Lesson 6: Creating a program

Repetition in shapes

National Centre for Computing Education

Lesson 6: Creating a program

To create a program that uses count-controlled loops to produce a given outcome

- I can design a program that includes count-controlled loops
- I can make use of my design to write a program
- I can develop my program by debugging it

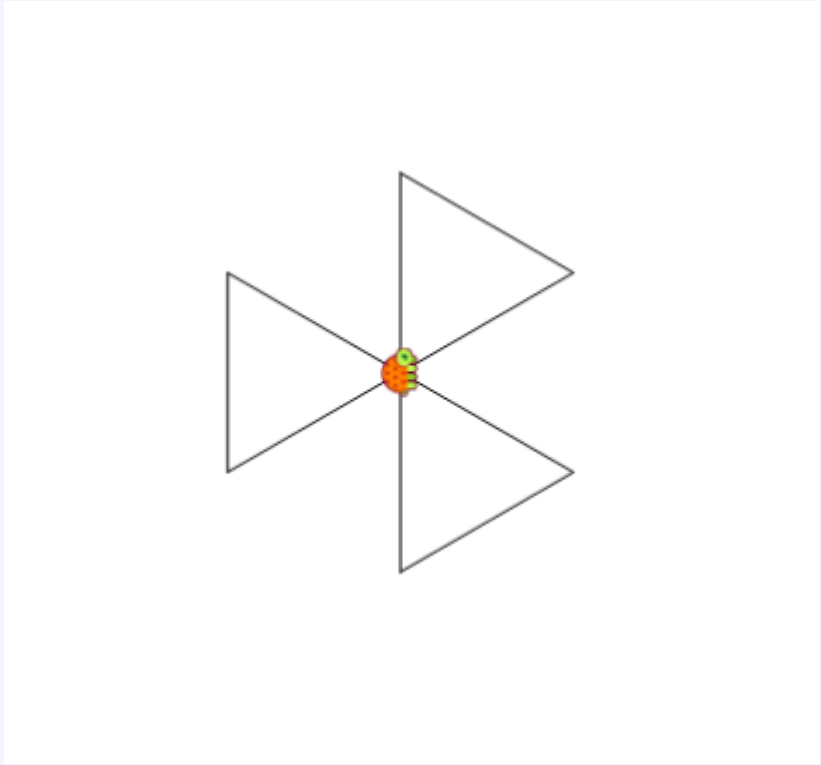
Matching designs

A

```
repeat 3 times
    Draw a triangle
    Turn right 120 degrees
```

B

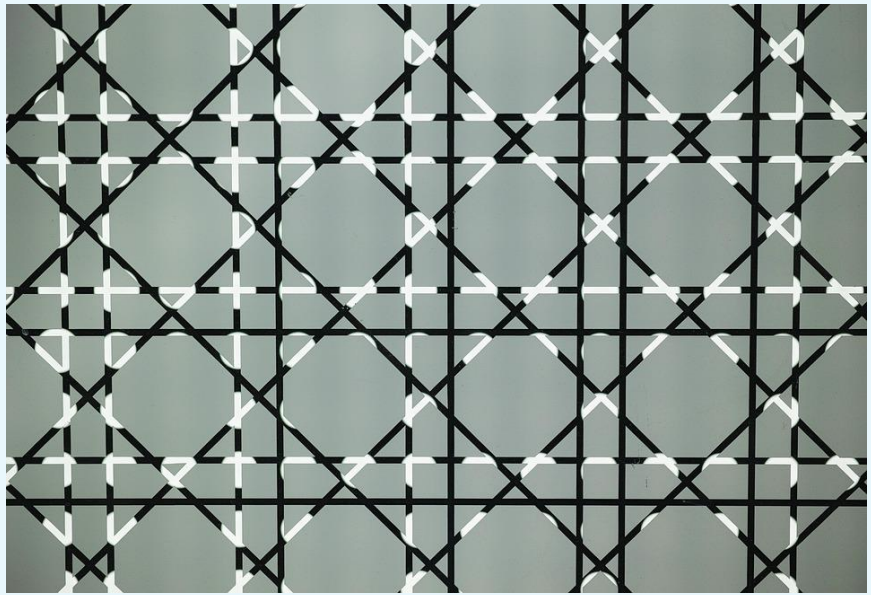
```
repeat 6 times
    Draw a triangle
    Turn right 120 degrees
```



