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Introduction to OpenSesame

http://softdev.ppls.ed.ac.uk/opensesame/

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What is OpenSesame?

Experimental Design Software that lets you:

- Present a stimulus
  - Visual
  - Auditory
- Collect a response and the data about it
  - Keyboard
  - Mouse
  - Voice
  - Response Times
- These can be repeated, combined and randomised

Why use OpenSesame?

How else could we do the same thing?

- PowerPoint presentation
- Custom computer program (e.g. jsPsych)
- Other experimental development software
  - (e.g. Testable, e-Prime, PsychoPy, Experiment Builder)

OpenSesame is a compromise between PowerPoint and computer programming

A Little Background

Developed by Sebastiaan Mathôt, a Psychology and Cognitive Science researcher

- http://osdoc.cogsci.nl/

Availability:

- Windows and Linux
- (Support for Mac OS X is experimental)

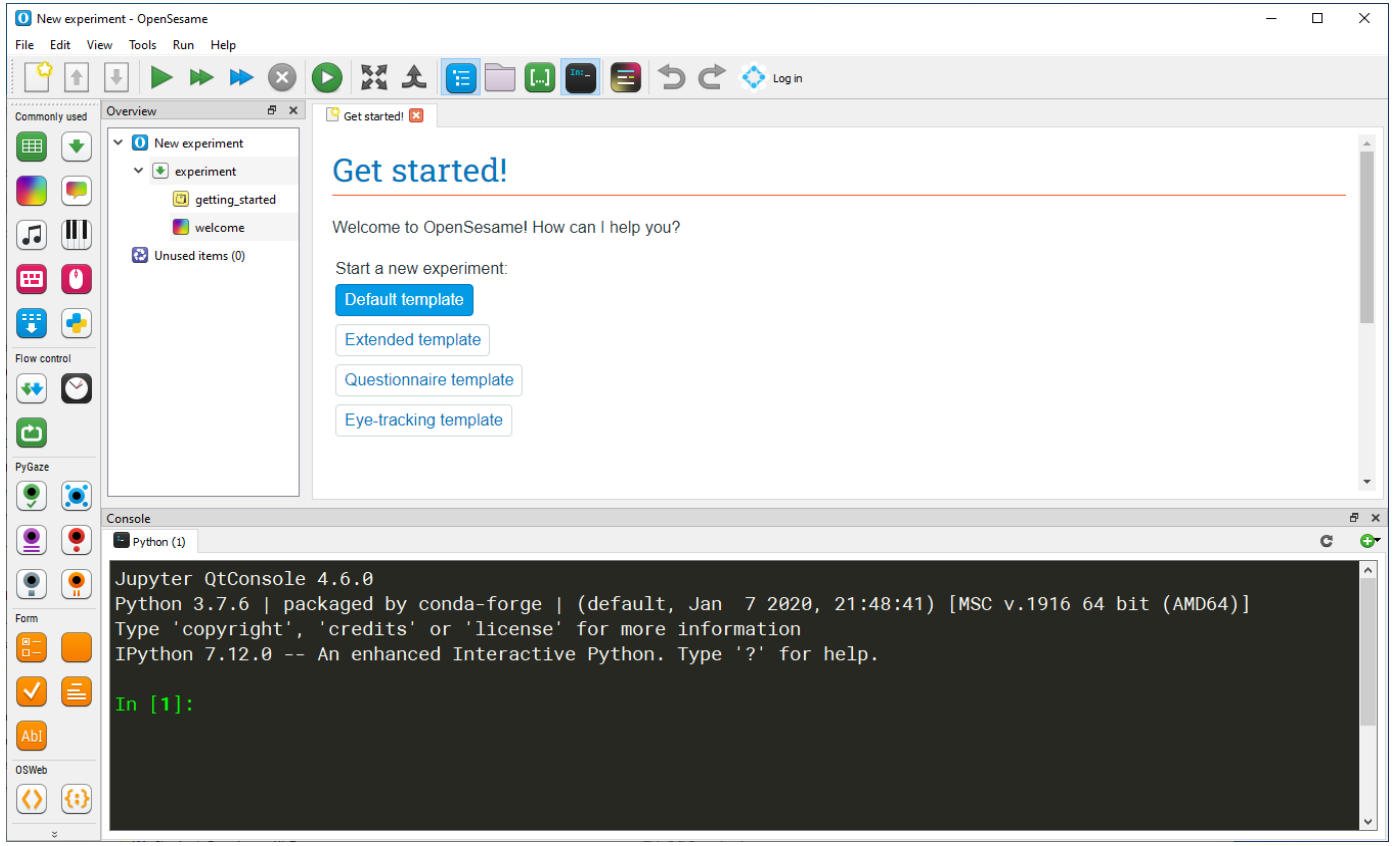
Getting Started

Download at:

- https://osdoc.cogsci.nl/4.0/download/

Start Menu

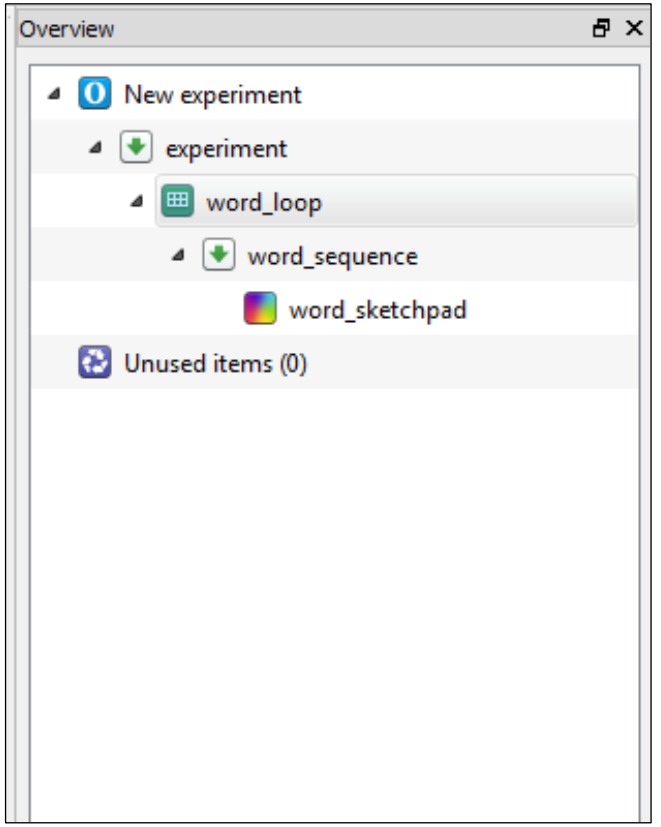
- OpenSesame
  - OpenSesame



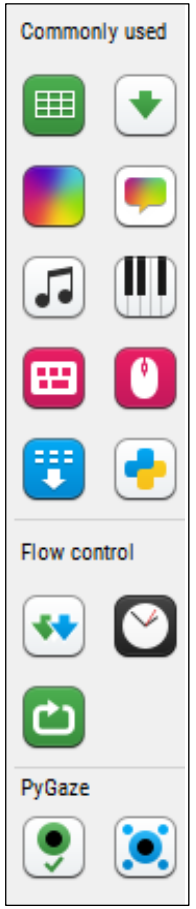
Experiment Overview

The Overview is a list of things to do

- It runs in order from top to bottom
- Each item has a name and a type, indicated by its icon



Tools



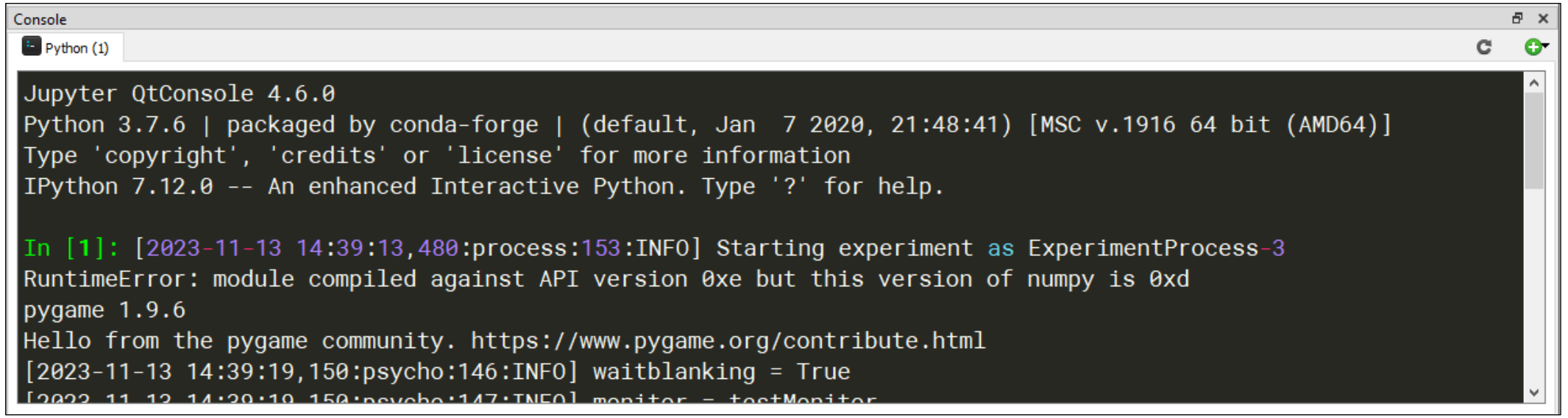
The Toolbox is a list of items that you can add to your experiment

