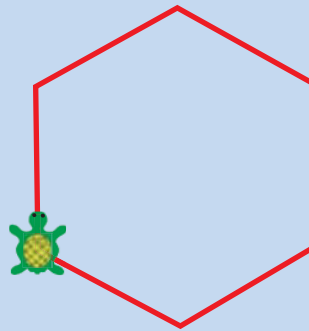
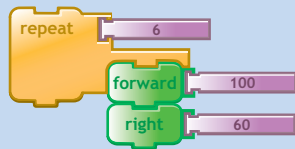
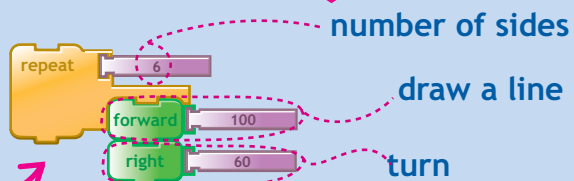
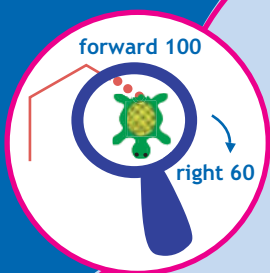


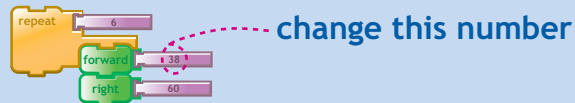
## Getting Started



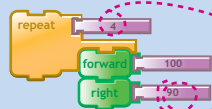
## Getting Started



## BIGGER OR SMALLER



## SQUARE



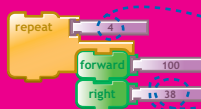
these numbers  
have changed

## TRIANGLE



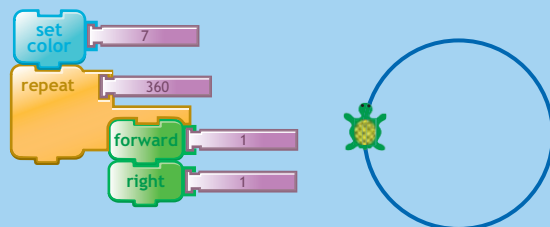
these numbers  
have changed

★ GETTING  
STARTED



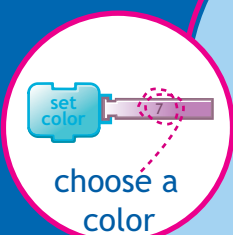
$$90 \times 4 = 360$$

360 is all the  
way around

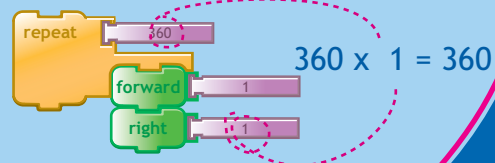


## Drawing Circles

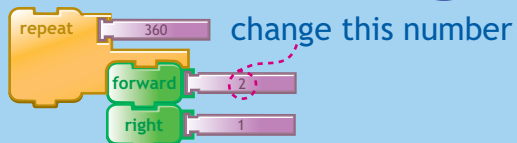
It takes a lot of little steps



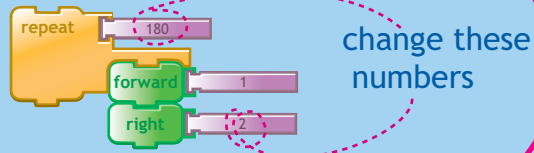
But it still turns 360



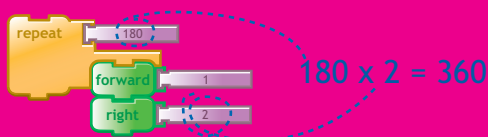
**BIGGER**



**SMALLER**



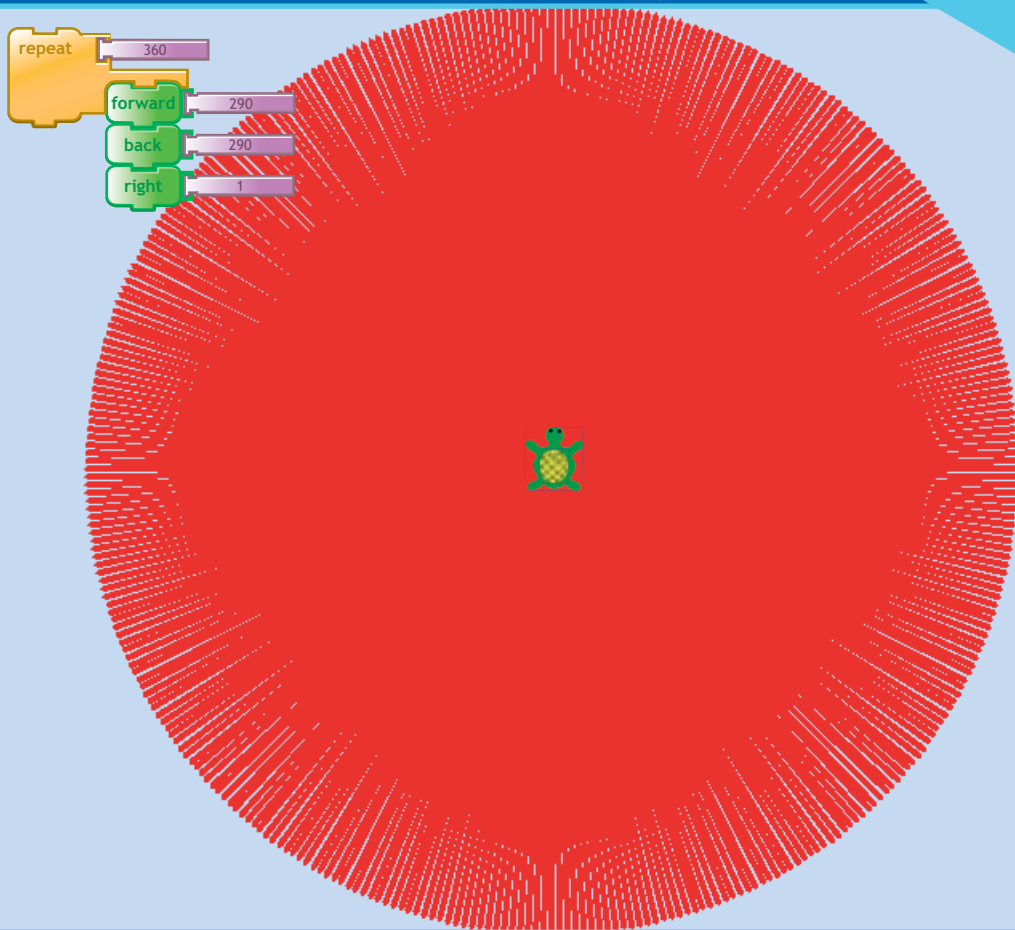
**DRAWING CIRCLES**



360 is all the way around

3

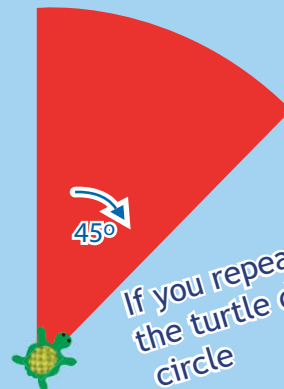
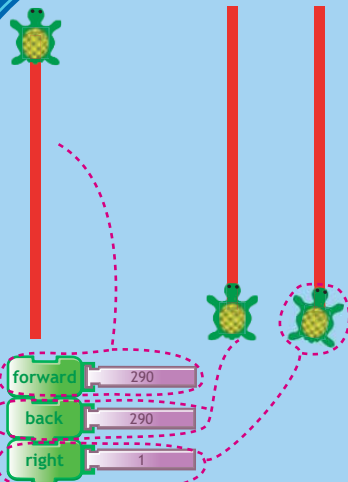
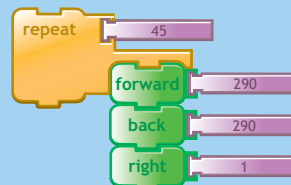
# Spinning Circle



3

## Spinning Circle

REPEAT IT 45 TIMES



### SPINNING CIRCLES

CHANGE COLORS



CHANGE PEN SIZE

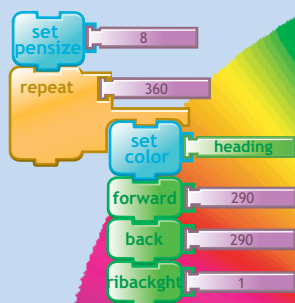


-----&gt;



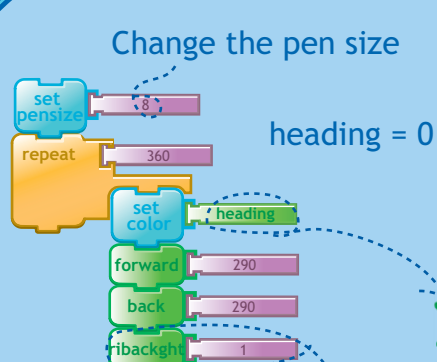
4

## Rainbow



## Rainbow

4



the next time through  
the heading will be 1,  
then 2, 3, 4... until 359

heading = 20

If you repeat 360  
times, the turtle  
does a full circle



RAINBOW

the first  
20 repeats

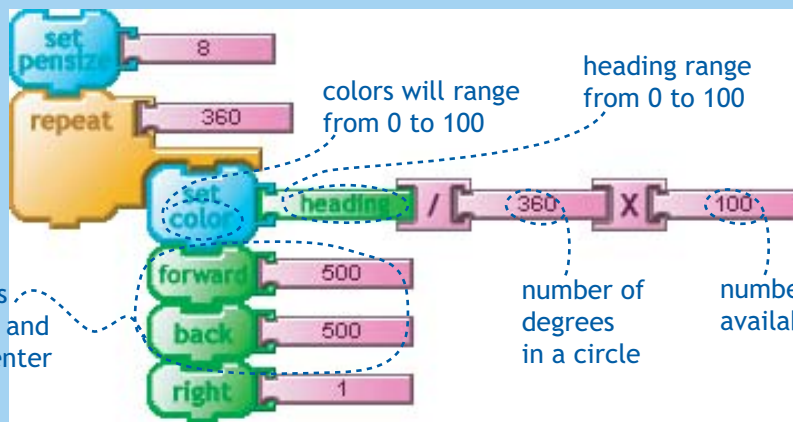
right 1 makes the  
heading change by  
one each time



