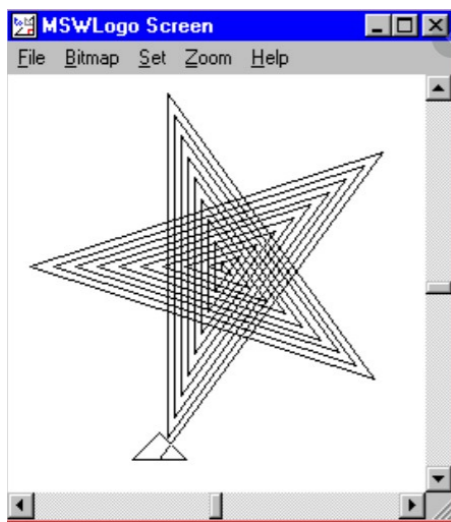


4.3 Programming A – Repetition in shapes – Knowledge Organiser

Year 7 Topic number Hyperlink to planning

Key prior learning is highlighted in green, but must be revisited and reinforced during this teaching sequence.

Overview

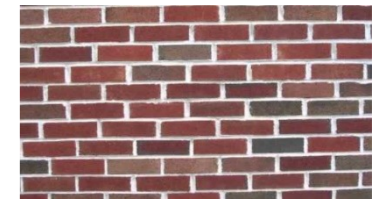


Repetition in Shapes

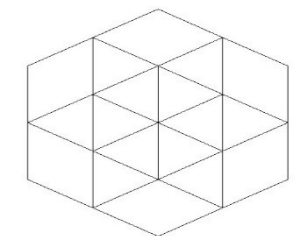
- **Programming is when we make a set of instructions for computers to follow.**
- **Logo** is a text-based program that we can use in order to create shapes and patterns.
- We use **algorithms** (a set of instructions to perform a task) which we can plan, model and test, in order to create accurate and imaginative shapes and patterns.

Programming Patterns

-Patterns: Patterns are things that repeat in a logical way. In everyday life, patterns are everywhere!

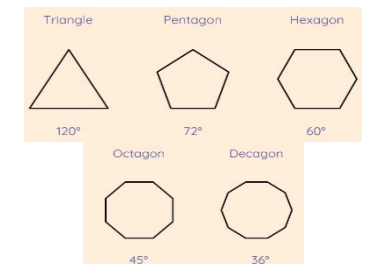


-Patterns in Logo and scratch: Instead of typing in the code to create each individual shape, we can save time by repeating a sequence of instructions. We use the 'repeat' function.



-Repeat: Type the command 'repeat' — this repeats commands a set number of times. The number following repeat is the number of times to repeat the code, and the code to be repeated is in square brackets, e.g. repeat 4 [FD 100 LT 90]

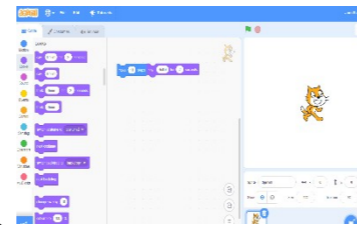
The above code will repeat FD 100 LT 90 four times.



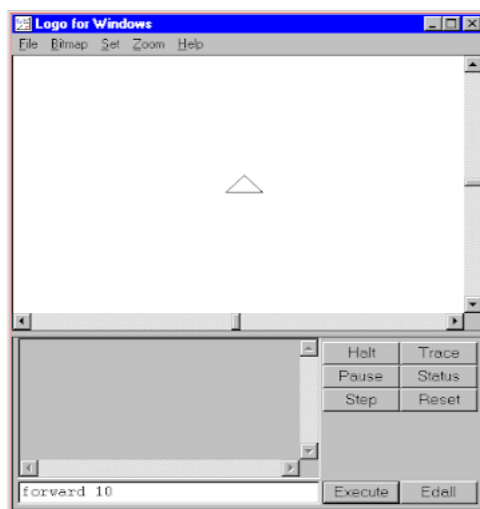
-Creating Shapes and Loops: To make shapes, we need to know the angles of corners of different shapes (see right). Using the repeat function with shapes can help us to make spirals.

The Basics of Turtle Academy (Logo) and the Scratch Pen tool

- Logo is a useful drawing language
- Scratch can do everything Logo can do using the pen tool
- To activate the pen tool in scratch, click on the bottom left corner, then click pen



The Display:



Basic Commands:



- FD**: Forwards. Always followed by a space and the number of steps, e.g. FD 50
- BK**: Backwards. As above, e.g. BK 50
- LT**: Left turn. Always followed by a space and then the degrees to turn, e.g. LT 90
- RT**: Right turn. As above, e.g. RT 90
- CS**: Clears any pen marks on your screen and gets the turtle back to the centre.
- PU**: Stops turtle from leaving a pen trail.
- PD**: Makes turtle leave a pen trail again.

Sequencing and Algorithms

-A sequence is a pattern or process in which one thing follows another.

-We design algorithms (sets of instructions for performing a task) to help us program the sequence that we require to achieve our desired outcomes.

-Programming is the process making code recognized by the computer (using your algorithm).

Trialing and Debugging

-Programmers do not put their computer programs straight to work. They trial them first to find any errors:



-**Sequence errors**: An instruction in the sequence is wrong or in the wrong place.

-**Keying errors**: Typing in the wrong code.

-**Logical errors**: Mistakes in plan/thinking.

-If your algorithm does not work correctly the first time, remember to debug it.

commands code snippet pattern repetition repeat value trace decompose procedure