

Shape Wheels & Snowflakes

Let's create some snowflakes with code! In this coding challenge, use loops and Repeat Blocks to code unique patterns called shape wheels! Coders can use the Root simbot in the 3D simulator or a physical Root® Coding Robot to create their coded drawings!

Getting Started

1. Visit code.irobot.com or the iRobot® Coding App on an **Android** or **iOS** device.
2. Tap on the + icon to open a new coding project.

With Coders

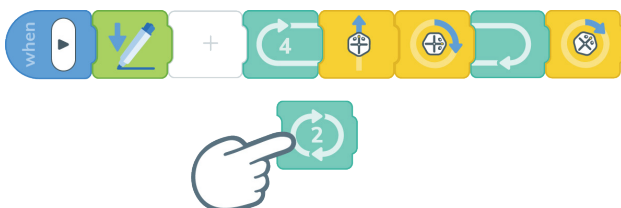
1. Drag in a Marker Block. This tells the simulated robot to put the marker down.
2. Model how to code the Root Coding Robot to draw a square. You will need a Move Block and Turn Block. To simplify code, use a Repeat Block. Tap the Repeat Block to open the editor and set to four times. Press Play to watch Root draw a square.



3. To make a shape wheel snowflake, the shape needs to repeat from the center point. Add a Turn Block and edit it to turn slightly. In this example, the Turn Block is edited to turn 45° to the right.



4. Drag in another Repeat Block after the Marker Block.



Subject(s):

Coding, Robotics
Art

Experience Level:

Beginner

Grades:

1-5

Time:

30-45 minutes

Group Size:

1-3

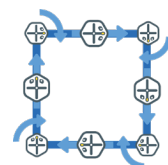
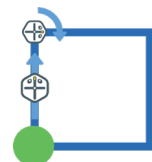
Supplies:

With SimBot

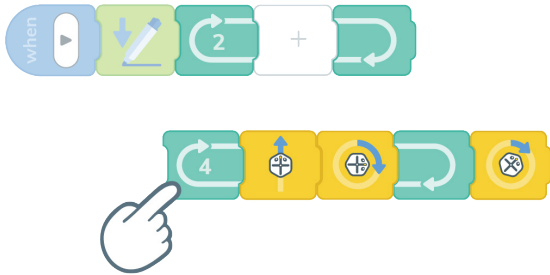
- Device with access to the iRobot® Coding App

With Root® Coding Robot

- Device with access to the iRobot® Coding App
- Markers
- Paper



5. Move all other blocks within the new Repeat Block. This is called a **nested loop**.



6. Edit the Repeat Block to repeat eight times.



7. Encourage coders to try coding their own shape wheel. Work in small groups or individually to experiment with Move and Turn Blocks.



Let It Snow

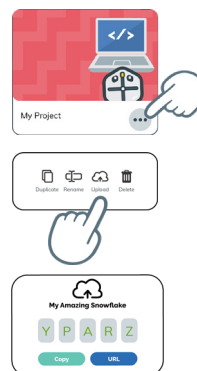
Print each snowflake for a festive holiday display that celebrates STEM! Press Play to run code in the simulator, then take a screenshot of each snowflake to print and display!

Going Further

- Try creating shape wheel snowflakes in Level 2. Use Arc Blocks to add some curves to the shape wheel.
- Leverage other Event Blocks to create more shapewheels. Use the When Bump and When Touch blocks to add more complexity to snowflakes. Or, add more snowflakes to your simulator canvas.
- Use a random block to create a a snowy scene in the simulator! Explore different parameters to keep the snowflakes within the virtual arena.

Share Your Projects

1. Click the three dots on your coding project.
2. Rename your project. Tap the Upload Icon.
3. Copy your Project ID or URL.
4. Share your Project ID or URL on social media and tag us @iRobotEducation!
5. Have fun!



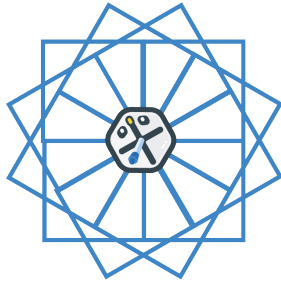
Keep Coding!

