CMPS 10 Lecture Notes: Lecture 7 (1-26-2016)

Pardis/Snap Segment

(As always, Pardis posts videos of her lectures (along with the slides!) on the course webpage, which is probably a far more sensible way of receiving this information! But if you feel brave enough to try to learn a visual programming language through purely text, please don't let me discourage you!)

Today, we will be talking about nested blocks. We're going to cover an example by what we mean by nested blocks

- Then we are going to be talking about two examples that will help us with our current assignment.
- Betweeness Assignment Logic
    - e.g. checking to see if 5 is between 4 and 6 (returns true if true, or false if false).
- And we'll be working with a Color Guessing example
    - Which is a hint for a Number Guessing assignment that we actually have.

Part 1: Nested Blocks from Lab 3

- So we have a "polygon" block
    - And that is embedded in a "flower" block
        * Which in turn is embedded in a "flower field" block
- So we receive the boundaries of our field (x1,y1) and (x2,y2)
    - We pick a random x (call it x') within x1 and x2. And the same for y
        * Then we draw a flower at x' and y'

So we made a new block with name "FieldOfFlowersWithx1x2y1y2" (and you can make your inputs show up anywhere in the name of the function, i.e. immiedietely after they show up in the name).

- Then in the Variables tab of blocks, we picked setX to the result of a pick Random Blank to Blank (and dragged x1 and x2 into the two blanks)
- And we create two new variables, x' and y', and we use those to grab the two pick random blocks.
- And we want to make sure that we put this in a repeat block (repeating for the number of flowers) because we're going to be doing this once for each flower that we draw (don't forget: x' and y' represent the coordinates of the flower that we are drawing right now!

We do a similar thing with making a block to make a flower: we call it FlowersWithPetalsSidesSidesLengthColorX'Y'

- We'll add that new block inside of our "field of flowers" block (which makes sense, as this new block we are creating is essentially "draw a single flower" so a field will consist of calling this multiple times).
- Just like before, with our new flower block, we make a bunch of new inputs (and note that we can call them the same thing as we called previous variables. We can say x' and y' again just fine).
    - And it even makes sense to do so, because they represent the exact same thing as the variables did before.
- We can then do things with these other variables (like petals, sides, and sidesLength) like before. We duplicate the pick random code we had before
    - so for sides, we probably want it to be somewhere between 5 and 8 (pentagon to octagon)
    - And sidesLength we pick 15 22
    - And petals we set to 9 15
        * All of the above is just playing around you could play around with those numbers
            · though note that right now those values are all set manually. If you wanted, you could provide additional inputs to provide the boundaries for all of these other pick random blocks!

And then don't forget that we need to write our polygon function!

- This will need input too!

– Though note that it does NOT need the angles to turn specifically handed to it! You can compute the degrees to turn simply by being given the number of sides.
  * The specific equation being (numberOfSides - 2 * 180)/number of sides
– So inside of our polygonWithSidesSideLengthColor block, we make a repeat block (we'll repeat for the number of sides we have), then we'll move for sides length steps, and then rotate by that equation we just computed above.

And then once we have our polygon function, if we return to our FlowersWithPetals...ColorX'Y' block

- we need to remember to rotate by 360 divided by the number of petals to get a full circle for our flowers.
- And also don't forget to add the "GoTo" block to actually make use of our x' and y'
- And to make sure that when drawing the flower, we repeat for number of petals (not hardcoded like 10)

Part 2: Betweenness Logic

- Betweeness Assignment
  – Inputs: a,b, c (say, 4, 7, 8)
- Logic to check: a <= b <= c?
- Output: True or False

All put together:
if(a<b and b<c) or (a == b) or (b ==c) report true
Else: report false.

We are going to make a new block, and we are going to make it of type Predicate

- it is very important that it is a predicate!
- So we call it something like Is b between a and c? (where b, a, and c are all inputs)
- And we can make it an operator predicate (so that it colors as green)
- Sometimes there might be some blocks that aren't showing up. If that case, click on the 'page' button and go to 'import tools' to make them show up! (If and Else I guess don't show up sometimes)
  – In our new block, we add in an if else block.
    * To do our test, we need two "or" blocks and an "and" block
      · and block looks like: a < b AND b < c
    * Or block 1: b = a
    * Or block 2: b = c
    * And then we combine them all together!
- Then we can report whatever we want
  – We drag in 'true' and 'false' from the blocks in the operator tab.

So now it shows up in our operators! And if you click on it, it will show up with a note that says yes and no!

Part 3: Challenges to Guess a Color

- Interactive Logic
  – We enter in a response (our name, Paris) and then the response uses that input.
  – Similarly, when we enter in color guesses, it knows is that is right or not, and responds accordingly.

Inside of the Sensing tab, there is the "ask and wait" block

- We say inside of that "Hello , what is you name"
- When you do that, there is then space for you to enter your name.
  – At first, when you hit enter, nothing happens, as there is not extra code to handle what happens.
- Every time you see an ask block, the next block should contain an answer.