COLORS

0

100



the turtle goes  
off the screen and  
back to the center

colors will range  
from 0 to 100

heading range  
from 0 to 100

heading / 360  
x 100 goes  
from 0 to  
100

number of  
degrees  
in a circle

number or colors  
available



RAINBOW MATH

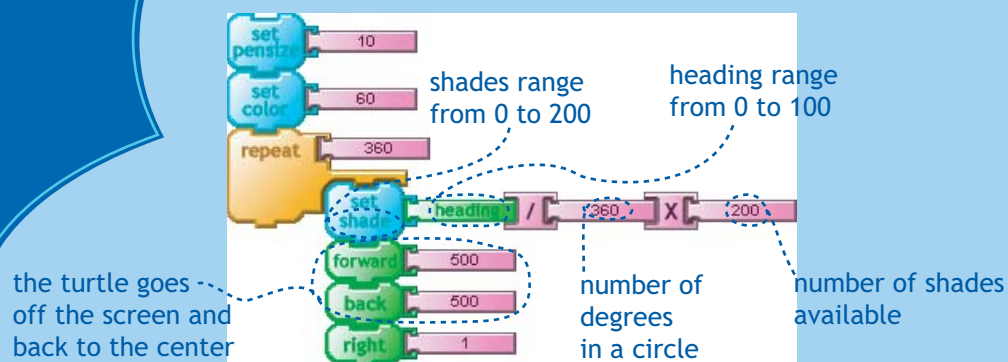
TRY THIS



Change this number  
and see what happens

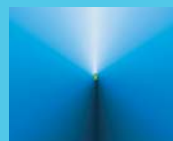


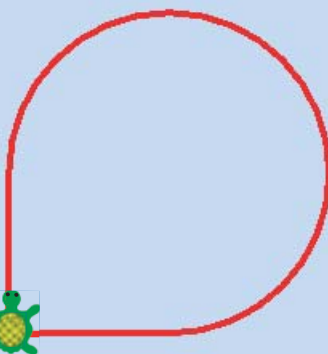
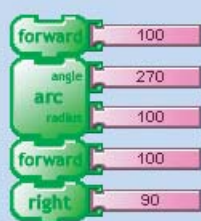
## Turtle Shades



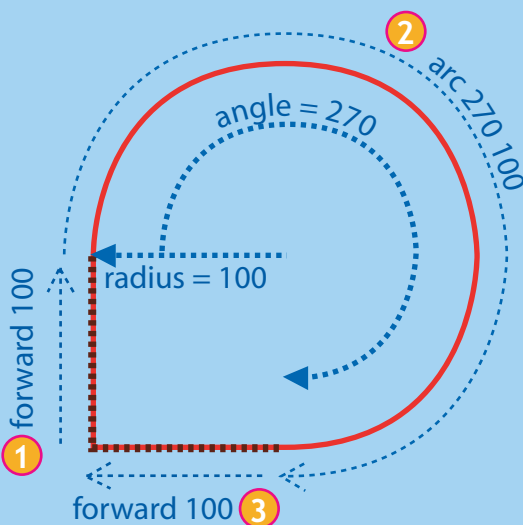
SPINNING  
SHADES

TRY TO CREATE  
THIS IMAGE





the turtle ends pointing up  
as it started



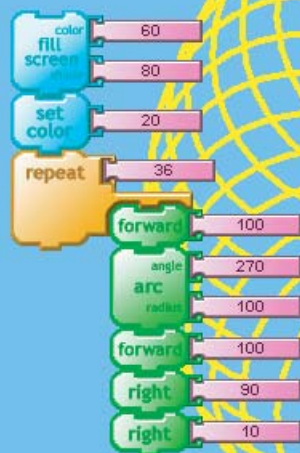
ARC

CAN YOU MAKE...





# Arcs in a Circle



## Arcs in a Circle

do it once



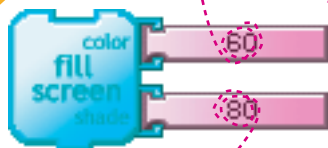
turn 100



do it again and turn



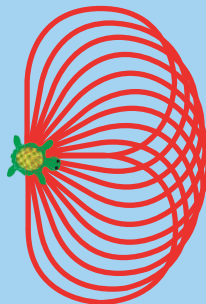
choose a color



choose a shade

and fill the screen

do it 10 times



If you repeat it 36 times,  
the turtle does a full circle

$$10 \times 36 = 360$$



### ARCS IN A CIRCLE

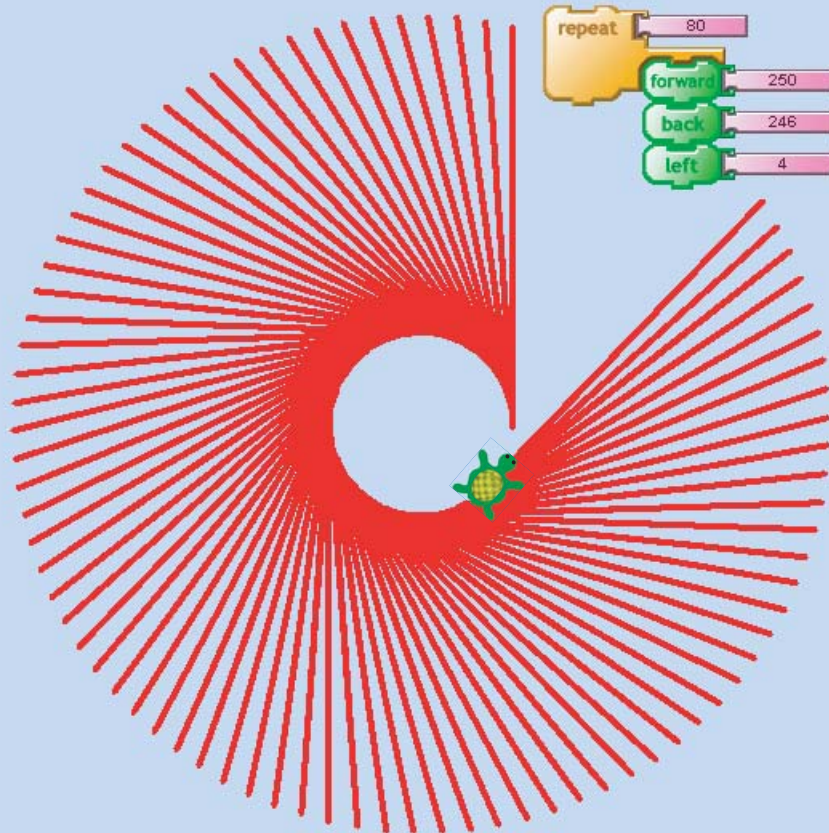


=

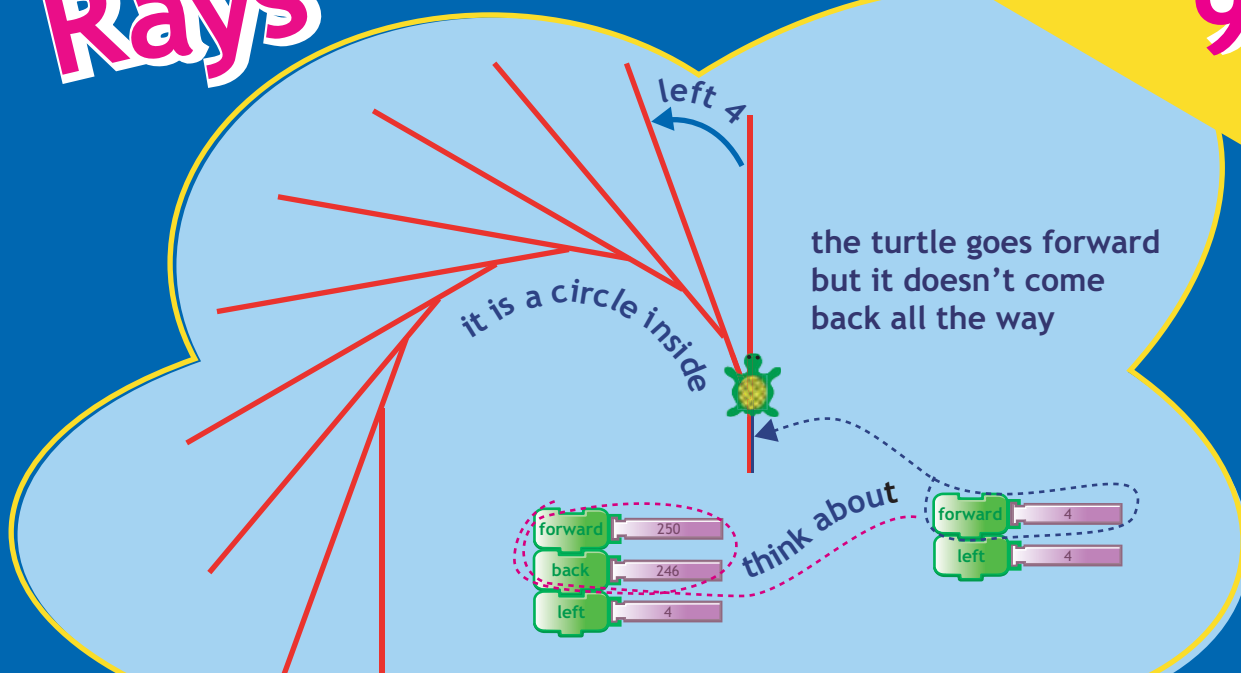




## Rays



## Rays



CHANGE SOME NUMBERS AND SEE WHAT HAPPENS

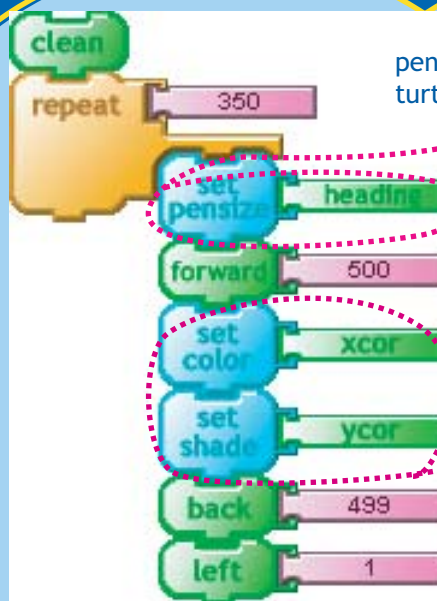
10

## Candy Vortex



## Candy Vortex

10



pensize gets smaller as the  
turtle turns (359, 358, 357..)

