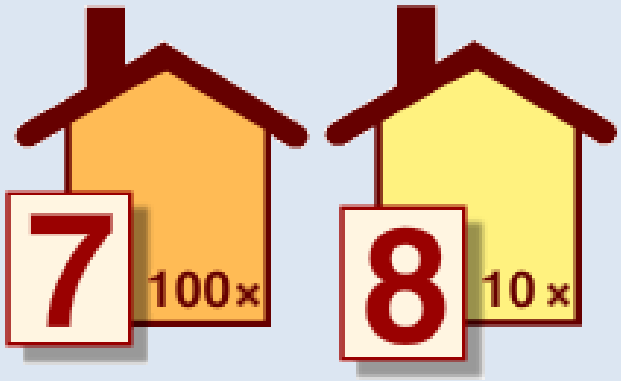
MODULE 4: INVESTIGATION 3

The Conversion Game



ACTIVITY 4.3.1

Unplugged:

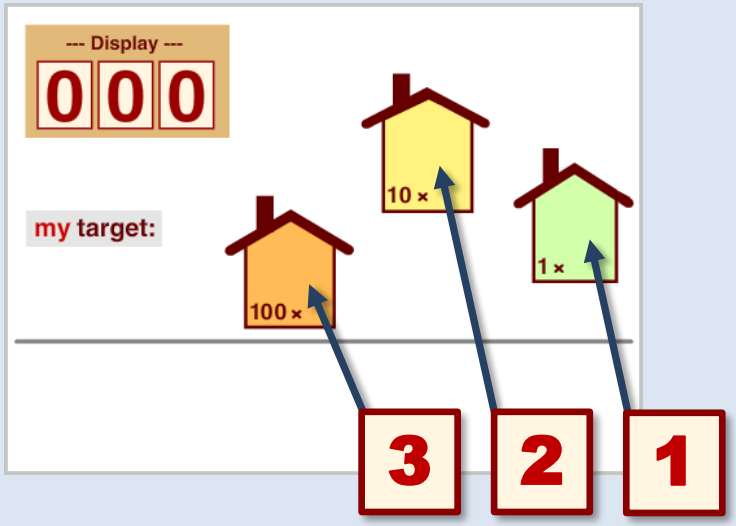
Playing the Conversion Game

Module 4: Investigation 3

Activity 4.3.1 – Unplugged: Playing the Conversion Game

- Tear your paper into three and write the following numbers on the squares of paper:

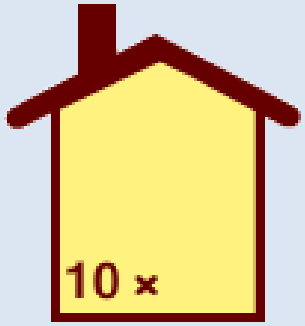
- Use your three digits to create bigger numbers by placing them into the different houses on your hand-out.

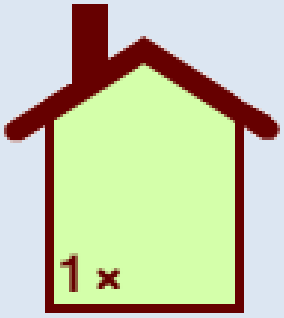


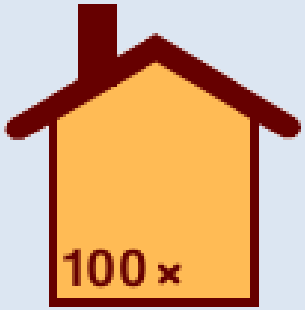
Module 4: Investigation 3

Activity 4.3.1 – Unplugged: Playing the Conversion Game

my target:







Module 4: Investigation 3

Activity 4.3.1 – Unplugged: Playing the Conversion Game

- Create the biggest number you can.
- Create the smallest number you can.
- Try to create the following numbers using your three digits:
  - 420
  - 15
  - 321
  - 240
  - 50

EXTENSION ACTIVITY 4.3.2

Building Conversion Game:

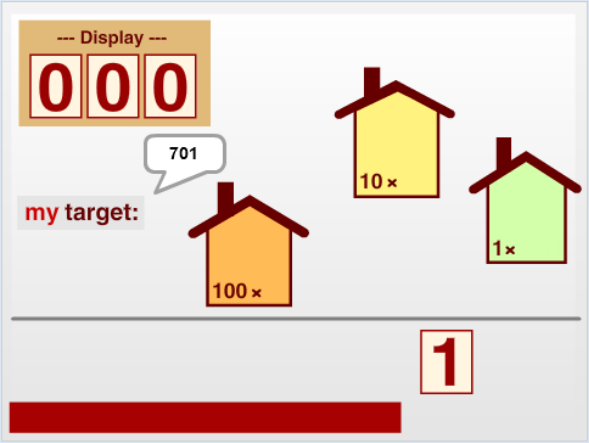
The Display

Module 4: Investigation 3

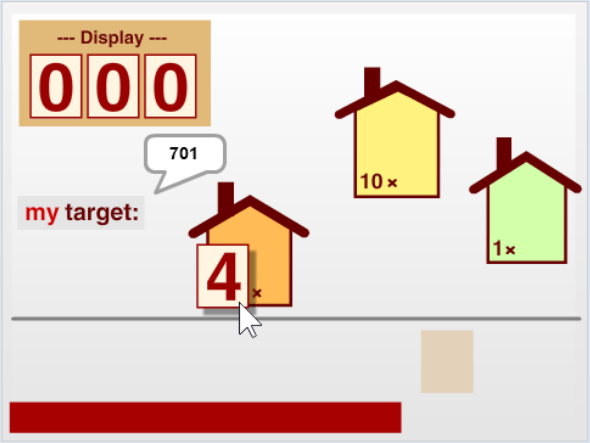
Ext. Activity 4.3.2 – Building Conversion Game: The Display

Open **46-Conversion Game FINAL** and play the game as a class.

