

Turtle Graphics Notes

1. Background

This mini-project will help with a new research project with the University of Cambridge Primary School. We shall investigate whether composing stories directly helps children to learn to code. To do this we need a parallel non-story WeeBee activity, and this will be turtle graphics.

2. Turtle Graphics API

Turtles have two intrinsic behaviours; they can move forward a given distance, and they can rotate through a given angle. Also, they can draw or not-draw when they move. They do inherit some affordances of WeeBees such as being able to talk.

The default direction for the turtles is facing right. So, when a shape is drawn the turtle should be rotated so it is facing to the right. This will allow simple concatenation of drawing sequences.

<code>turtle1.moveForward(20);</code>	moves forwards 20 units, in the direction the turtle is heading
<code>turtle1.rotate(45);</code>	rotates 45-degrees from the current heading. Currently negative angle are anti-clockwise. This may need to be changed to conform to “standard” approaches.
<code>turtle1.setPenDown(true);</code>	enables drawing (default red).
<code>turtle1.setPenDown(true,color);</code>	enables drawing with a specified color which uses the keywords red blue black cyan orange yellow green .
<code>turtle1.setPenDown(false);</code>	pen is not down, so there is no drawing.
<code>turtle1.moveForwardTo(X,Y);</code>	moves directly to coordinates (X,Y) without drawing.
<code>turtle1.moveForwardTo(X,Y,true);</code>	moves directly to coordinates (X,Y) without drawing and then rotates so it is facing right.

3. This Design-Build-Test Mini-Project

You should build up a sequence of learning activities which is *progressive* in other words starts off simple and ends up challenging. You may want to produce several activities with the same ‘difficulty factor’ I will let you define your own measure of difficulty.

A simple shape like a square could be coded as 4 lines. Then this could be put inside a function with no parameters, then a couple of parameters could be added, then a couple more. Complex patterns would be drawn using functions. Of course, you can use loops, but the if-then-else construct will not work with this engine mode. You do have access to lots of the Java Language.

There are two turtles **turtle1** and **turtle2** so for an advanced activity you could get them to collaborate, say to draw a house.

Here's some suggestions, I won't add any commentary. Look around inside and outside for object which could be drawn as simple geometrical shapes.