the color and shade  
are set by the turtle's  
X and Y position



CANDY  
VORTEX

EXPERIMENT! SWITCH AROUND THESE BLOCKS:

heading

ycor

xcor

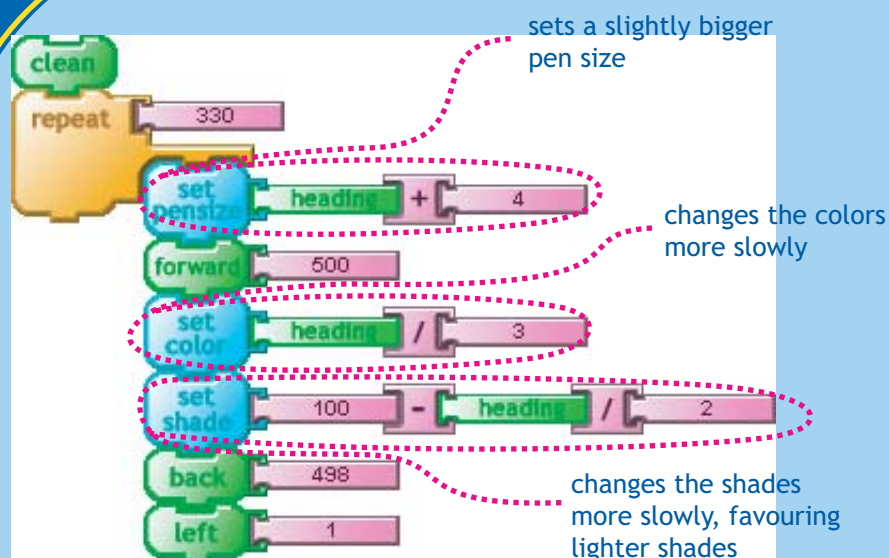
11

Smooth Candy



Smooth Candy

11

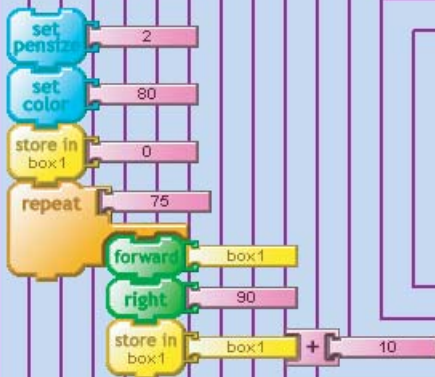
SMOOTH  
CANDY

USE THESE BLOCKS TO CHANGE THIS STACK:



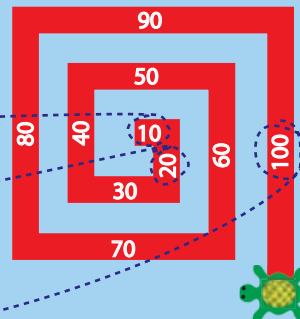
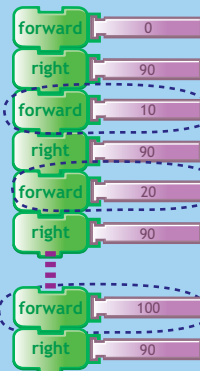