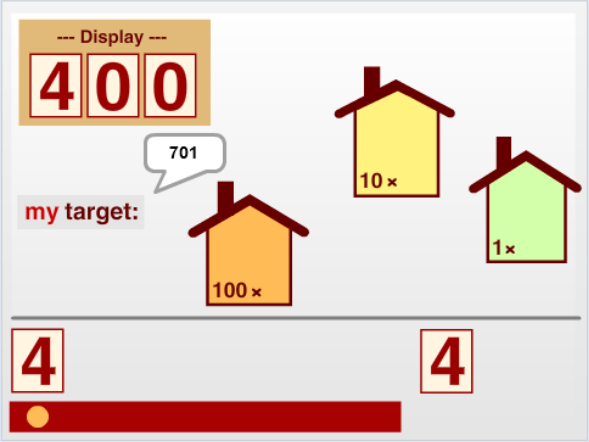
1



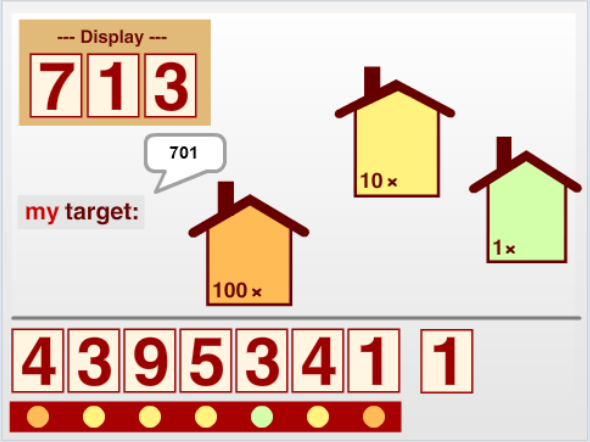
2



3



4



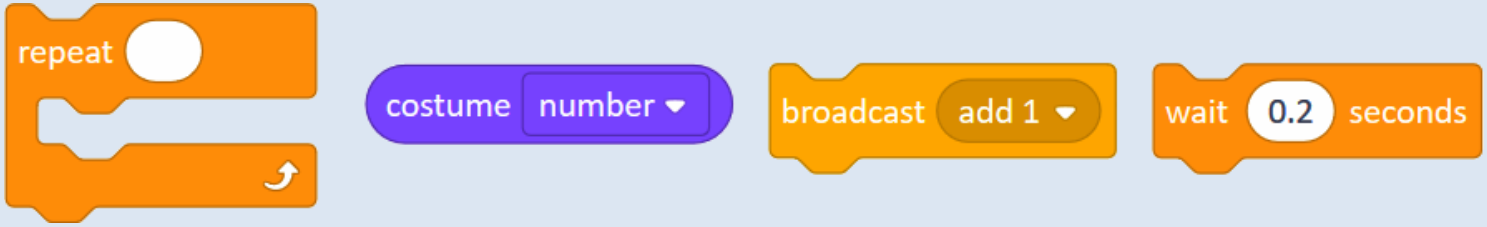
MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.2 – Building Conversion Game: The Display

Open project **46-Conversion Game**.

- Explore the project. Look at the sprites, costumes and *setup scripts*. Note how the **ones** sprite reacts to the *add 1* message .

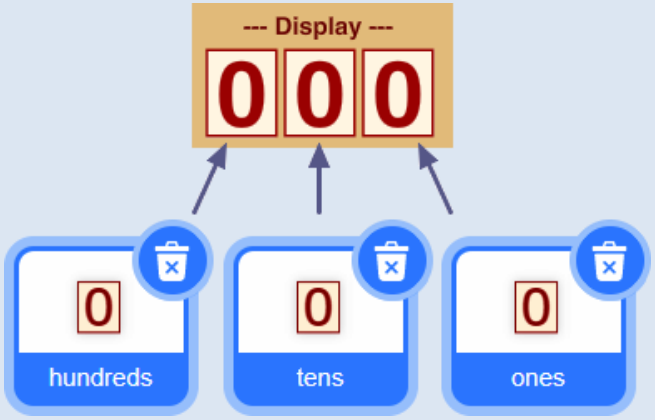
- For the **input** sprite build a script to **broadcast** *add 1* message in the **repeat** loop – repeated as many times as the value it displays.



MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.2 – Building Conversion Game: The Display

- Duplicate the **ones** sprite twice and rename the new sprites **tens** and **hundreds**.
- Update their *setup scripts* so they sit in the correct placeholders.