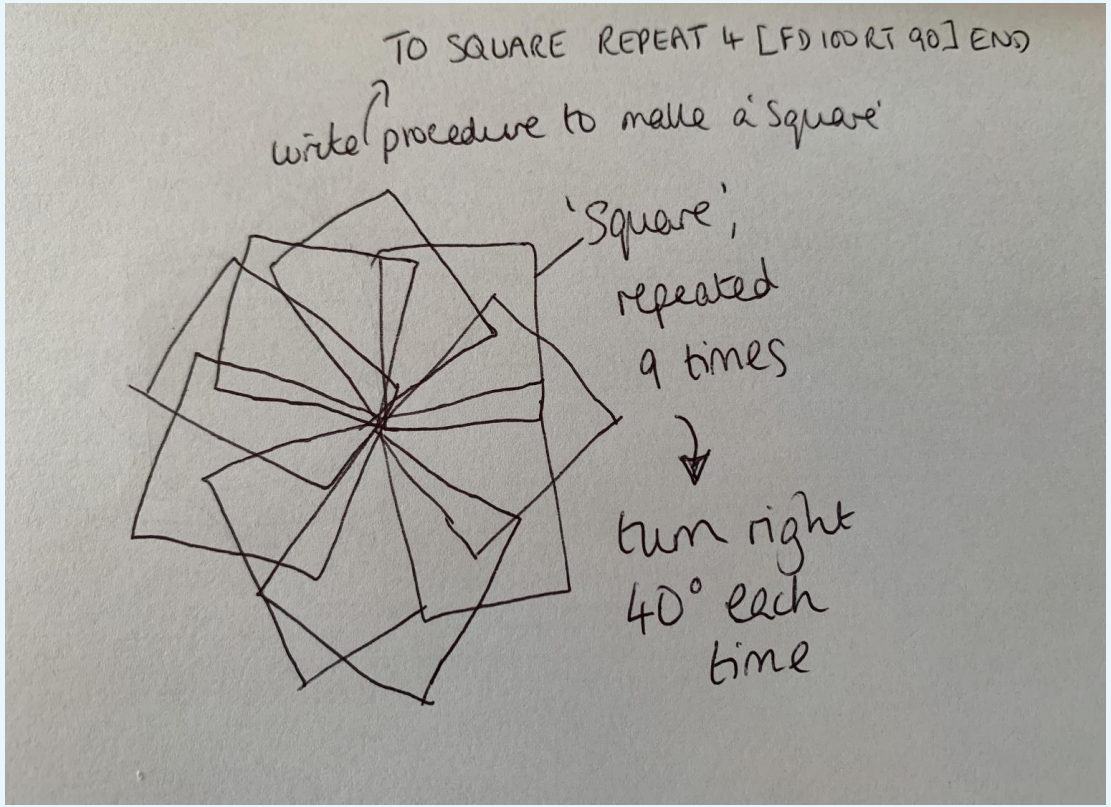
Designing patterns — project brief

Task: Plan and program a design for wrapping paper. The design:

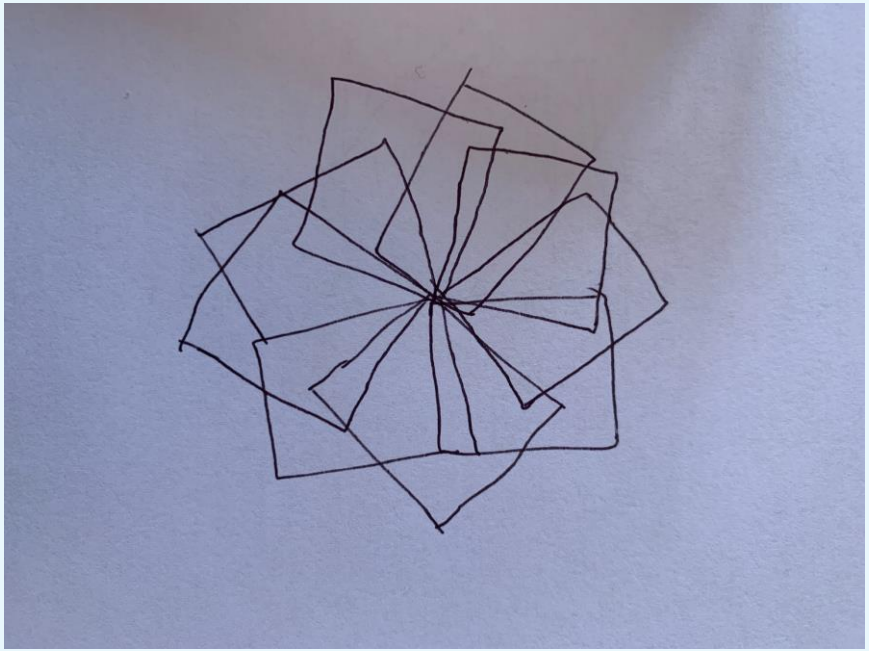
- Must use shapes with a count-controlled loop
- Must contain more than one shape, eg square, triangle, hexagon
- Could use the same shape in different sizes, eg a large square and a small square