Looking for other winter themed activities? Code a song and dance with the **Snowkey Pokey!** Learn about variables while coding the Root Coding Robot to glow and flicker in **Fireplace Variables!**

Check out other cross-curricular coding activities in the iRobot Education **Learning Library!** (edu.irobot.com/learning-library)

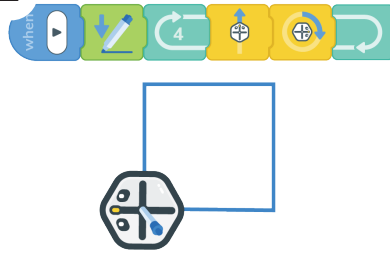
Shape Wheels & Snowflakes Coding Guide

1



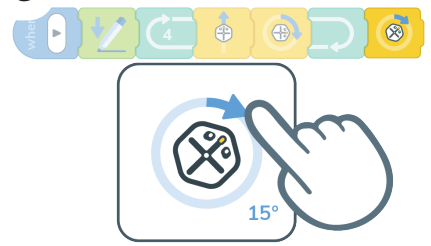
When Root draws a simple shape and turns slightly, repeating those steps over and over, it creates a pattern we'll call a shape wheel.

2



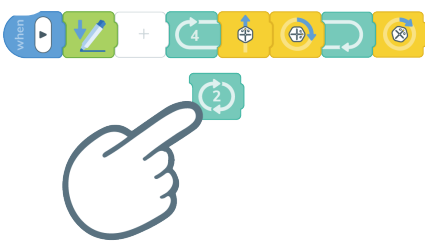
Let's start with code that tells Root to draw a square.

3



Add a Turn Block to change Root's angle.

4



Add another Repeat Block after the Marker Block. This will tell Root how many times to draw a square and create a circular pattern.

5



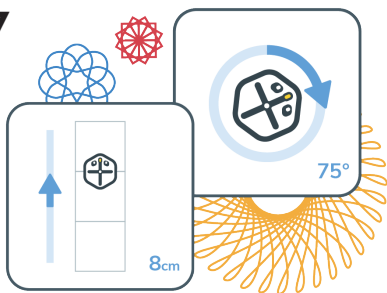
Move or nest your code inside of the new Repeat Block.

6



You can change how many times Root repeats code by tapping on the first Repeat Block.

7



You can experiment with shape wheels by changing the angles Root turns and the distance Root moves. Try using the Virtual Arena!

8

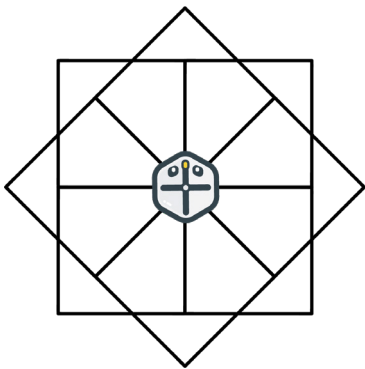


You coded Root to draw patterns and snowflakes with the Repeat, Move, Turn, and Marker Blocks.

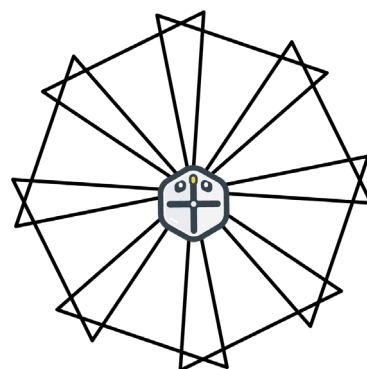
Shape Wheel Reference Guide (Level 1)

Here are some Level 1 Shape Wheel examples.