Module 4: Investigation 3

Ext. Activity 4.3.2 – Building Conversion Game: The Display

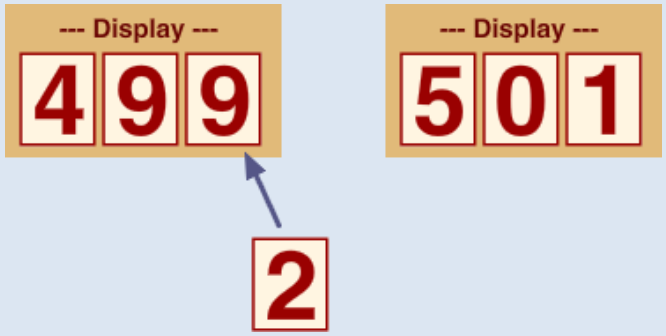
While **ones** reacts to the *add 1* message…

- … make **tens** react to **when I receive** *add 10*
- … make hundreds react to **when I receive** *add 100*

How should tens and hundreds react? ?

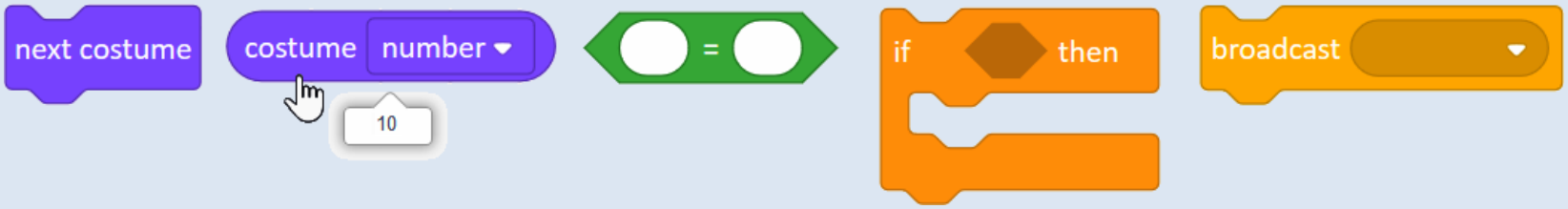
- Extend their scripts so that they properly 'nudge':

  ones nudges **tens** when it reaches 0
  tens nudges **hundreds** when it reaches 0



Module 4: Investigation 3

Ext. Activity 4.3.2 – Building Conversion Game: The Display



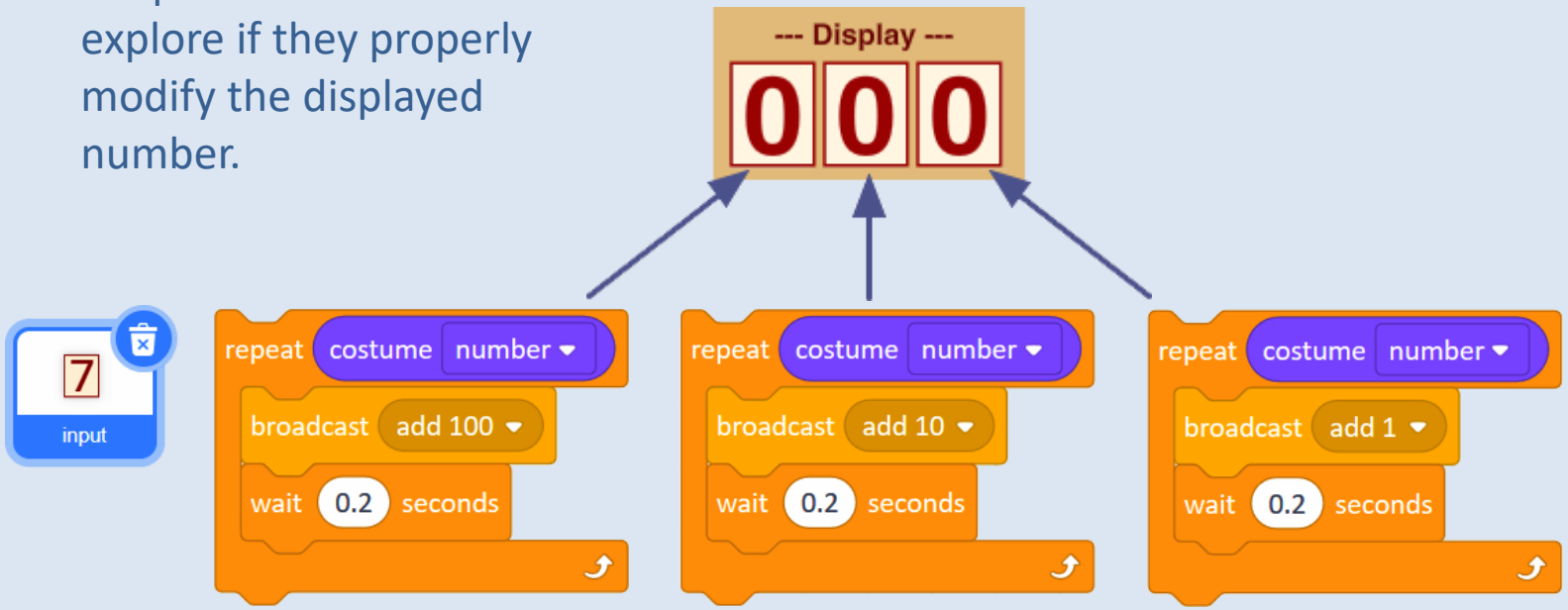
- Are your scripts similar to the below? Discuss any alternative solutions.

MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.2 – Building Conversion Game: The Display

- In the **input** sprite duplicate twice the **repeat costume** *number* script, modify their broadcasts to *add 100*, *add 10* and *add 1*.

Keep them isolated and explore if they properly modify the displayed number.

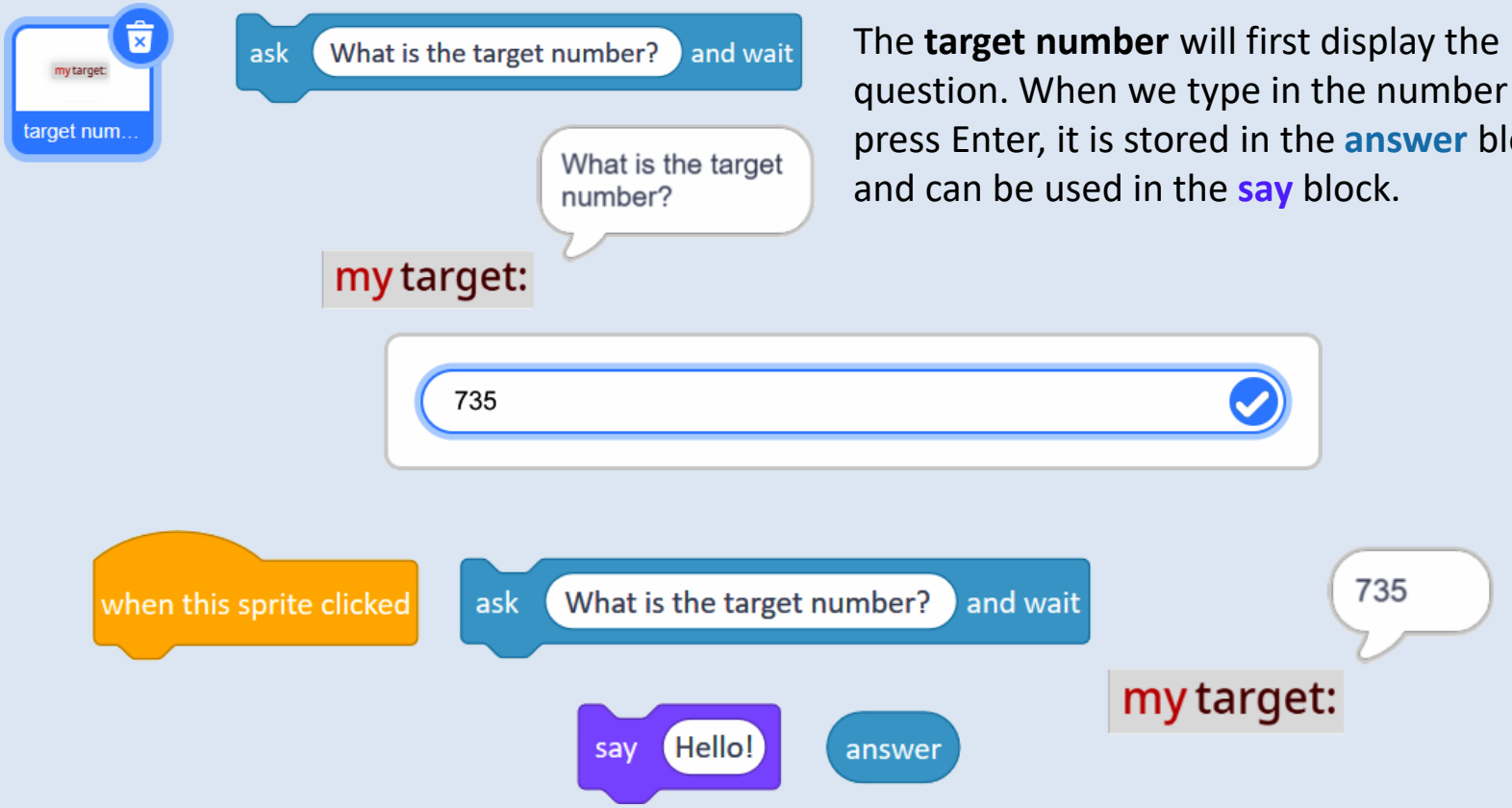


- **Are there several ways how to generate the same target number by using different combinations of these scripts and the input value?** ?

MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.2 – Building Conversion Game: The Display

- For the **target number** sprite build a **when this sprite clicked** script so that it will **ask** for the target number then in a bubble **say** the **answer**:



The **target number** will first display the question. When we type in the number and press Enter, it is stored in the **answer** block and can be used in the **say** block.

EXTENSION ACTIVITY 4.3.3

Building Conversion Game:
Coloured Houses

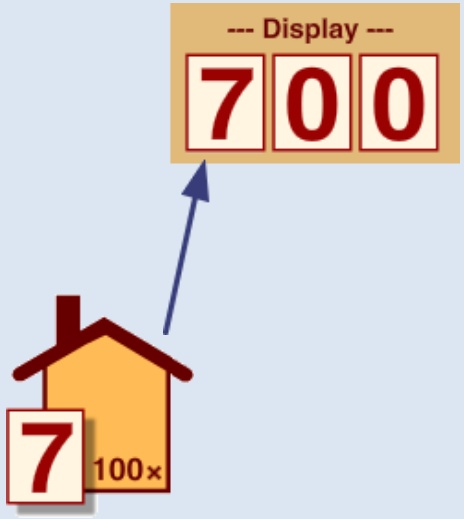
MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.3 – Building Conversion Game: Coloured Houses

Continue in your **46-Conversion Game** project.