Annotated design



Sketch + algorithm



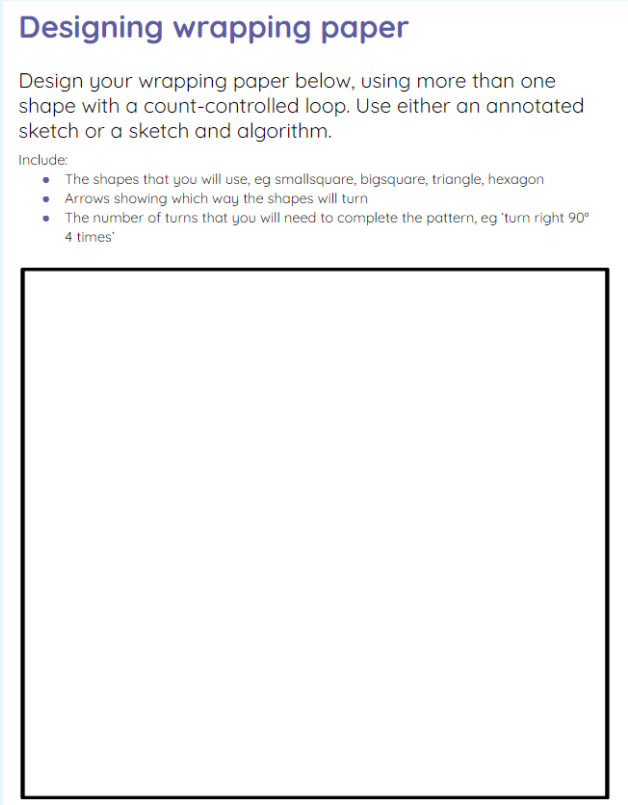
This is a square:
  Repeat 4 times
    Draw a side 150
      Turn 90 degrees

Repeat 9 times
  Draw a square
  Turn 40 degrees

Choose your design method

With a partner, reflect on the two different design approaches. Share what you liked or didn't like about them.

Decide which you will use for your work and use the design sheet to plan your program.



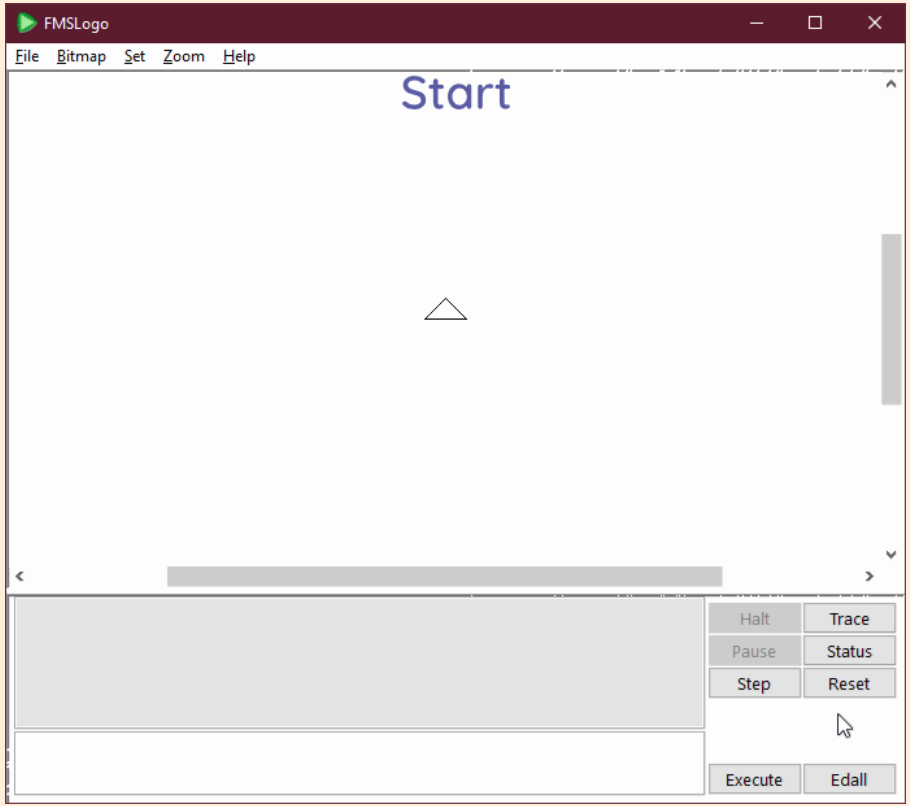
Designing wrapping paper

Design your wrapping paper below, using more than one shape with a count-controlled loop. Use either an annotated sketch or a sketch and algorithm.

