Initial Steps in Programming

with Kojo
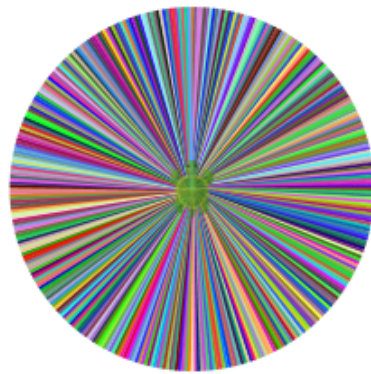
by

Lalit Pant

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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!

```
clear()
forward(50)
```

```
clear()
forward(50)
right(90)
forward(50)
right(90)
```

```
clear()
forward(50)
???
```

```
clear()
forward(50)
???
```

```
clear()
forward(50)
right(90)
forward(50)
left(90)
forward(50)
```
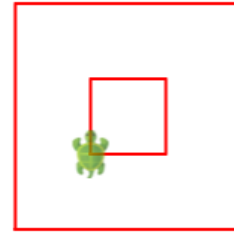

```
clear()
???
```

```
clear()
setSpeed(medium)
// make the figure without
// re-drawing over any line
???
```
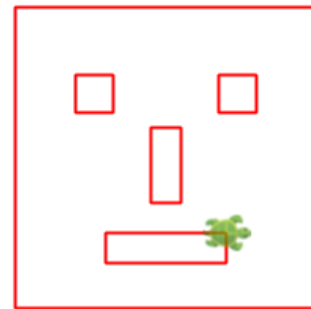
```
clear()
forward(150)
right(90)
???

hop(50)
right(90)
hop(50)
left(90)

forward(50)
right(90)
???
```
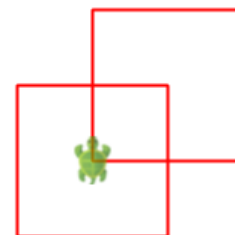

```
clear()
setSpeed(fast)
forward(200)
// pay attention to symmetry
???
```
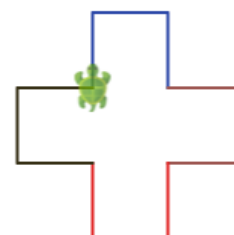

```
clear()
// Note the use of the repeat command
// How does the repeat command help?
repeat(???) {
    forward(100)
    right(90)
}
```

```
clear()
// Use repeat, hop, etc to make the figure
???
```
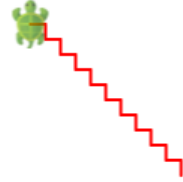

```
clear()
setSpeed(medium)
repeat(4) {
    setPenColor(randomColor)
    forward(50)
    right(90)
    ???
}
```

```
clear()
setSpeed(medium)
repeat(10) {
    forward(10)
    ???
}
```

```
clear()
setSpeed(medium)
setPenColor(black)
repeat(10) {
    setFillColor(randomColor)
    repeat(4) {
      ???
    }
    ???
}
```

```
clear()
setSpeed(medium)
setPenThickness(4)
repeat(8) {
    setPenColor(randomColor)
    forward(50)
    hop(-50)
    right(45)
}
```
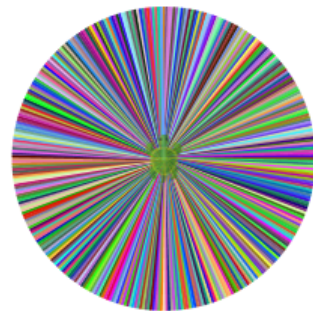
```
clear()
setSpeed(fast)
repeat(???) {
    setPenColor(randomColor)
    forward(100)
    hop(-100)
    right(1)
}
```

```
clear()
forward(50)
right(15)
setPenColor(black)
forward(50)
```

```
clear()
forward(50)
right(30)
setPenColor(black)
forward(50)
```

```
clear()
forward(50)
right(45)
setPenColor(black)
forward(50)
```

```
clear()
forward(50)
right(60)
setPenColor(black)
forward(50)
```

```
clear()
forward(50)
right(90)
setPenColor(black)
forward(50)
```
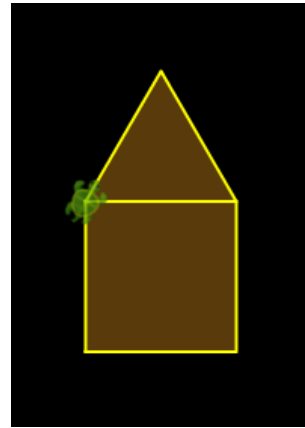
```
clear()
forward(50)
right(90 + 60)
setPenColor(black)
forward(50)
```

```
clear()
setSpeed(medium)
setBackground(black)
setPenColor(yellow)
setFillColor(brown)
repeat(4) {
    forward(100)
    right(???)
}
hop(100)
right(???)
repeat(3) {
    forward(100)
    right(???)
}
```
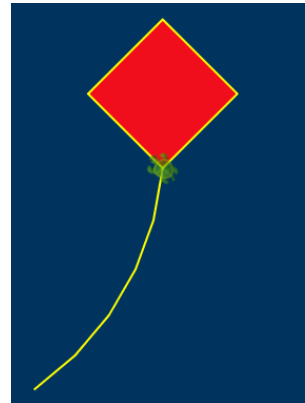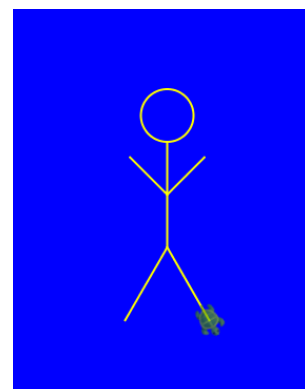
```
clear()
setSpeed(medium)
setBackground(blue)
setPenColor(yellow)
right(50)
repeat(5) {
    forward(50)
    left(10)
}
setFillColor(red)
left(???)
repeat(4) {
    forward(???)
    right(90)
}
```

```
clear()
setSpeed(medium)
setBackground(blue)
setPenColor(yellow)
right(90)
circle(25)
right(90)
forward(50)
right(90 + 45)
forward(50)
hop(-50)
right(90)
forward(50)
???
```