## Spiral

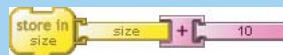


## Spiral

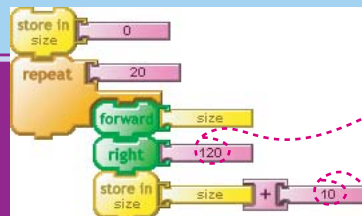
this is like doing



box1 starts at 0



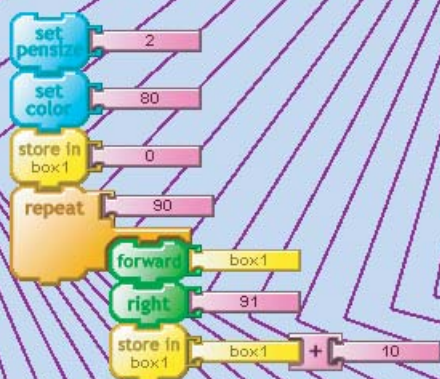
adds 10 each time



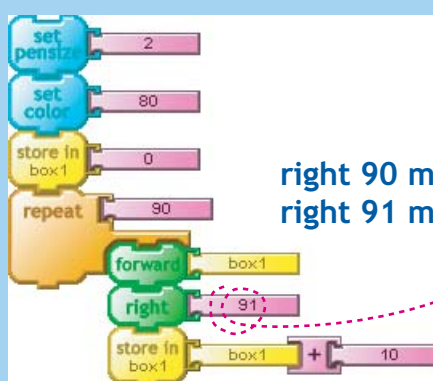
change this number  
and this one too



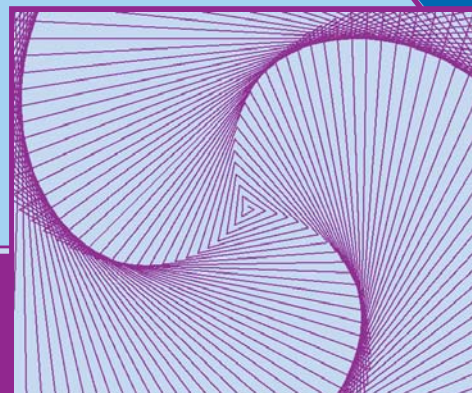
SPIRAL



## Bent Spiral



right 90 make a square spiral  
right 91 makes a bent square spiral

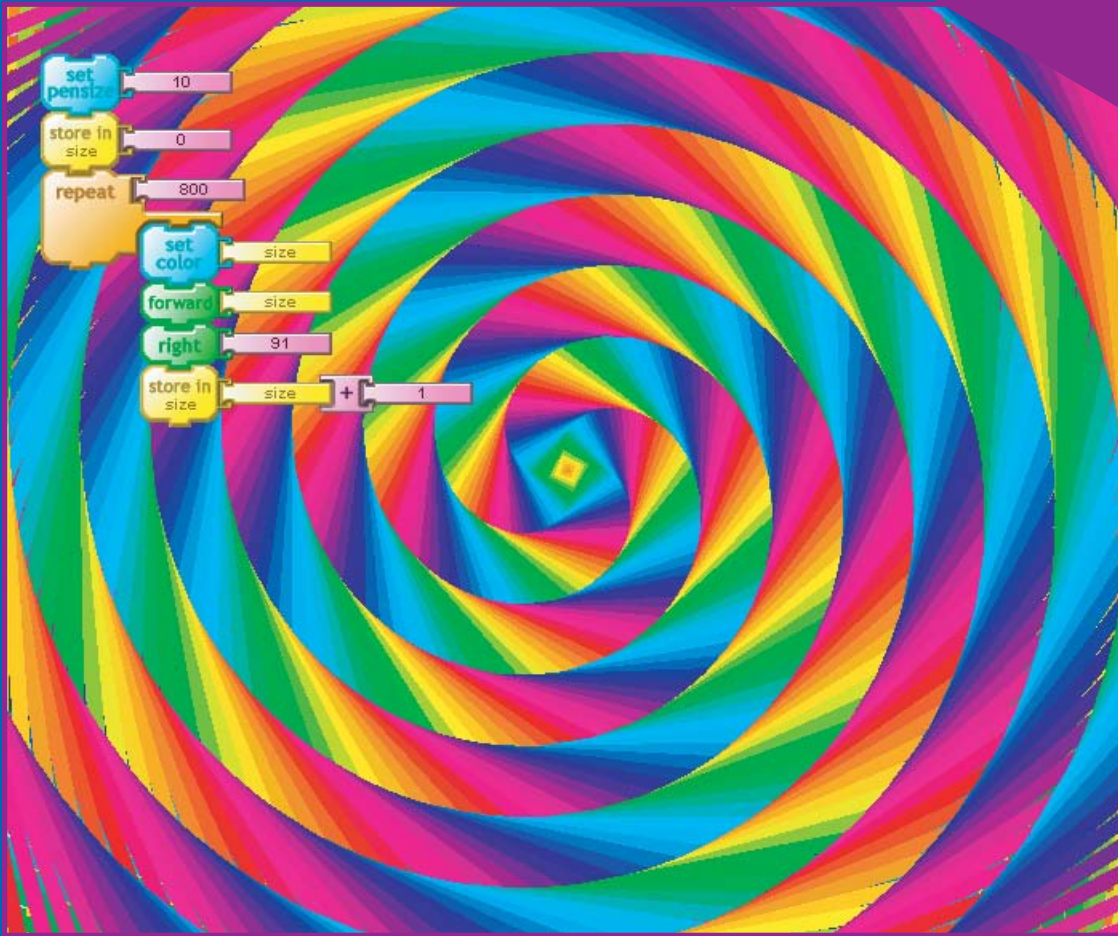


**BENT  
SPIRAL**

Try making a bent  
triangle spiral



## Spin Rainbow

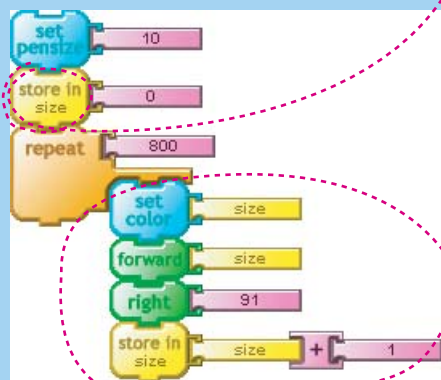


## Spin Rainbow

Click and type to change its name



the blocks automatically change names



each segment is slightly different color



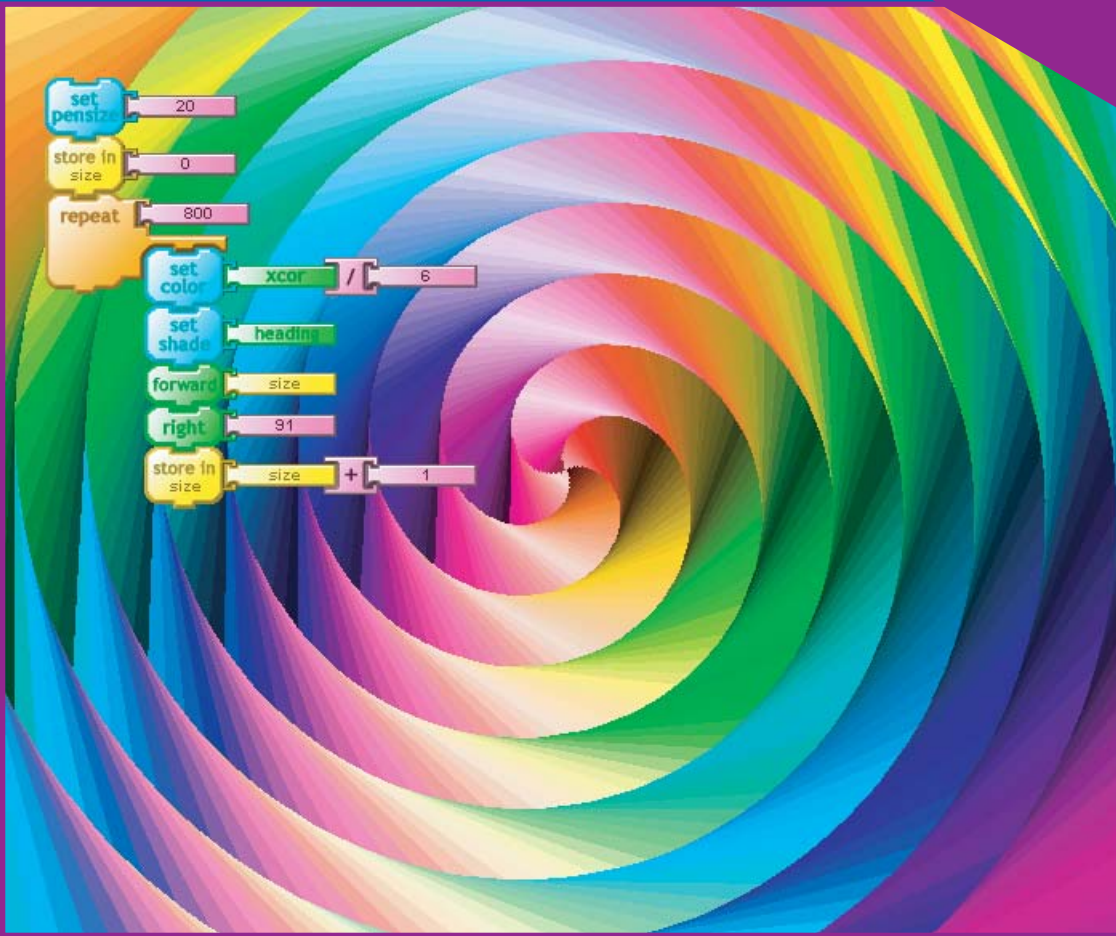
**SPIN  
RAINBOW**

It is good to use a name that indicates what is stored in the box



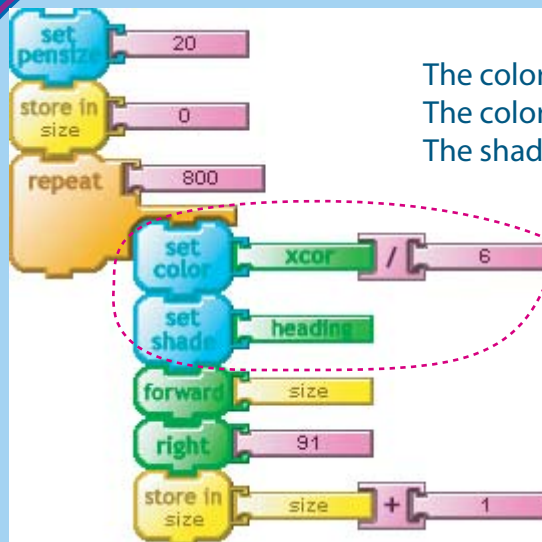
15

## Color Squirrel



## Color Squirrel

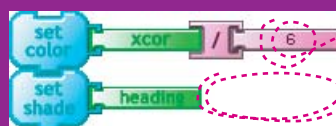
15



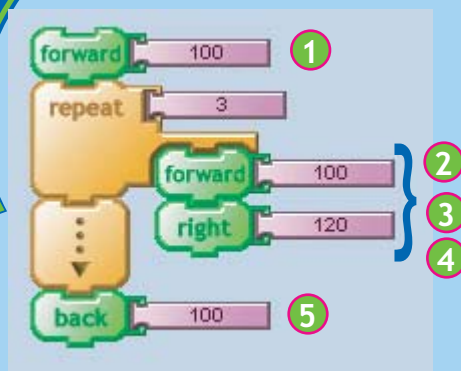
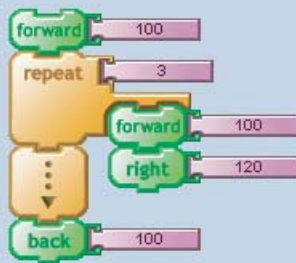
The color and shade of the pen change  
 The color depends on the X coordinate  
 The shade depends on the heading



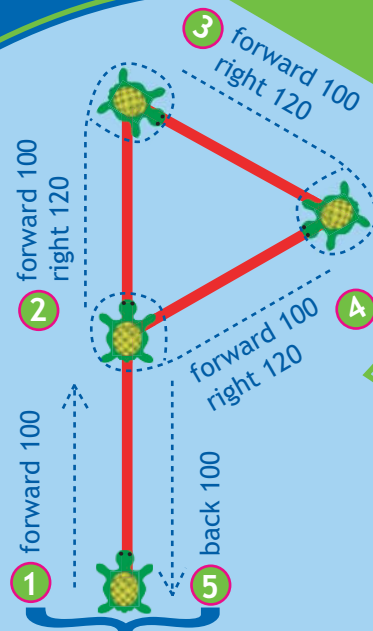
COLOR  
SQUIRAL



try changing this number  
 try adding arithmetic here

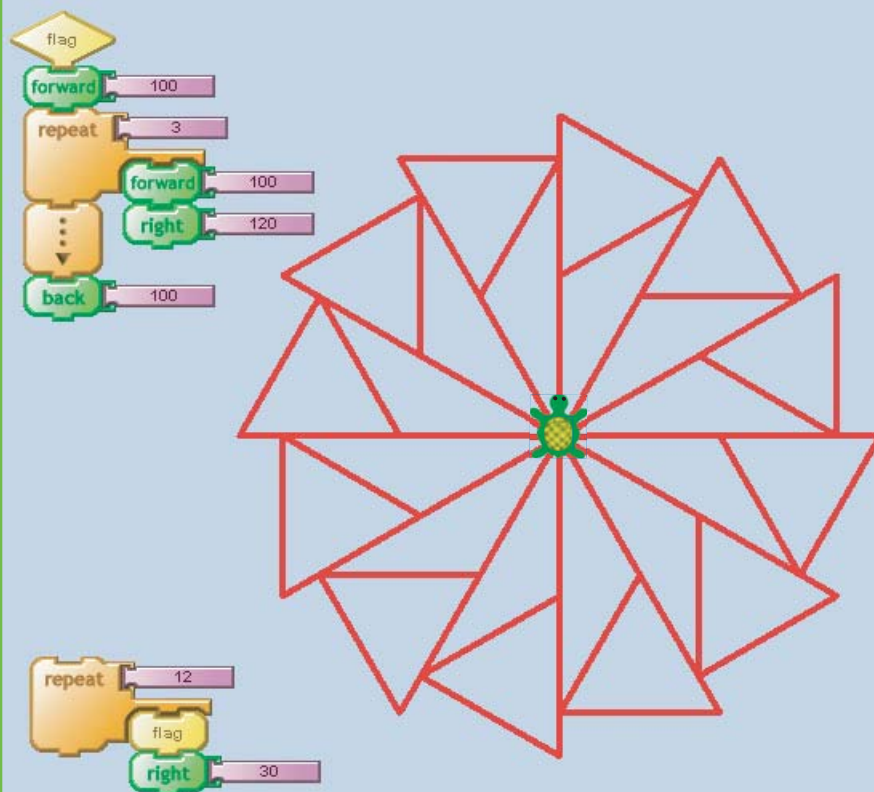


the turtle ended  
where it started



Try other things where the  
turtle ends where it starts





## Flags

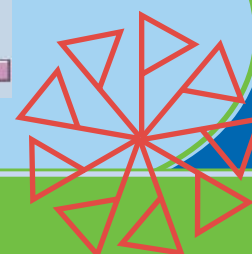
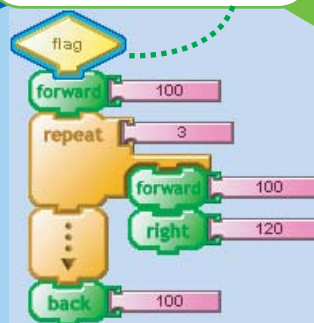
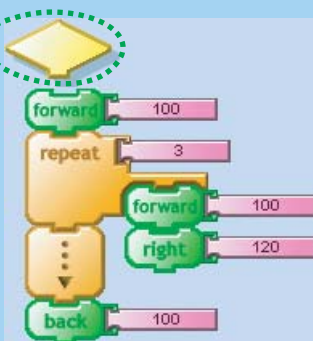
create a block

2. Click and type a name

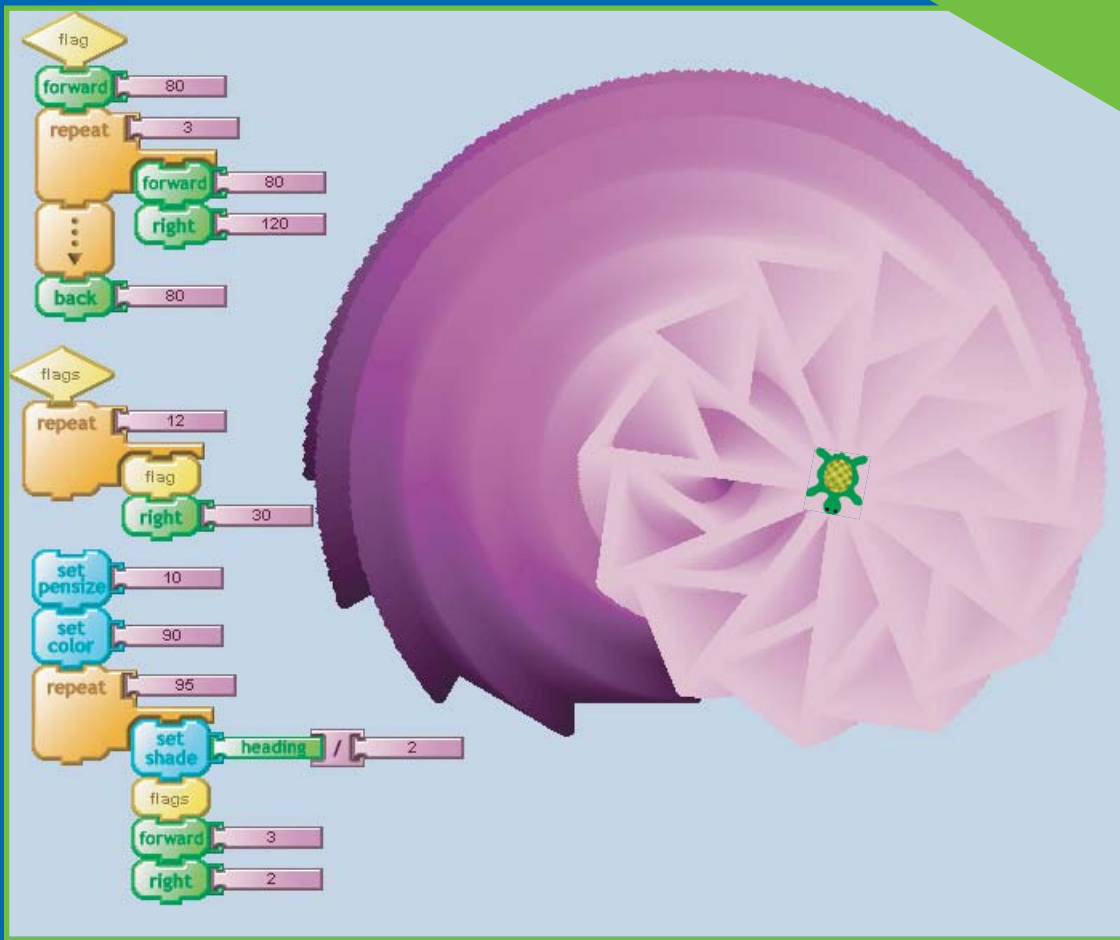
1. Place this block on top

3. A new block with that name appears

4. Use it in other stacks

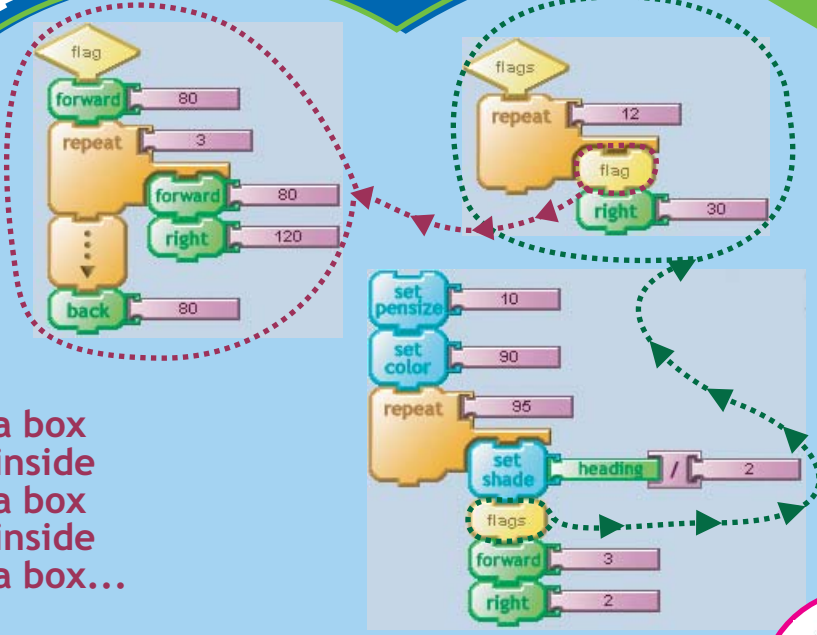


Create our own blocks and  
use them in different stacks



# Windmill

a box  
inside  
a box  
inside  
a box...

