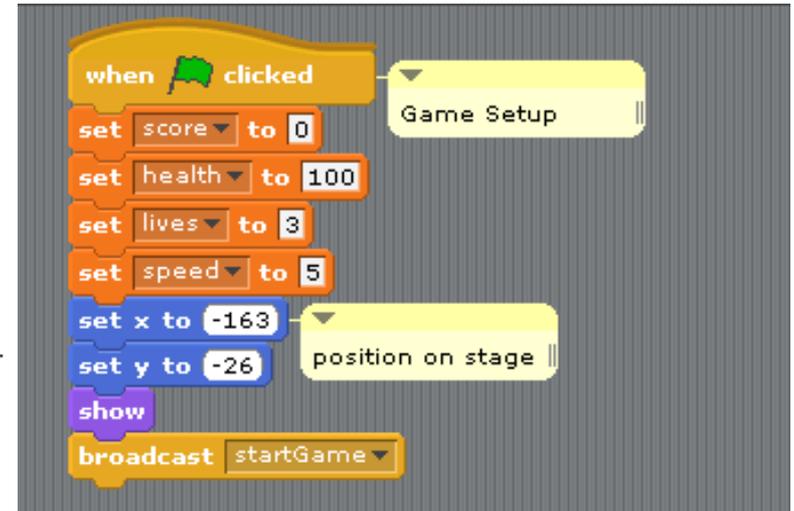# Game/Simulation Design Tips with Scratch
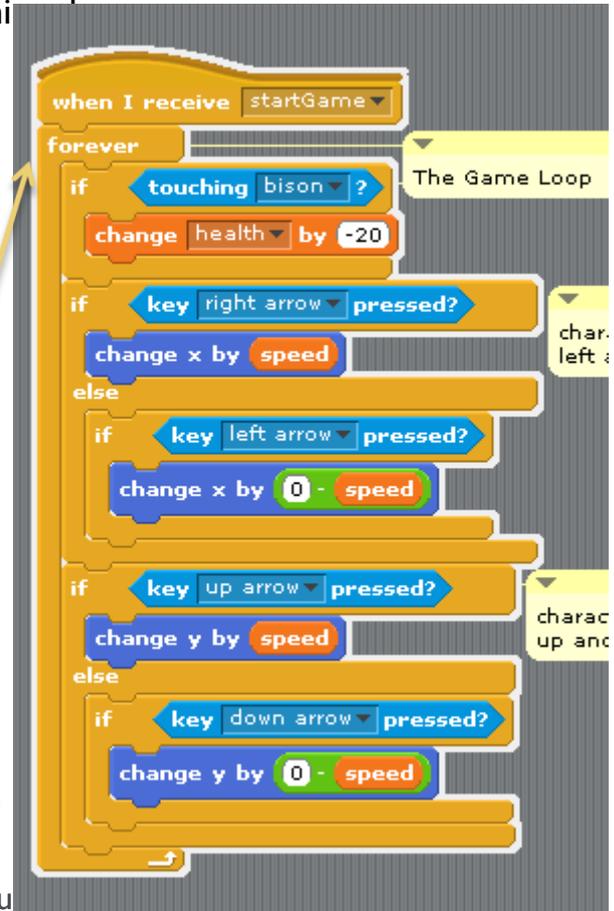
An Introduction to Computer Science
Programming 1

Set-up

- Create 3 main variables:
  - score
  - health, &
  - lives
- Reset the position of any sprites that move through-out the game
- Make sure the stage resets the correct background for the beginning of the stage
- Show any sprites that need to be visible

The Game Loop

- From the time the game begins until it ends, the game is continually running a game loop
  - 30x a second
    - typically – I really don't know how many loops there are a second with Scratch
- During the game loop, you need to program the following elements:
  - Player/object movement control
  - Collision-detection – is the object touching a/an…
    - Enemy sprite
    - Bonus sprite
    - wall/obstacle/etc.
  - Scoring – you will probably code this with the collision-detection
    - Add points when you hit an enemy
    - Subtract health when an enemy hits you or collide with obstacle
    - Subtract a life when health is 0 or lower
      - Don't forget to add back to health
    - End game when there are no more lives
- Anything that happens during the game loop must happen in a forever loop
  - Typically when the start button goes
  - But not when you want to start with a splash page – ask Mr. Winikka if you splash page

Object Control

- To control objects, a simple, but effective way to do it is to
  - set a variable for speed (speed)
  - change x by speed to move to the right
  - change x by (0 - speed) to move to the left
  - change y by speed to move up
  - change y by (0 - speed) to move down
- Place a block of if-else statements in your while loop
  - Have 1 if-else for left and right
  - Have 1 if-else for up and down
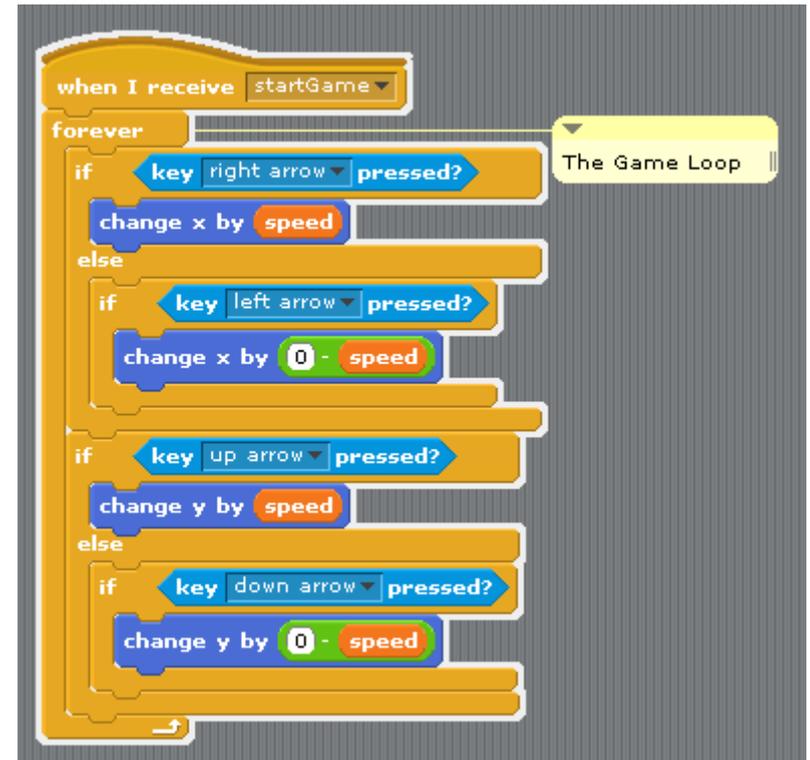
Game Design Tips

- Object-Control
  - Place in forever loop (the game loop)
  - Check for key presses
  - Code what happens when a particular key is pressed
    - If up arrow > move it up
    - If down arrow > move it down
    - Etc.

- Collision-detection
  - Place in forever loop
  - Check to see "if touching…"
    - Color
    - A particular sprite
  - Depending on what you are colliding with
    - Either add or subtract to score
    - If it's an enemy, subtract from health
    - If it's a bonus object, add to score
- Health & Lives
  - Place in a forever loop
  - If no more health…
    - Subtract 1 from life
    - Add back to health
  - If no more lives…
    - End game