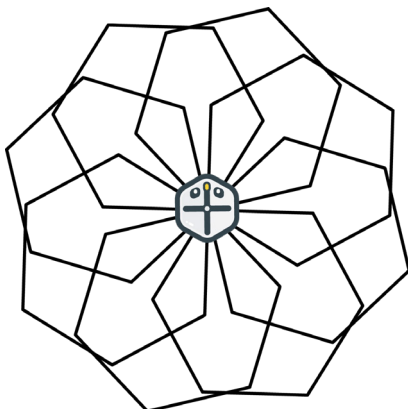
Square



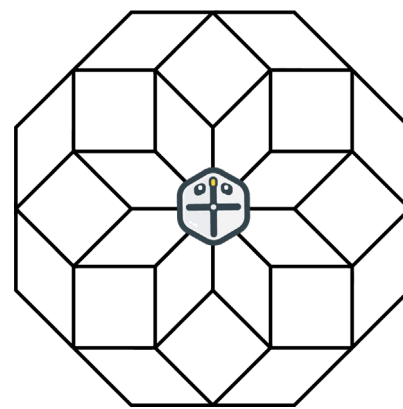
Triangle



Hexagon



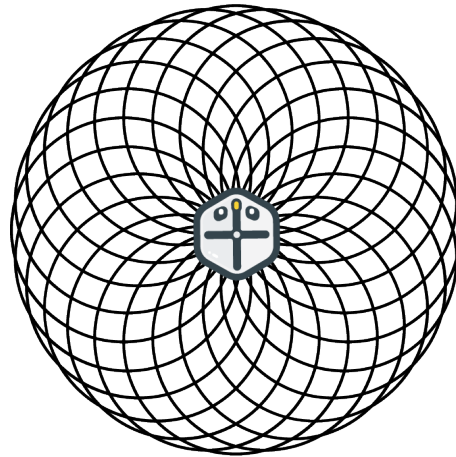
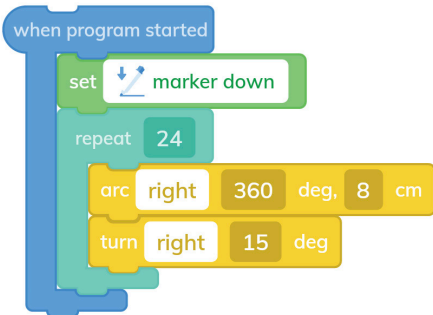
Octagon



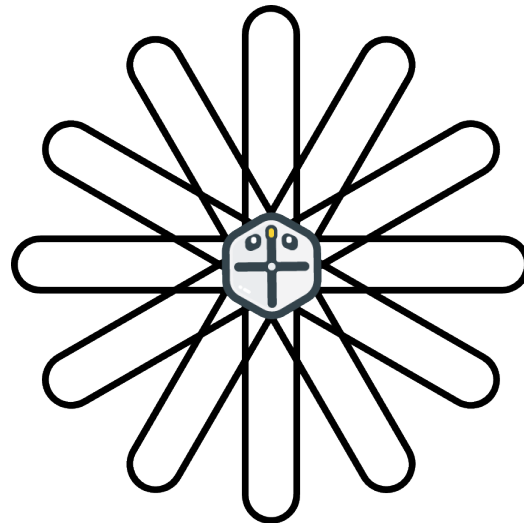
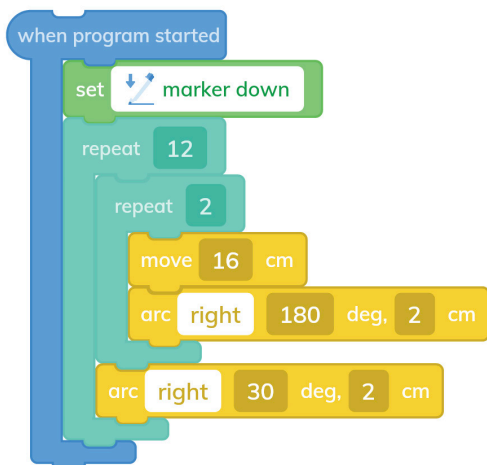
Shape Wheel Reference Guide (Level 2)

Here are some more complex Shape Wheels to build with code in Level 2.

