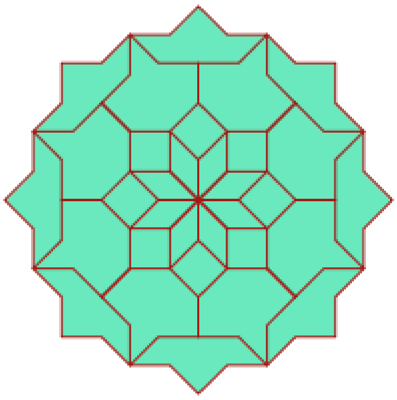
Visual Patterns

with Kojo



by

Lalit Pant and Anusha Pant

Version: March 24, 2015

A Note for Facilitators and Teachers

This book contains a series of activities for kids to play with.

Most activities contain a fully defined program and a picture of the output of the program. For such activities, ask a kid to type in the program inside the script editor, run it, and then check that the actual output of the program matches the output shown in the book. Then, ask the the kid to do some reflection, i.e., think about and discuss what was just learned.

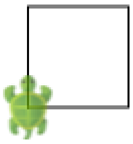
Some activities contain an incomplete program, with the incomplete areas marked with ???, and a picture of the output of the (complete) program. For such activities, ask a kid to type in the program inside the script editor, fill out the incomplete portions of the program, run it, and then (as before) check that the actual output of the program matches the output shown in the book.

At every step, encourage the following:

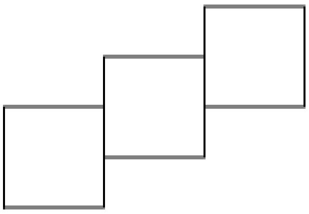
- exploration, discovery, and a sense of play.
- perseverance in the face of unexpected results, and joy in the process of figuring out what went wrong.
- reflection and discussion about what was learned.
- digressions and diversions from the provided sequence of activities.

It is not important to finish all the activities. But it is vitally important to spend time with, go deep into, enjoy, and learn from each activity!

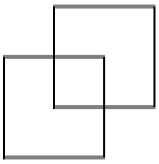
```
def square() {
    repeat(4) {
        forward(50)
        right()
    }
}
clear(); setAnimationDelay(10)
setPenThickness(1); setPenColor(black)
square()
```



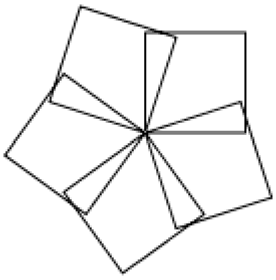
```
def square() { /* same as before */ }
def block() {
    square()
    right(90)
    hop(50)
    left(90)
    hop(25)
}
cleari(); setAnimationDelay(10)
setPenThickness(1); setPenColor(black)
repeat(3) {
    block()
}
```



```
def square() { /* same as before */ }
def block() {
    square()
    ???
}
clear(); setAnimationDelay(10)
setPenThickness(1); setPenColor(black)
repeat(2) {
    block()
}
```



```
def square() { /* same as before */ }
def block() {
    square()
    ???
}
clear(); setAnimationDelay(10)
setPenThickness(1); setPenColor(black)
repeat(5) {
    block()
}
```



Shown below are forty figures. Some are building blocks for patterns, and the others are the patterns themselves. Use the ideas learned while working through the previous page to make the patterns. Each program that you write to make a pattern should contain:

- the definition (via a `def`) of the building-block shape of the pattern.
- the definition (via a `def`) of the pattern building-block (which includes the building-block shape, and some commands to set the position and direction of the turtle to make the next building block in the pattern).
- A repeat command that makes the pattern building-block a certain number of times to create the full pattern.

Note – the following are Kojo drawings of the figures presented in a wonderful book by Barry Newell called Turtle Confusion.