- Continue working with the three **repeat** **costume** *number* scripts of **input**.

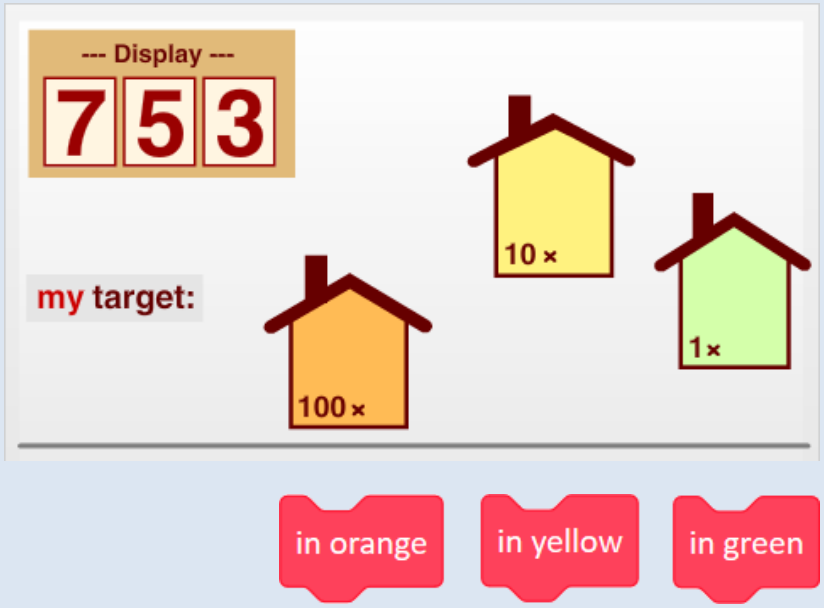
The script with *add 100* will be used when we put the **input** value into the orange house. Therefore give it a name **in orange**.



Module 4: Investigation 3

Ext. Activity 4.3.3 – Building Conversion Game: Coloured Houses

- Similarly, give names to two other **repeat** **costume** *number* scripts.



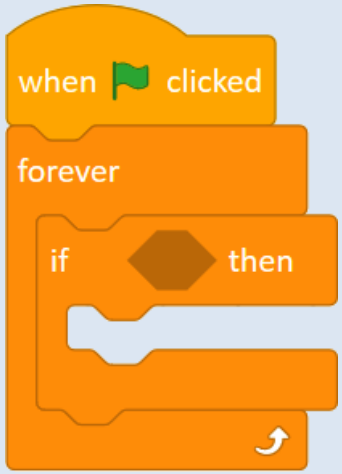
- **What will happen with the Display when you use these three new blocks? (Envisage before clicking on them)** ?

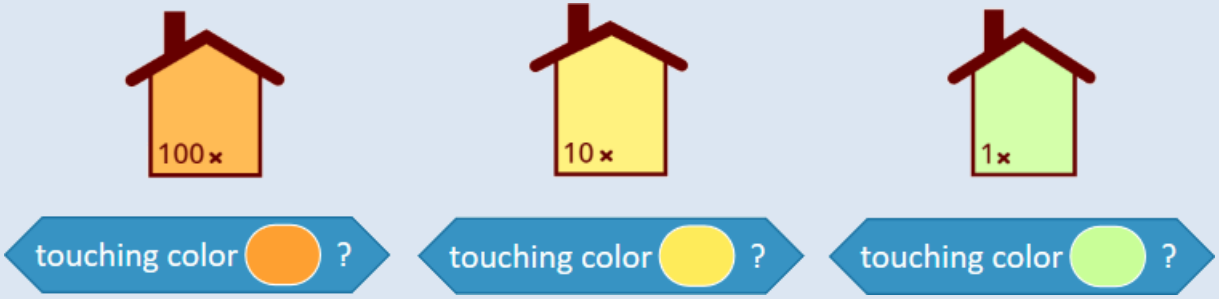
MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.3 – Building Conversion Game: Coloured Houses

We want to drag the **input** sprite into one of houses to 'convert' its value and add it to the Display.

- For the **input** sprite build three 'whenever scripts' to monitor if the sprite is **touching** the different house colours:





MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.3 – Building Conversion Game: Coloured Houses

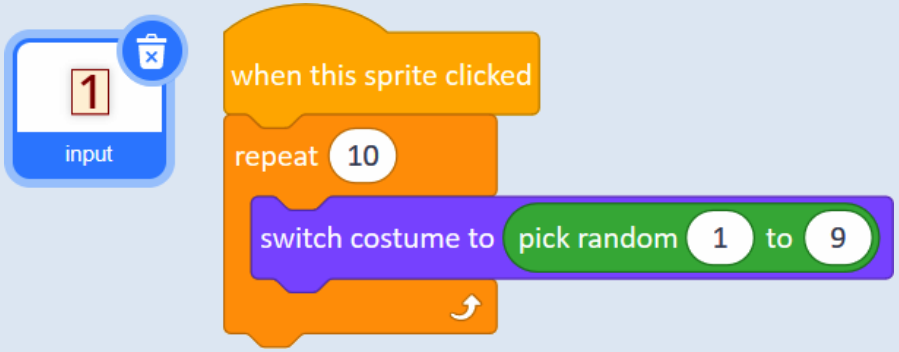
- Build a script so that whenever the **input** sprite is dragged over the orange house, it will:
  - run the **in orange** block to add its value to **hundreds**,
  - then **glide home**.