Free Thinking Time

You have done a fair bit of guided activity. Now it's time to make a few drawings of your own! Feel free to first sketch your idea on paper and then draw it in Kojo.

Here are some ideas to get you going:

- Flags of a few different countries.

- Patterns made out of geometric shapes like squares, rectangles, triangles, etc.

- Drawings based on real-world objects like houses, buildings, cars, ships, tanks, etc.

- Anything else that you can dream up!

After you are done, move on to the next page to start playing with patterns in a systematic way.

```
clear()
setSpeed(medium)
setPenThickness(4)
repeat(8) {
    setPenColor(randomColor)
    ???
    left(45)
}
```

```
clear()
setSpeed(medium)
setPenThickness(4)
repeat(4) {
    setPenColor(randomColor)
    ???
}
```
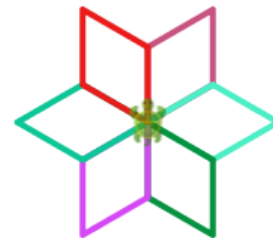
```
clear()
setPenColor(darkGray)
setPenThickness(4)
forward(50)
right(60)
forward(50)
right(120)
???
```

```
clear()
setSpeed(medium)
setPenThickness(4)
repeat(???) {
    setPenColor(randomColor)
    ???
    right(???)
}
```

```
clear()
setSpeed(medium)
setPenThickness(4)
repeat(???) {
    setPenColor(randomColor)
    ???
    right(???)
}
```

```
def square() {
    repeat(4) {
        forward(50)
        right(90)
    }
}
clear()
setSpeed(medium)
setPenThickness(4)
repeat(3) {
    setPenColor(randomColor)
    square()
    ???
}
```