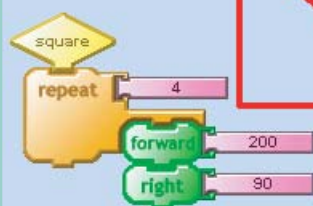


WINDMILL

Change the windmill or  
create something new







## Spin Square

make a  
square

turn  
36°

and another...

and another...

and another...

If you repeat it 10 times,  
the turtle does a full circle

$$10 \times 36 = 360$$



**SPIN  
SQUARE**

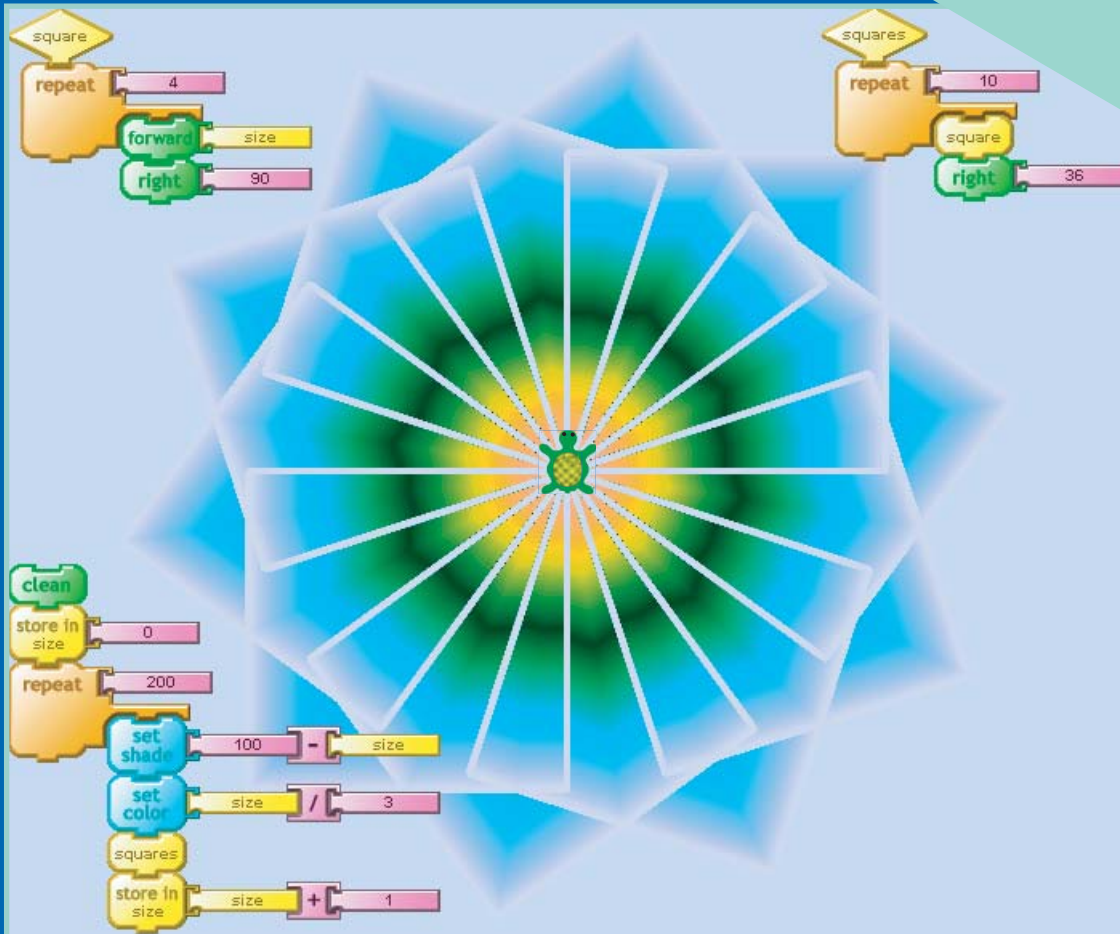
once you name a stack,  
a block appears here