Shape Wheel 1



Shape Wheel 2



Name _____

Date _____

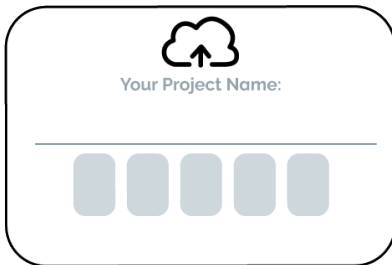
Shape Wheels & Snowflakes

Coding Reflection

Share about your experience coding your project!

1. Rename your project and save it.

Enter your project code here:




2. Circle your coding style.



I coded on
my own.



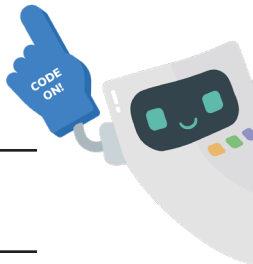
I coded with
others.

 **Draw it!** What does your snowflake
shape wheel look like?

3. Describe a pattern in your life.

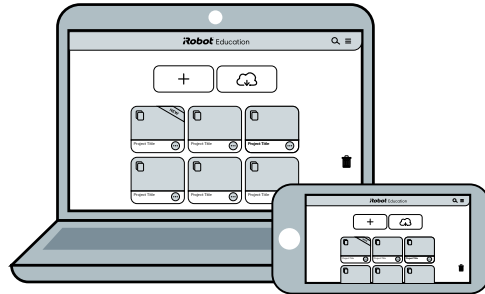
4. Did your coding project turn out exactly how you planned? Why or why not?

5. How would you describe your Shape Wheel coding project to a friend?



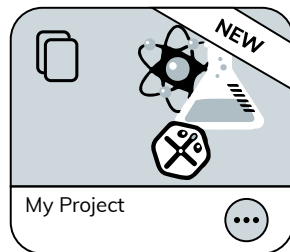
Uploading Projects

Step 1:



Visit **code.irobot.com**
or the **iRobot™ Coding App**.

Step 2:



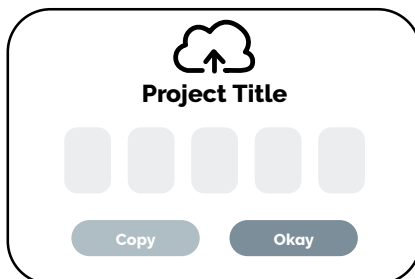
Select the project. Click on the
three dots.

Step 3:



Click on the **Upload Icon**.

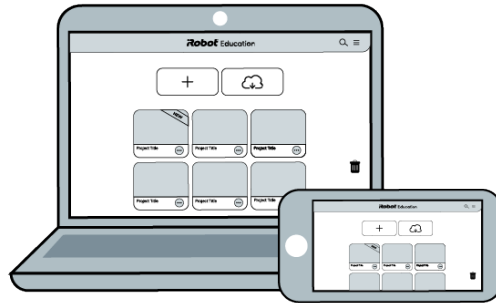
Step 4:



Copy the project code to
share with your friends!

Downloading Projects

Step 1:



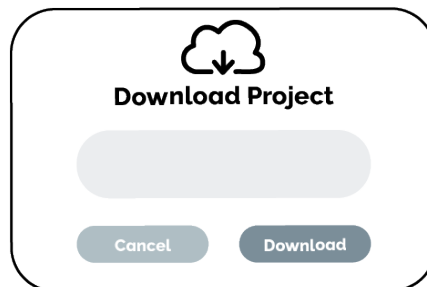
Visit **code.irobot.com**
or the **iRobot™ Coding App**.

Step 2:



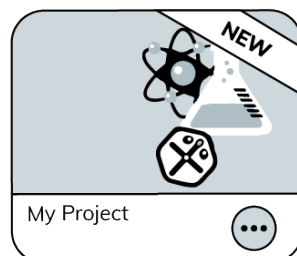
Click on the **Download Icon**.

Step 3:



Enter your 5 character project
code and click **Download**.

Step 4:



Open the downloaded project!