Introduction to Programming with Scratch

In 5 hours plus homework

By George Stockman ITEC Lansing

For the Boys and Girls Club of Lansing

Winter 2011

Who computes?

- Scientists
- Engineers
- Businessmen
- Social scientists
- Artists
- FBI agents
- Brain surgeons
- Gamers
- Grandparents

Everyone uses information in some way.
Computers do information processing.
What can we do with Scratch?

- Learn some computing concepts.
- Learn some practical algorithms.
- Use Scratch as computing tool.
- Have fun with Scratch creating stories, games, art.

Part I: Looks and Motion

- Goals:
  - Learn Scratch programming environment
  - Learn the looks and motion menus
  - Write a sequence of instructions
Start scratch and let’s go!

- Click on the cat icon
- Scratch programming environment comes up
- We will first do simple things

Our Scratch environment

- **Stage** is at upper right (where actors act and information is displayed)
- **Sprite** is another name for actor.
- Instruction menus/panel at left (instructions for the actors)
- A **script** is another name for program or method; a script tells the actor what to do.
- Programming area in center; here is where we construct scripts for the sprites
We start with the cat sprite

We will learn to use many other sprites later. For now we use the cat as our only actor. We script the BEHAVIOR of our cat.

The LOOKS menu

Has instructions for setting the color, size, and visibility of a sprite. Costumes will be used later.
The “hello” script (program)

- Choose the Looks menu
- Click on the “say hello” lego block
- Check your sprite behavior at the right
- Then click “say hello for 2 secs”

Your very first Scratch program!

Try some other looks operations (click on menu items)

- Change color effect by 25
- Change color effect by 25 again
- Hide
- Show
- Change size by 10
- Change size by 10 again
- Set size to 100%
Let’s write a script to

- Say “hello” for 2 seconds
- Then change color by 25
- Then think “Hmm..” for 4 seconds
- Then change color by 75
- Then change size by 200

Drag each instruction from the menu to the center script area. Connect them into a single block. Edit the parameters to get the numbers we want.

Our script (program)
A sequence or block is a simple script or program

- The first instruction is done first
- The second instruction is done second
- The last instruction is done last.
- (if any one instruction is done, then every one of them is done)

The WAIT instruction

- WAIT is needed to slow down the acting so we can see or hear it properly (computers are too fast sometimes)
- Get the wait instruction from the CONTROL menu. Ignore the other menu options for now.
- Insert a wait in our looks script
3 second pause between changing color and size

Student exercise: write a script to do the following

- Double the size of the sprite
- Wait 2 seconds
- Change the color of the sprite to green
- Wait 4 seconds
- Change the whirl effect to 100
- Say “That’s all folks!”
The MOTION menu

How to locate and orient a sprite; moving a sprite.

Position on the stage

• Using the **Looks menu**, shrink our cat to 25%.
• Click on the **Motion menu**.
• Click to check the box for x-position and y-position
• Drag your cat around and note its x-y position.
Exercises: goto instruction

• In the Motion menu, drag the “goto xy” instruction to the script panel.
• Edit the coordinates and click to see the sprite’s position
• A) goto x=200, y=0
• B) goto x=-200, y=0  Where does the cat go?
• C) goto x=200, y=-100

The “glide-to” instruction

• Drag the “glide-to” instruction into your script panel.
• Edit the coordinate values and click to see where your sprites goes.
Exercise

• Create a script to glide the sprite along the sides of a triangle. The first vertex of the triangle is (-100, -100). The second vertex is (200, -100). The third vertex is (50, 100). Make sure you complete the triangle.
• Change the speed of gliding and run again.

Angles and directions

Making your sprite go this way and that way
Exercise Script

- Start at ( -100, 100 )
- Move 200 steps
- Turn right 90 degrees
- Move 200 steps
- Turn right 90 degrees
- Move 200 steps

Exercise/Homework Script

- Sprite starts at home base at x=-100; y=-50
- Sprite says “I hit the ball” for 2 seconds
- Sprite runs (east) 200 steps to 1st base
- Sprite changes color
- Sprite runs 200 steps to 2nd base (north: left turn from 1st base)
- Sprite doubles size
- Sprite says “I hit a double” for 5 seconds
End of Part I: Outcomes

Student should be able to control the looks of a sprite and its location on the stage. Students should be able to construct sequences of instructions controlling looks and location on the stage.