My Blocks

square

20

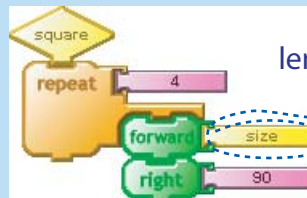
Flower



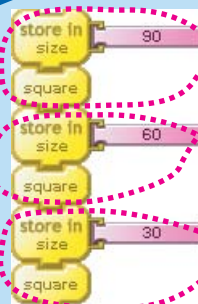
Flower

20

draw a square of any size



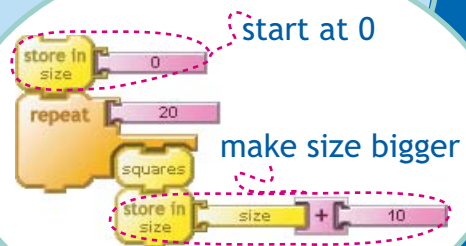
length of a side



square 90

square 60

square 30

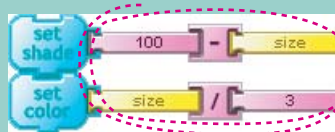


start at 0

make size bigger



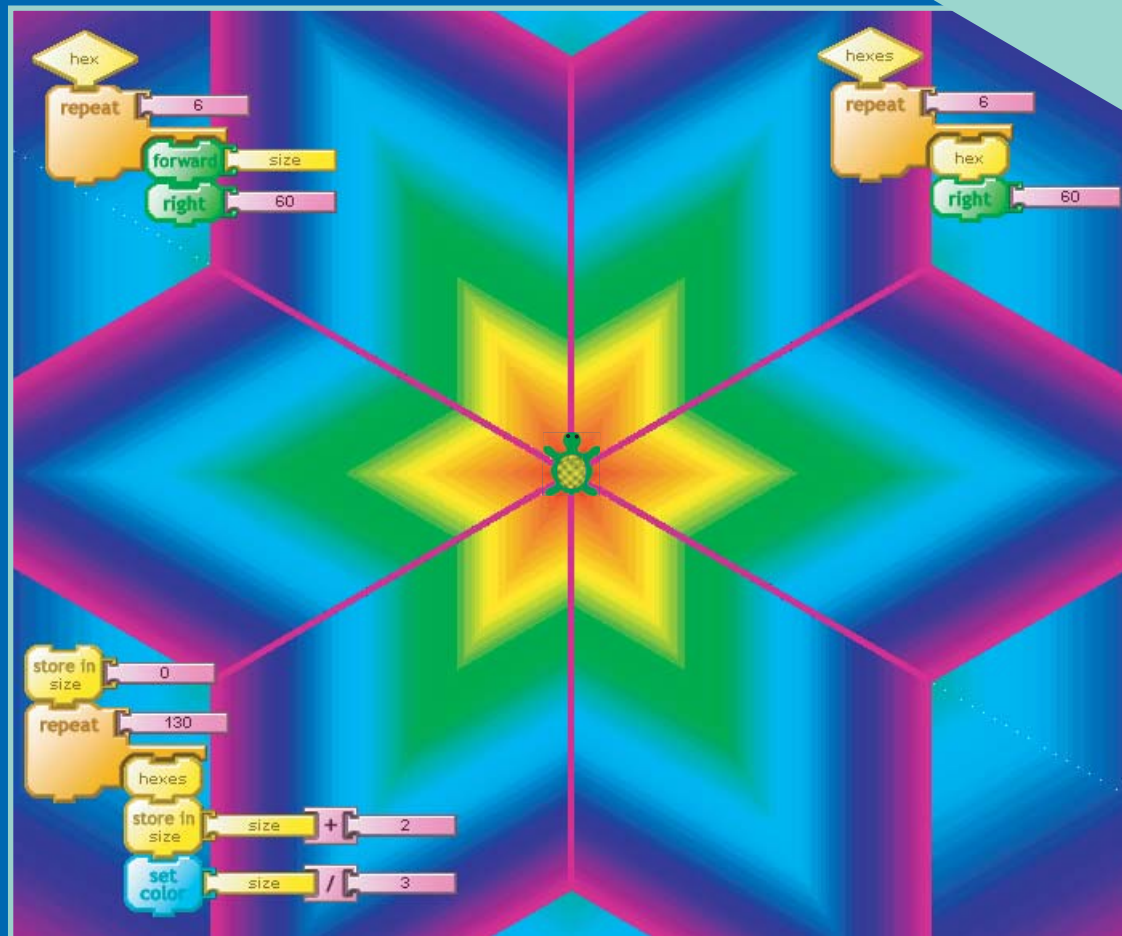
FLOWER

make some changes  
and see what happens



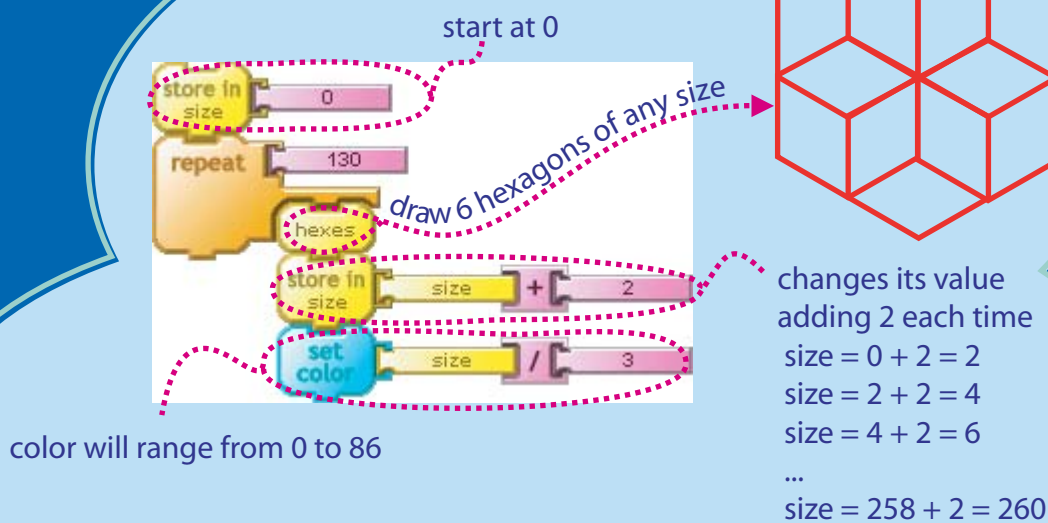
# 21

## Hexrainbow

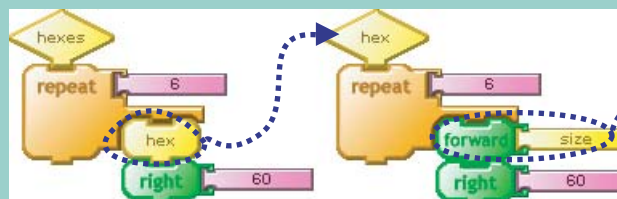


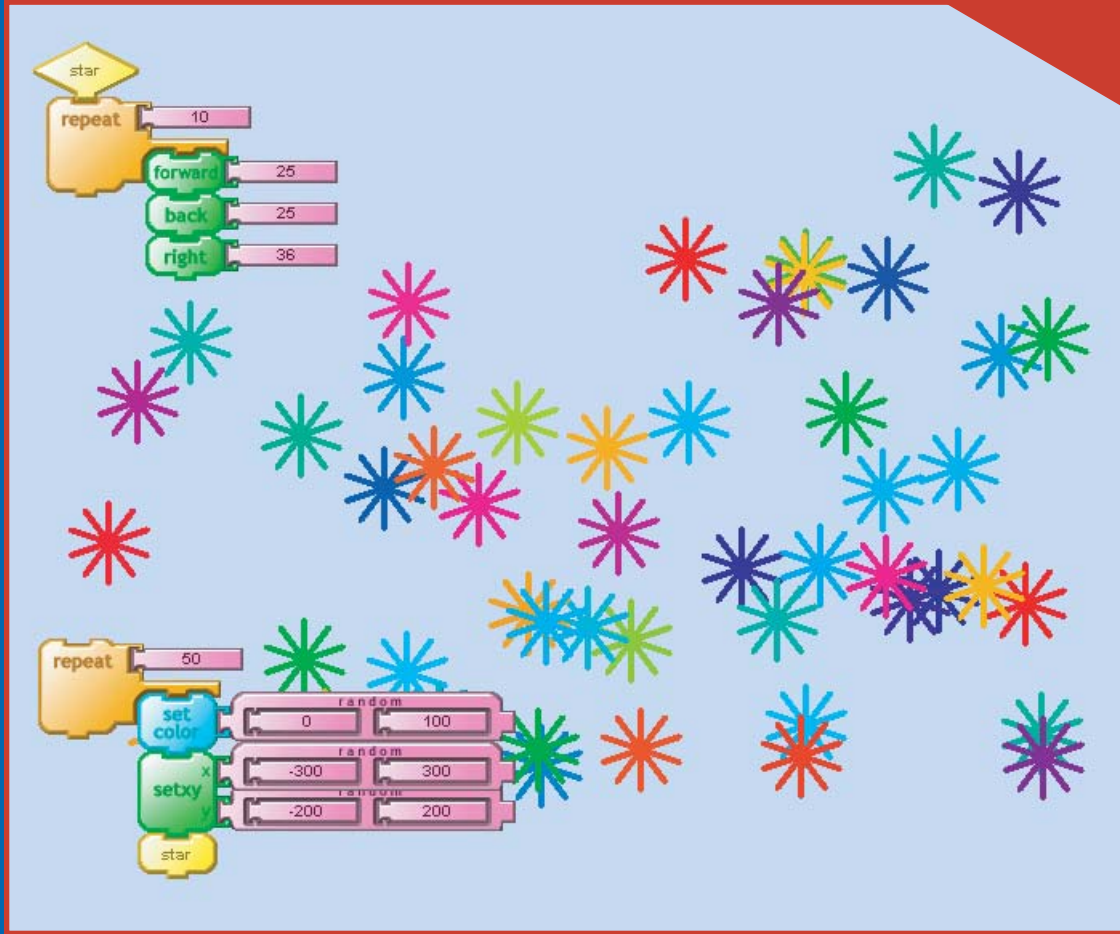
## Hexrainbow

# 21




## HEXRAINBOW





# Random Stars

pick a random color from 0 to 100

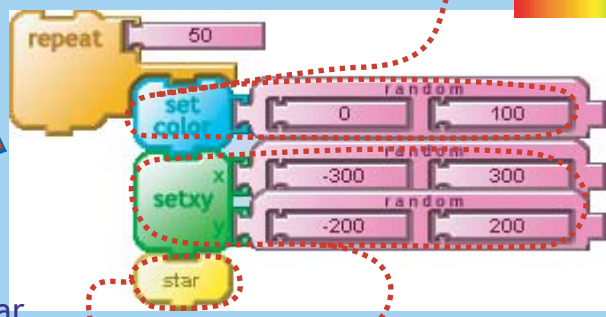


try this several times

what values did you get?

draw a star of a random color at a random place

pick a random X position, from -300 to 300, and a random Y position, from -200 to 200



The code blocks are: 'repeat 50', 'set color to random color', 'set x to random position', 'set y to random position', and 'star'. Red dotted lines connect the 'set color' block to the color spectrum bar, the 'set x' block to the X range text, and the 'set y' block to the Y range text.

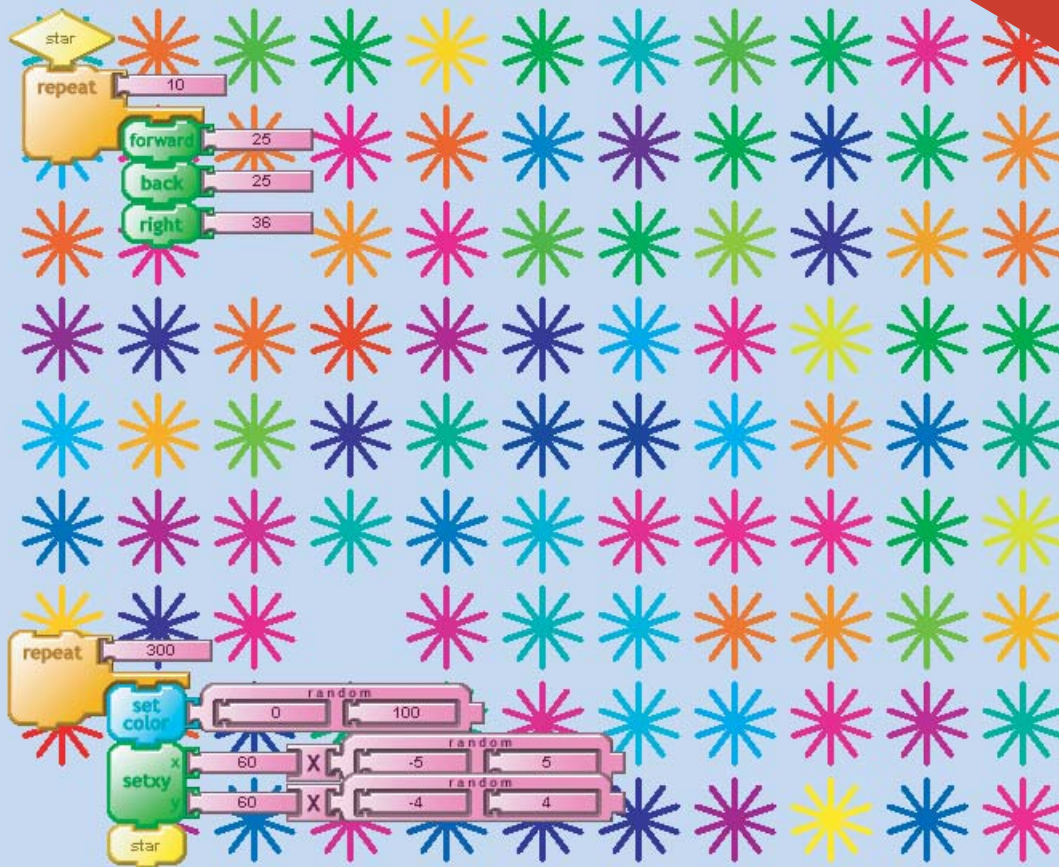


**RANDOM STARS**

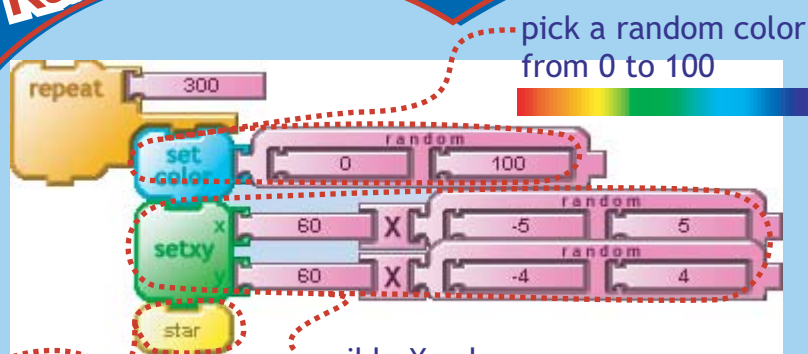


try using random with pen sizes and shades...