  Complete all three *whenever scripts* so that when **input** is dragged over any of the houses, it will correctly update the Display.

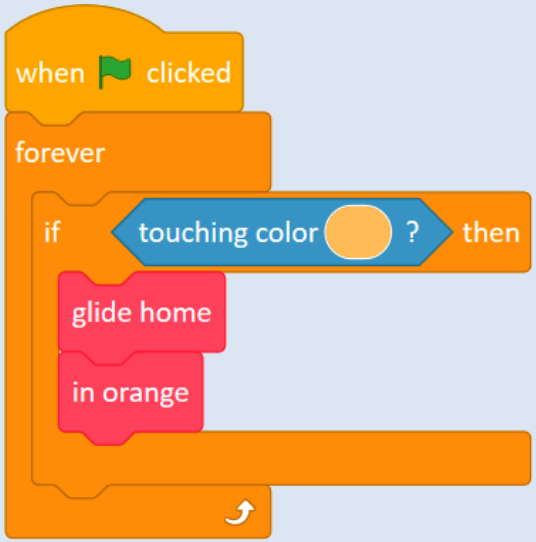
- Modify the **input**'s behaviour: when clicked, it will switch to a random value (costume) – avoid switching to 0 (the last costume).

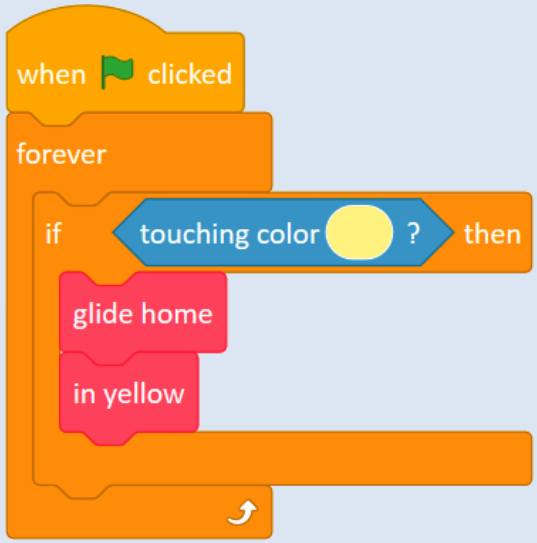
MODULE 4: INVESTIGATION 3

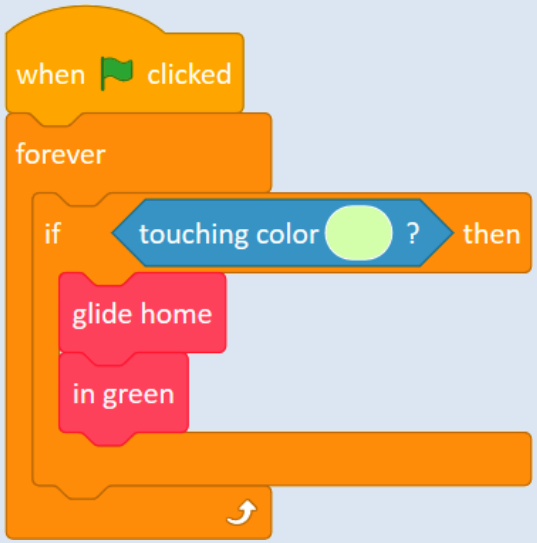
Ext. Activity 4.3.3 – Building Conversion Game: Coloured Houses



- Are your scripts similar to the below? Discuss any alternative solutions.







EXTENSION ACTIVITY 4.3.4

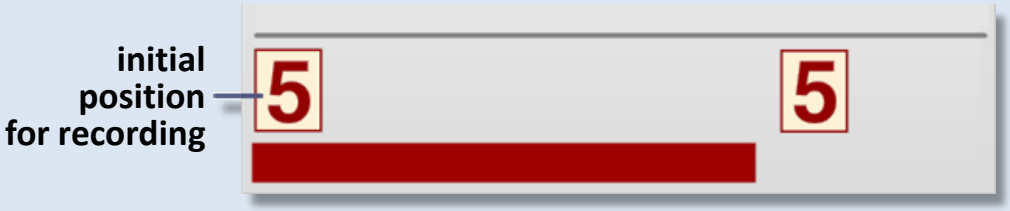
Building Conversion Game: Record Keeping