- When input is received, it ALWAYS goes to the variable "answer"
    * it is OUR responsibility to SAVE the answer value into a local variable because otherwise it will be overwritten.
- There is another thing we can do: a script variable
    - I think that is just a nice shortcut thing, that may only remember the variables for the duration of that one script.
- The 'say' block (purple) makes text appear on the screen – don't forget to use the "say and wait X seconds" block to make your stuff show up on screen!
- The 'join' block is a way to concatenate strings. You can use that to combine manually added text and variables together to form a single sentence.
    - We add another script variable, we call it 'sequence' and that will be how many times we guess
    - We'll also add another variable, and call it something like 'guessedColor'
        * And we'll need to use another set block to store guessedColor (don't forget: originally it is stored in the answer block)
- We can also create a new variable called secretColor
- Which you can just set manually (call it "yellow" for example)
    - Then we can use a repeat until block, which means "do this forever UNTIL some condition is fulfilled"
    - So, maybe make it so that we have one of these repeat until blocks. After this block, we'll say Congratulaions you win!
    - And the condition of the repeat until block will be something like until guessed color is equal to secret color.
        * And we'll use 'ask 'inside of that to be ready to get their new answer (don't forget to reset it as their new 'guessedColor'

Part 4: Blocks to Turn in:

- You need 8 BLOCKS
    - You need betweenness.
    - You need if one number is greater than another
    - You need letter grade (returns a different grade based on parent)
    - You need a traffic signal
    - State of water
    - If it is a weekend day
    - Another one (check the course webpage!) (leap year)
    - Number Guessing is the last one it is the hardest one
        * it has 6 PARTS
            · sprite welcomes player, if they guess incorrectly, sprite apologies using their name, etc. check course webpage.

Hints on Number Guessing Part:

- Incremental Approach:
    - Create a new block step by step.
        * And actually create new

BREAK TIME

Is This Science?
Get your clickers out

- Click a button to see how many people are here.
    - About 40 people are here.

- There is a warning that there might be something coming that could cause emotional trauma
  - Teacher was checking out Facebook,
    * Tico Times (which may or may not be reputable) has an article that says "Mexicans and other Latin Americans carry happiness in their DNA"
    * First question: I believe it is possible to establish a claim like that using science. (A is Yes, B is No)
      · About 60 percent say no, 30 percent say yes (others guess nonsense answer)
    * Second question: This is a racist statement (A is Yes, B is No)
      · 40 percent yes, 60 percent no.
    * Third question: There are four choices: Scientific vs non scientific, and racist vs. not racist. So four possible opinions you could hold
      · A: (Scientific and Racist) 7 percent
      · B: Non Scientific and Racist: 48 percent
      · C: Non Scientific and Not Racist: 36 percent
      · D: Scientific and Not Racist 11 percent

So 82 percent feel that this is a nonscientific claim.

- NOW try really hard to push reset in your brain. Imagine that if instead of saying Mexicans, imagine that the title said "Scandinavians and other northern Europeans"
- And we ask the same questions.
  - A: (Scientific and Racist): 5 percent
  - B: (Non Scientific and Racist: 40 percent
  - C: (Non Scientific and not racist: 31 percent
  - D:(Scientific and Not racist): 21 percent

Interestingly enough, the biggest change seems to be from B and D.

- 10 percent more people now think it is scientific.
- Among the people who felt it was scientific, fewer people think that it is racist.

Free form discussion:

- Among the people who feel this can not be a scientific claim, is the main objection that happiness is very hard to measure and quantify.
  - For how many people is measuring and quantifying happiness is too difficult to do and measure scientifically.
    * How many people view that as the primary objection.
    * A: Yes that's it, B: No there is something even more severe that I object to.
      · Roughly 2/3 is A, 1/3 is B
  - Next question: I have taken recreational drugs
    * A is yes, B is no (but it is anonymous)
      · Roughly half and half
  - Next question: I have been drunk from alcohol at least twice in my life
    * 70 percent say yes, about 30 percent say no.
  - Now, only people who have taken drugs or have gotten drunk
    * The change in my body can be fully explained by science and there is nothing metaphysical about it
      · About 3/4 say yes just science, about 1/4 say no.
      · That is: 28 percent say mechanism of action is not accessible to current science.
  - Next question: I am nothing but a chemical soup. There is a big big system with protein and whatever, and it is governed by the laws of physics, vs NO, I do what I do to some extent influenced by mechanisms that we absolutely no idea about today.
    * A for yes physics, B for no.

- · About half and half.
  - ∗ So, first version ("no soul") is a, second version ("yes, there is a soul") is B.
    - · Now A is 40 and B is 55.
    - · Metaphysical camp has half or more of the vote.
  - – Next question: for people who think that we can't explain it
    - ∗ A: it is just because science isn't good enough yet, but it will be some day.
    - ∗ B: It is due to something fundamental about the human soul. Science will never be able to do it.
      - · 1/4 say it is a limitation of current science, 3/4 say it will be a limitation of science forever.

Study found that there is a connection between people WITH a particular version of a gene AND people who report being happy.

- • That is how they determine it.