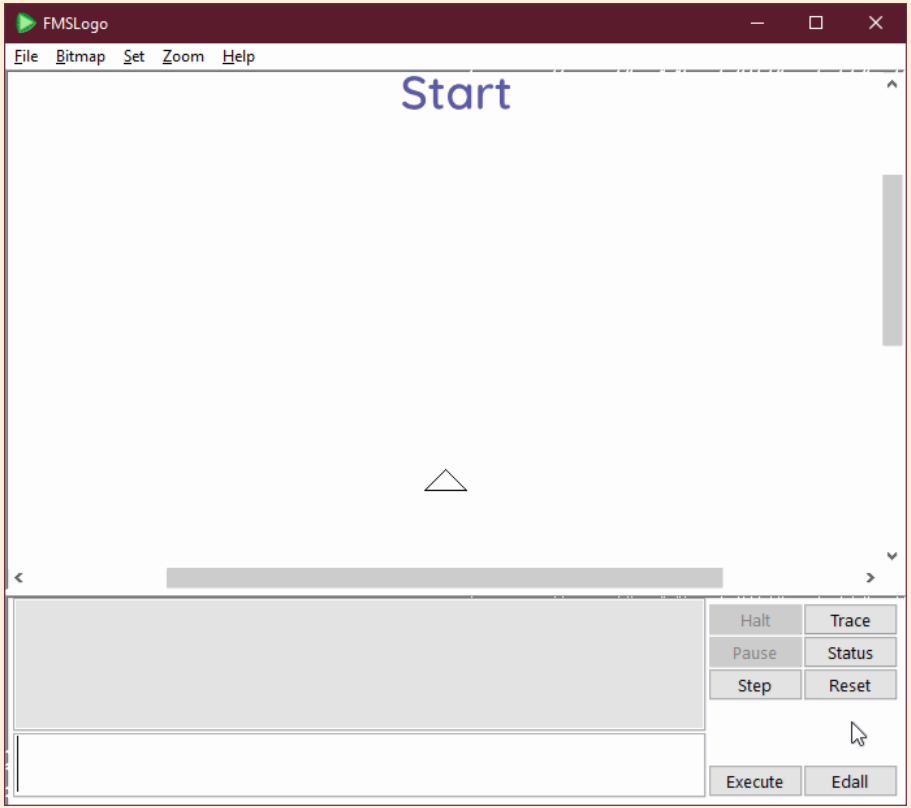
Include:

- The shapes that you will use, eg smallsquare, bigsquare, triangle, hexagon
- Arrows showing which way the shapes will turn
- The number of turns that you will need to complete the pattern, eg 'turn right 90° 4 times'