Not That Random



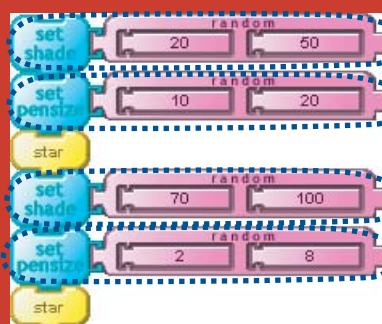
draw a star of a  
random color at a  
not that random place

possible X values:

-300 -240 -180 -120 -60 0 60 120 180 240 300

possible Y values:

-240 -180 -120 -60 0 60 120 180 240

NOT THAT  
RANDOM

pick a dark shade

pick a thick pen size

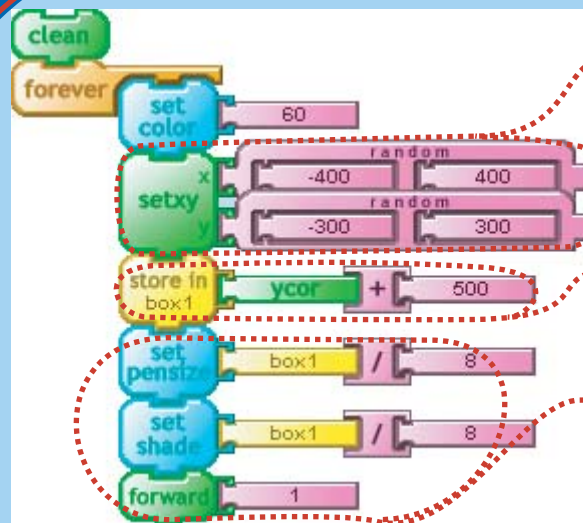
pick a lighter shade

pick a thinner pen size

## Bubbles



## Bubbles



pick a random position on the screen

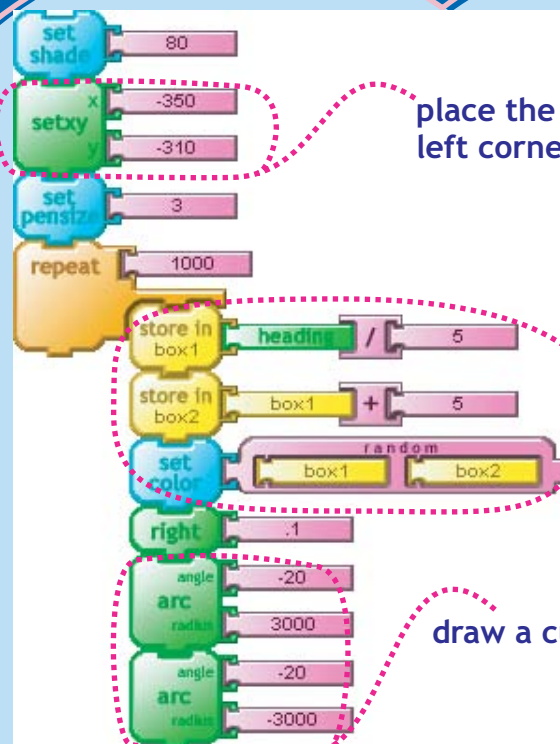
store in box1 a value between 200 and 800

set the pensize and shade so the bubbles get smaller and darker towards the bottom of the screen



## BUBBLES

try making the bubbles lighter and bigger towards the bottom

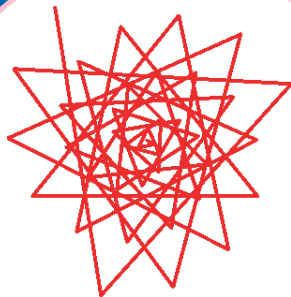
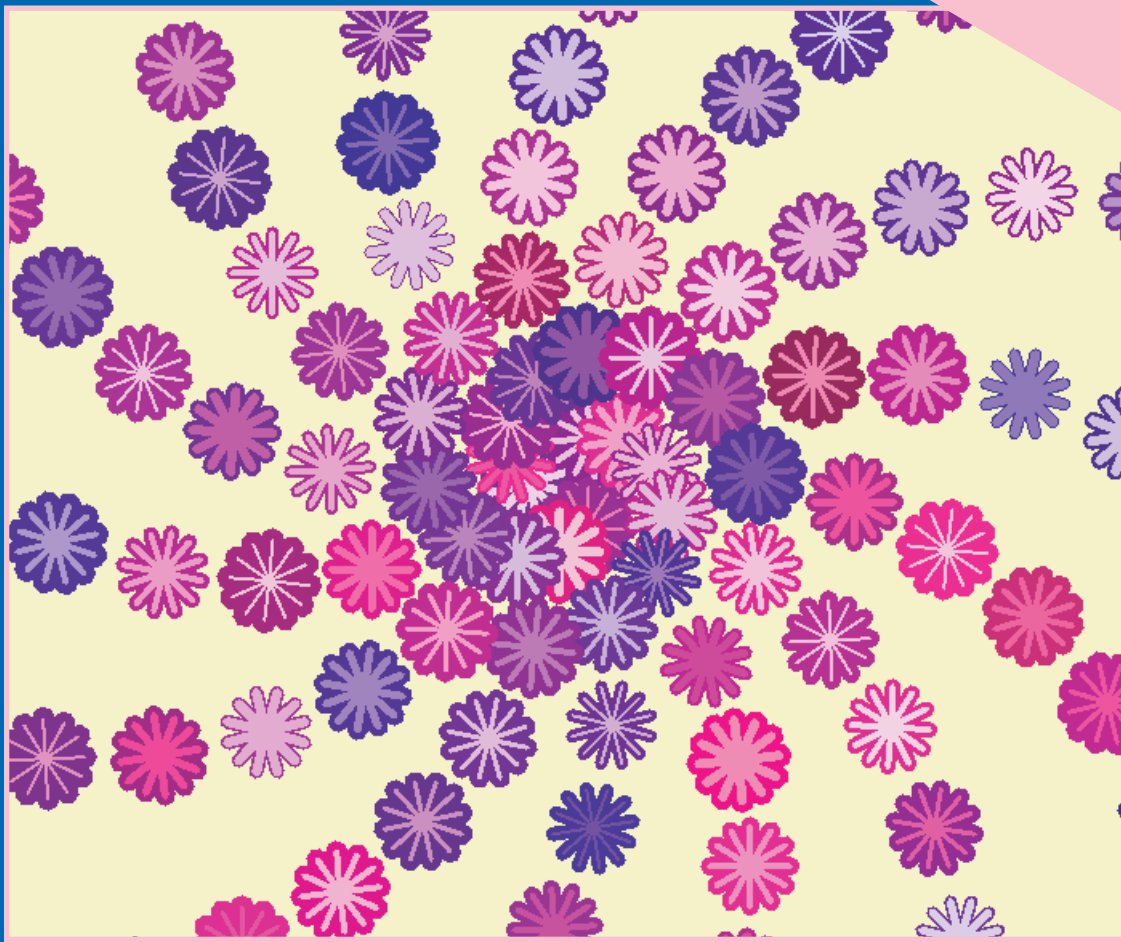


place the turtle at the bottom left corner (off the screen)

