START** point and wait for your code.

Click on start

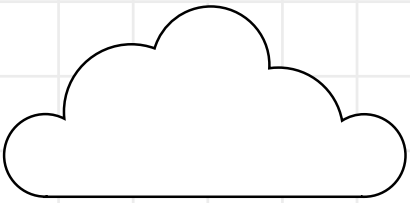
Tip: Click the Scoutbot to hide the message

7 Program the ScoutBot to reach the camp on your new map.

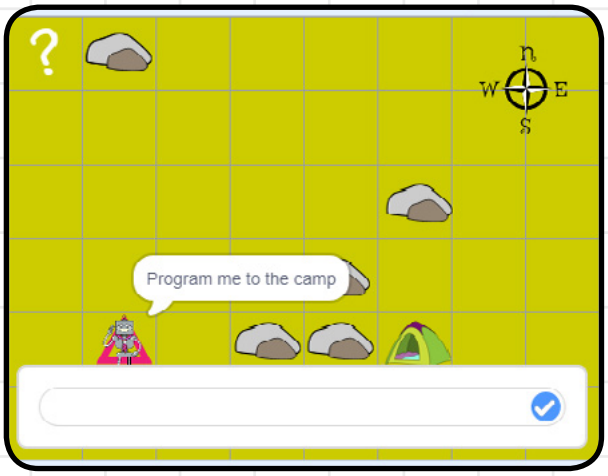


Instructions

8 Make maps for other people to solve. Make sure everyone gets a turn.



9 To make things more challenging, you can drag more rocks to add more obstacles.



Trivia

Did you know that the 1996 launch of the Ariane 501 Space Shuttle ended in an explosion because of a bug in its code. Luckily, there were no people onboard, but the bug still cost the European Space Agency £240,000,000!

Community and Sharing

Explain your ‘code’ instructions for the ScoutBot, or explain how you found or fixed a bug to the rest of your team.

You can also use the activity at home at rpf.io/scouts-compass-on