Creating procedures for squares of different sizes

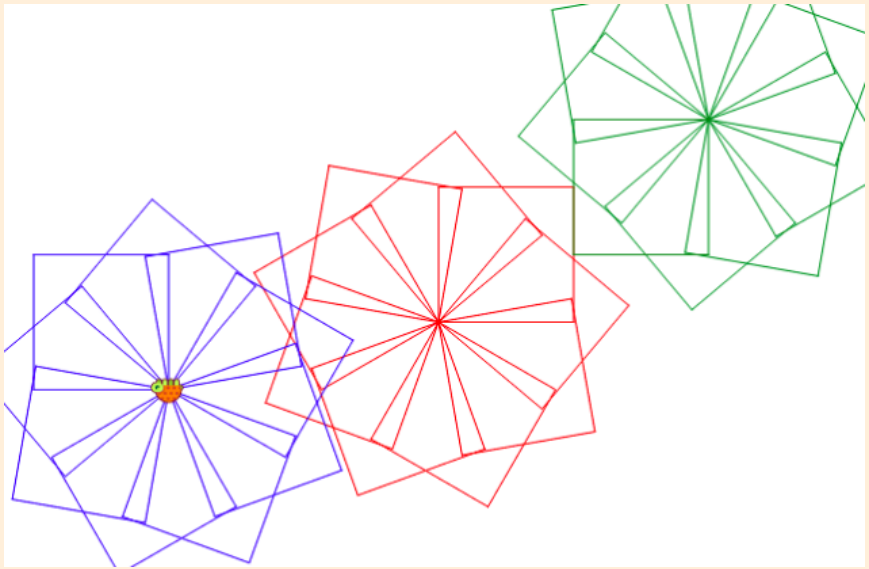


Changing the pen colour



Programming in Logo

- Use your designs to program the wrapping paper.
- `Home` — returns the turtle to the start position
- `PU` — pen up
- `PD` — pen down
- Use procedures for shapes in your programming if you want to. The design on the right uses the repeated square pattern in different colours.



Debugging — finding and fixing errors

Remember to use your design as you program, following along with your plan to check that your programming is correct.

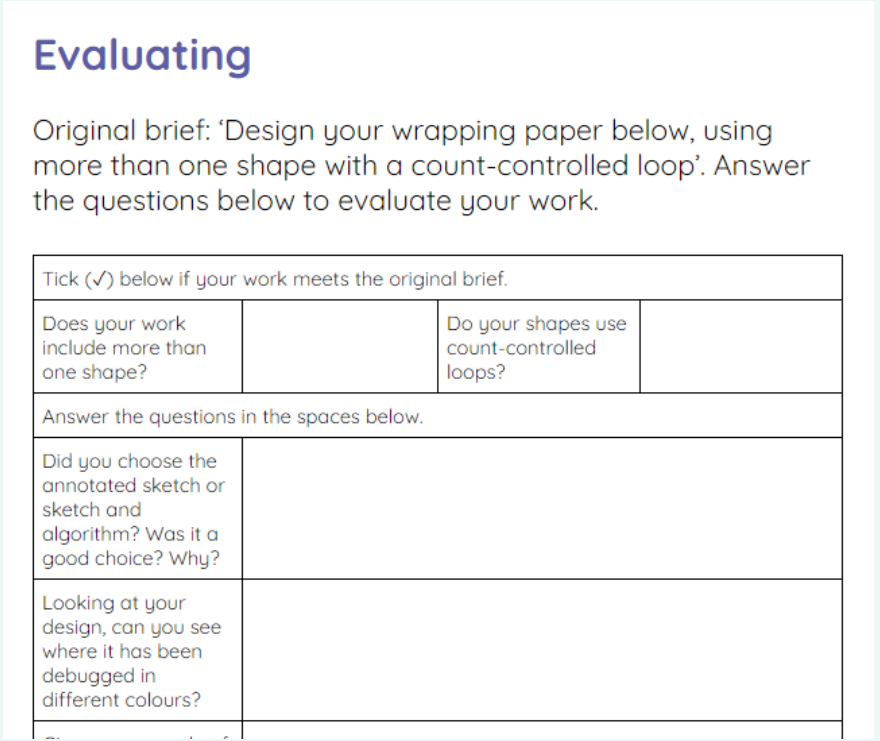
If you find an error in your design, use a different coloured pencil to correct it.

What debugging strategies have we used before?

- Tracing through the code line by line to check it
- Reading the code out loud to see if it makes sense
- Decomposing the program into smaller parts to find errors
- Looking at other patterns with a similar code and checking your changes

Evaluating your programs

Use the activity sheet to evaluate your work, including reflecting on the strategies that you used for debugging.



Evaluating

Original brief: 'Design your wrapping paper below, using more than one shape with a count-controlled loop'. Answer the questions below to evaluate your work.

Tick (✓) below if your work meets the original brief.			
Does your work include more than one shape?		Do your shapes use count-controlled loops?	
Answer the questions in the spaces below.			
Did you choose the annotated sketch or sketch and algorithm? Was it a good choice? Why?			
Looking at your design, can you see where it has been debugged in different colours?			

Creating a program

Share your program on screen with a partner. Tell your partner:

- Two things that you had to debug and how you did it
- Something that went well
- Something that you would like to have more practice with

How confident are you? (1–3)

- I can design a program that includes count-controlled loops
- I can make use of my design to write a program
- I can develop my program by debugging it

3 – Very confident

2 – Unsure

1 – Not confident

This lesson

In this lesson, you...

Designed wrapping paper using your preferred method

Included shapes with count-controlled loops

Used your design to program the wrapping paper in Logo

Debugged and evaluated your program