pick a color in a small range

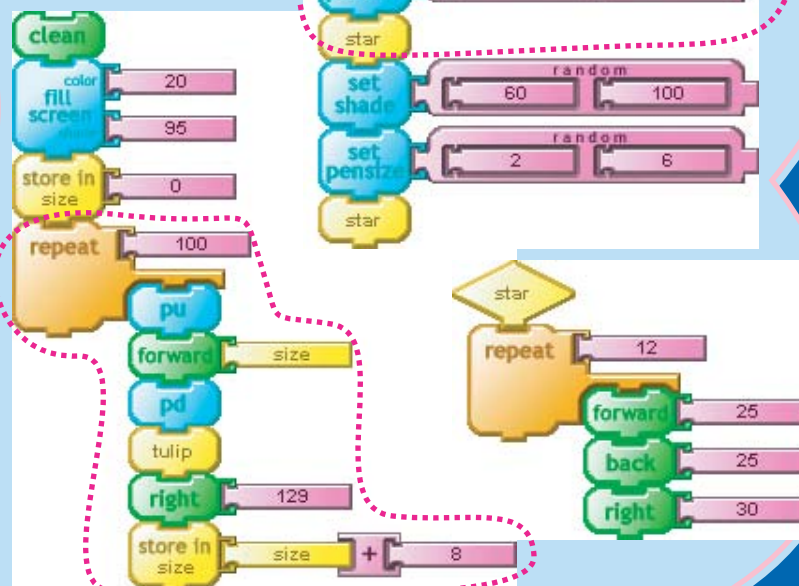
draw a curved line, then retrace it





draw tulips at the corners  
of this pattern

pick a color,  
a shade and  
draw a star



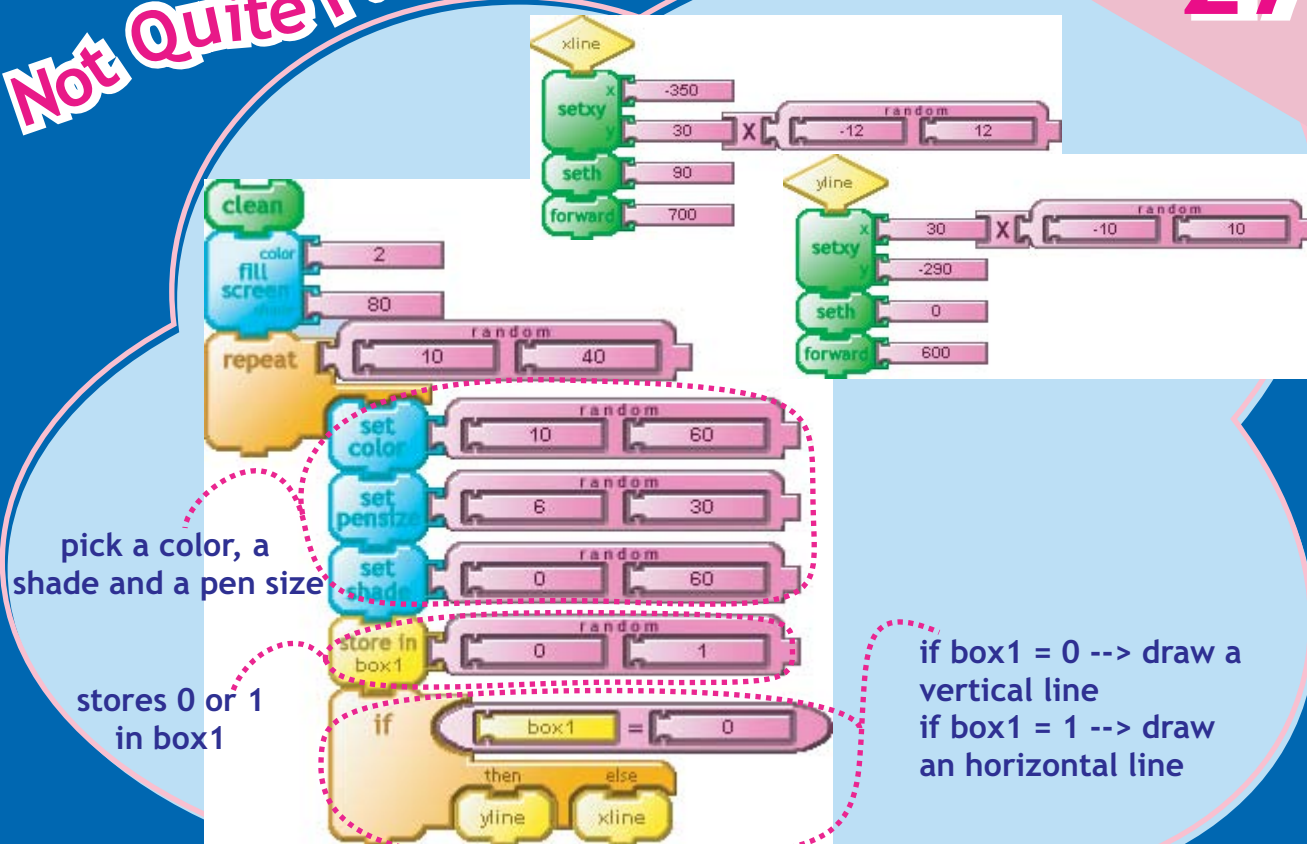


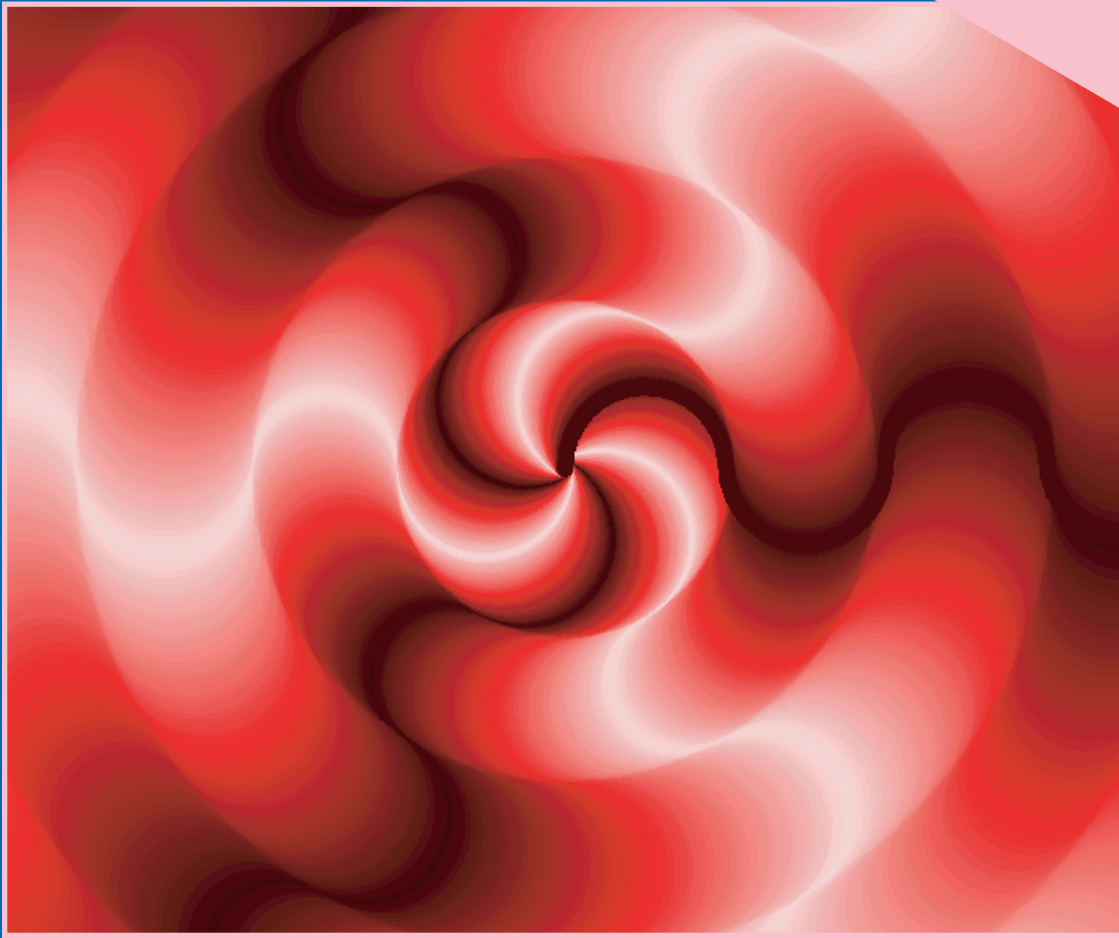
27

Not Quite Plaid

Not Quite Plaid

27



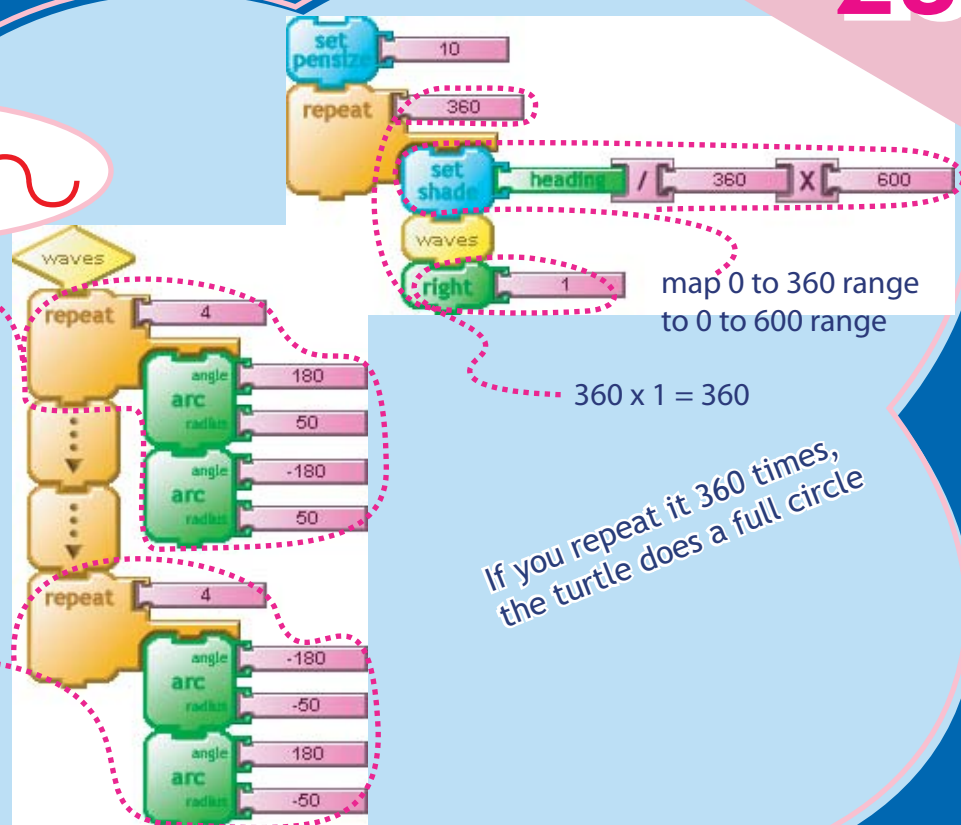


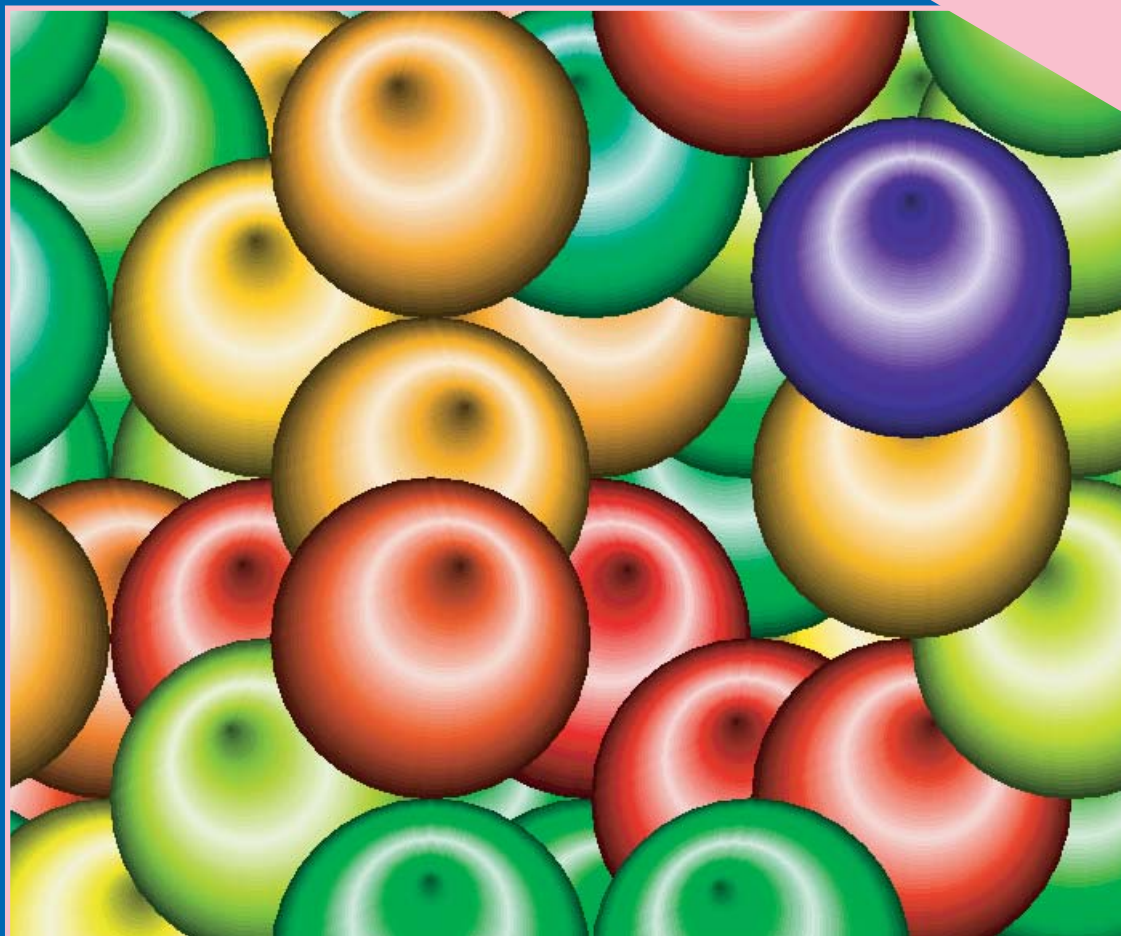
## Swirl

draw a squiggle

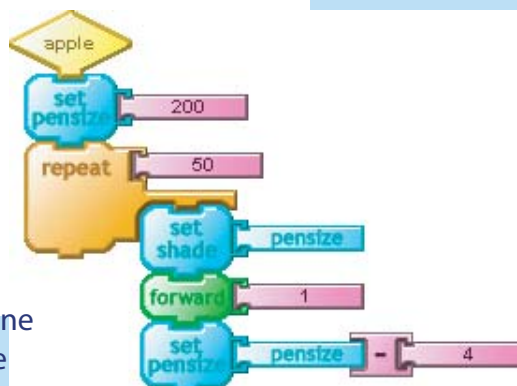
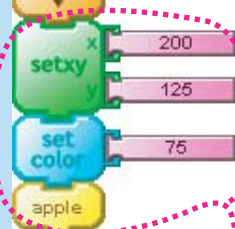
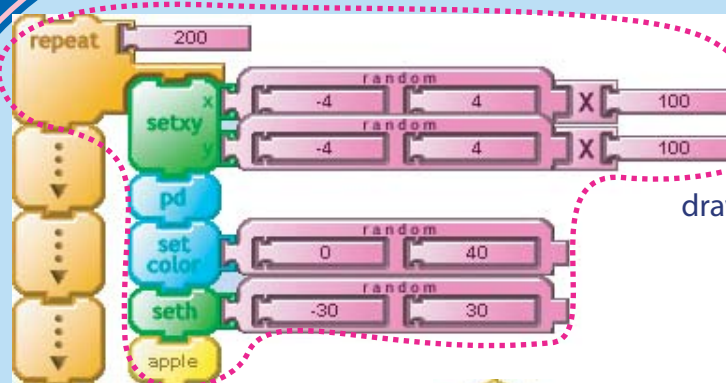


then retrace it





## One Bad Apple





30

# Reflections

30

## Reflections