MODULE 4: INVESTIGATION 3

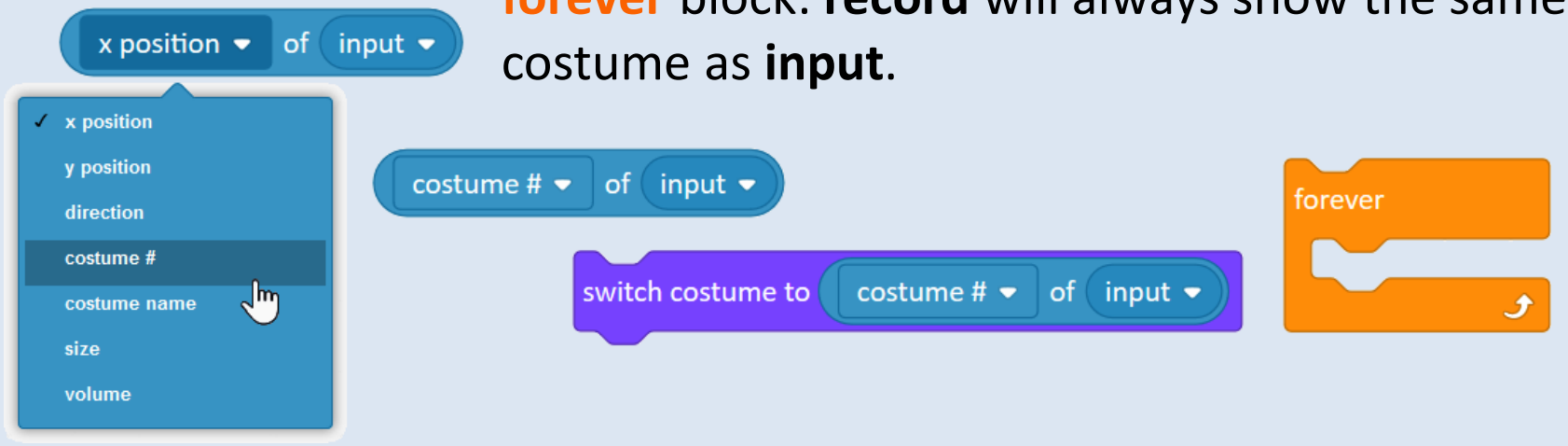
Ext. Activity 4.3.4 – Building Conversion Game: Record Keeping

Continue in your **46-Conversion Game** project.

- Duplicate one of the sprites from the Display, rename it **record**. Delete all its scripts except the *setup script*. Modify its initial position.



- Extend the *setup script* of **record** by adding the **forever** block: **record** will always show the same costume as **input**.



Module 4: Investigation 3

Ext. Activity 4.3.4 – Building Conversion Game: Record Keeping

- What is the algorithm for the recording sprite?
- How do we find the position for the next stamp?

?

- The **record** sprite will react to the *record* message (broadcast by the **input** sprite) by **stamp**ing itself and jumping to the right by 46 steps. Build this **when I receive** *record* script.

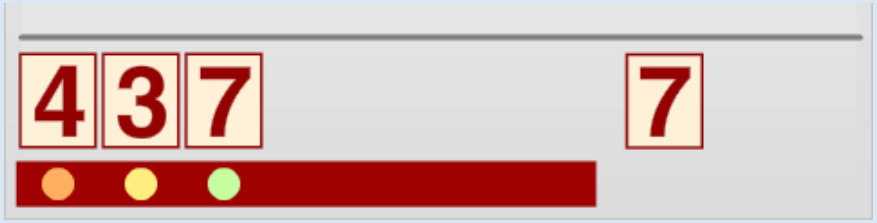
- The **input** sprite will **broadcast** *record* whenever it has been dragged into one of the houses, before it runs **glide home**.

  You may consider having the **record** sprite **hide** in its *setup script*.

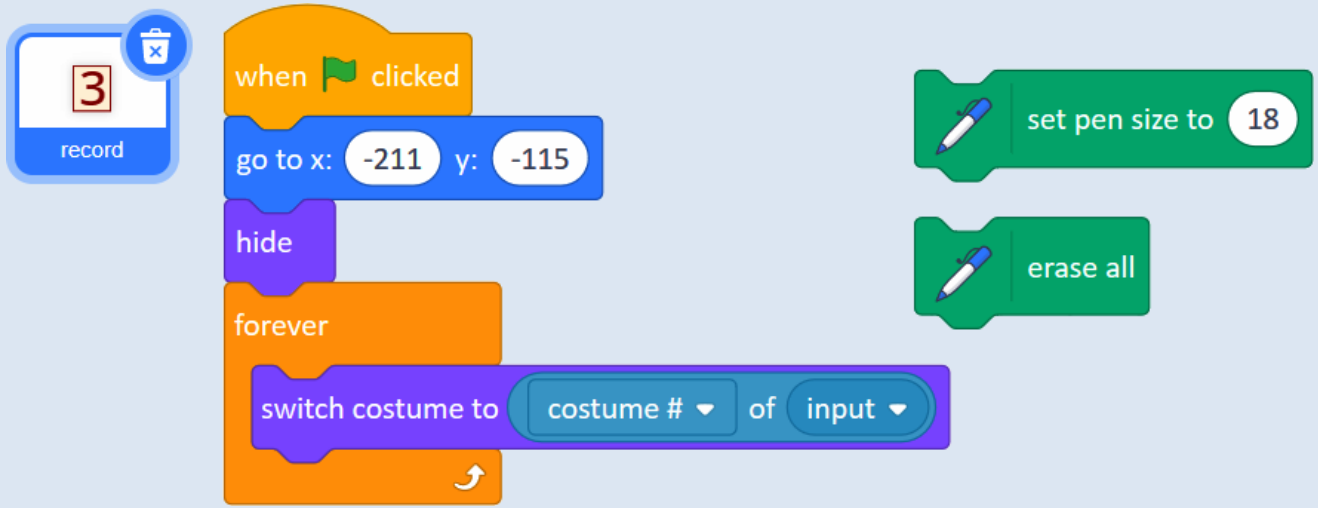
MODULE 4: INVESTIGATION 3

Ext. Activity 4.3.4 – Building Conversion Game: Record Keeping

Finally we want to add big colour dots below each stamp.



- If we want the **record** sprite to draw big dots, we have to first extend its *setup script* by setting its **pen size** and **clear**ing the stage (so it will remove any previous dots and stamps…).



Module 4: Investigation 3

Ext. Activity 4.3.4 – Building Conversion Game: Record Keeping

- **How could we solve the problem of keeping a record of the house colour the digit was dragged to? How does the recording algorithm change?** ?

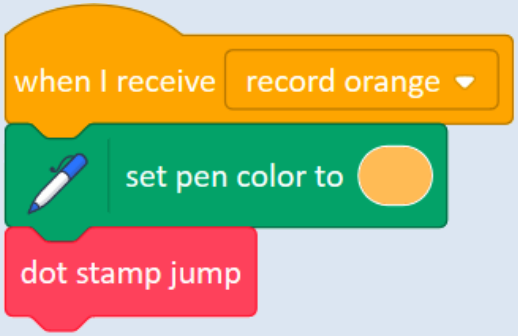
- The dots will be drawn by the **record** sprite itself: instead of reacting to one common *record*, it will react to three different messages *record orange*, *record yellow*, and *record green* from **input** – when it is dragged over the matching house.

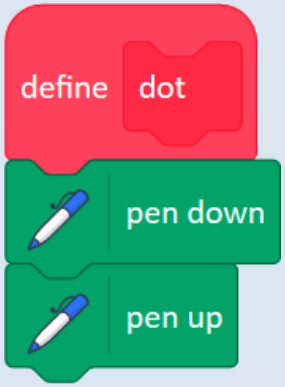
- Build similar reactions for *record yellow* and *record green*.

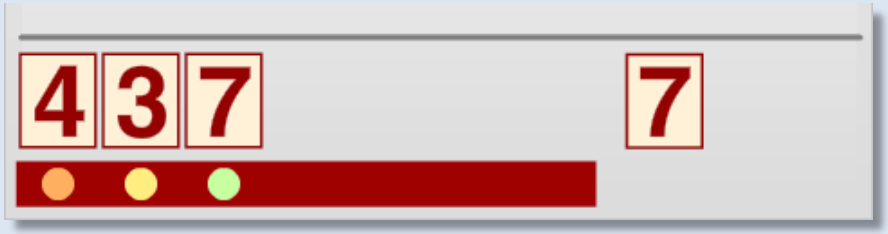
Module 4: Investigation 3

Ext. Activity 4.3.4 – Building Conversion Game: Record Keeping

- Are your scripts similar to the below? Discuss any alternative solutions.







Module 4: Investigation 3

Ext. Activity 4.3.4 – Building Conversion Game: Record Keeping

- What number would be displayed based on this record?

- And this one?

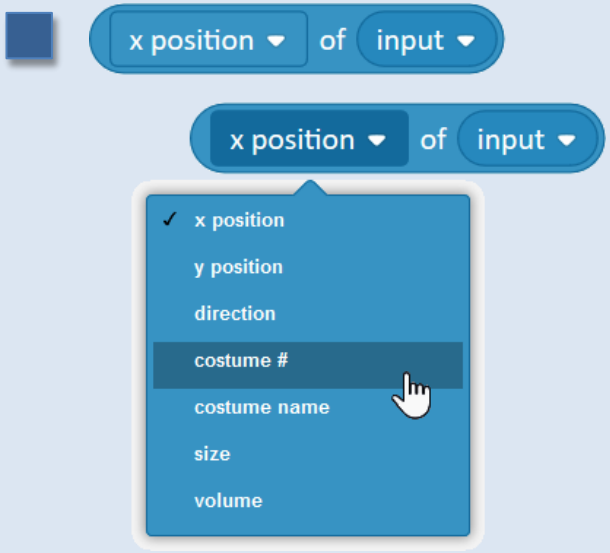
- Select a target number – can you explore and explain three different ways to build it?
- Is it possible to build 133 using only the input value 6? (use as many times as needed)
- Is it possible to build 201 using only the input values 7 and 9? (use as many times as needed)

Module 4: Investigation 3

My Investigation 3 check list:

- ☐ I explored how to generate different numbers by playing the conversion game on paper and explained how I generated specific numbers.
- ☐ **[Extension]** I built a display in Scratch that correctly increased in increments of 1, 10 and 100 by using my knowledge of place value.
- ☐ I explored different ways of generating the same target number within the conversion game.
- ☐ **[Extension]** I built scripts so my display would increase by the correct amount when I dragged my sprite over different coloured conversion houses.
- ☐ **[Extension]** I built a record keeping feature within my game.
- ☐ **[Extension]** I envisaged the display number from the record of digits and coloured dots.

MODULE 4 INVESTIGATION 3: Key Vocabulary



is a **sensing and reporter block** that reports the specified value (e.g. costume #, i.e. costume number) of the specified sprite (e.g. input)