- Each one is a different possible kind of step
- For example:
  - Sketchpad shows text or images
  - Keyboard_Response allows the participant to respond by pressing a key
- These can be combined together to make up your experiment

Console

This shows you the output from your experiment

- If there are errors they'll display here to help you fix problems
- It also acts as a Python console

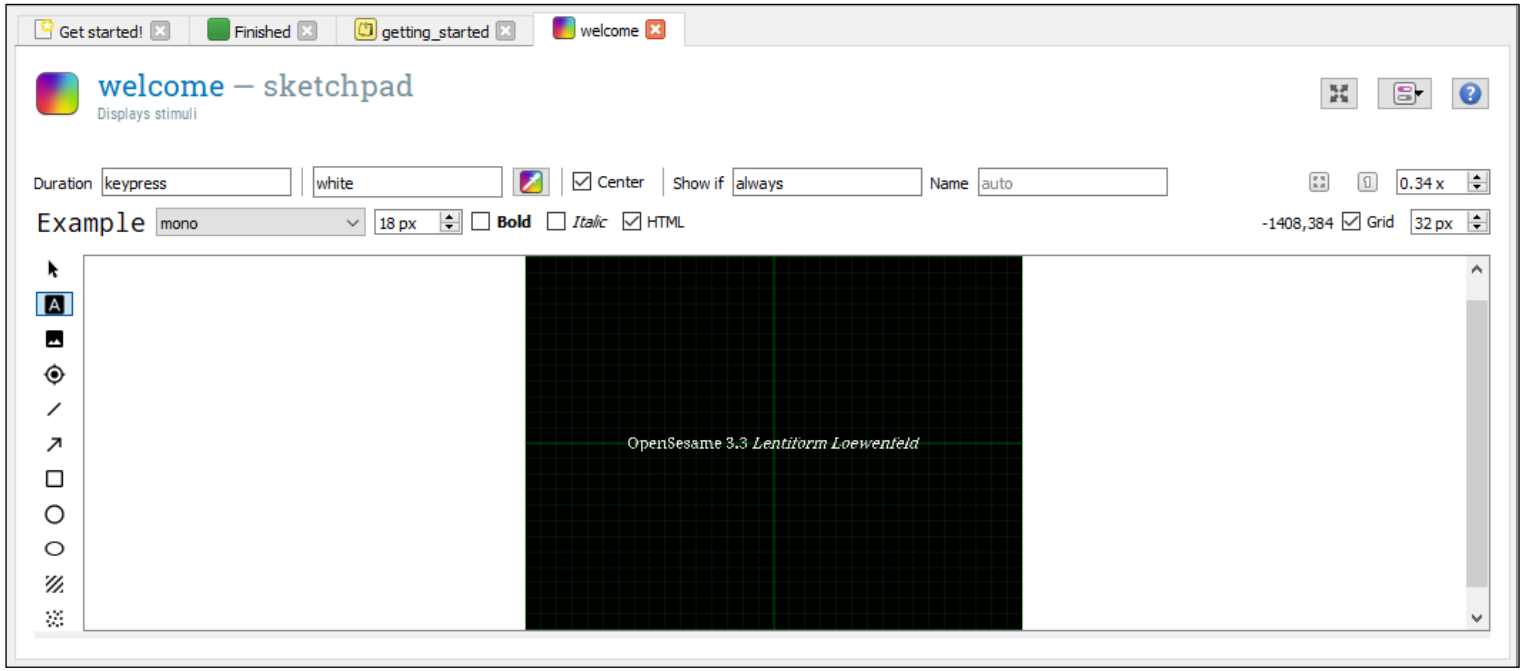


Tab Area

The tabs show various items relating to the experiment.

Here you can:

- Change the properties of experiment items by double-clicking on an item in the Overview to open its tab
- See the output when the experiment finishes



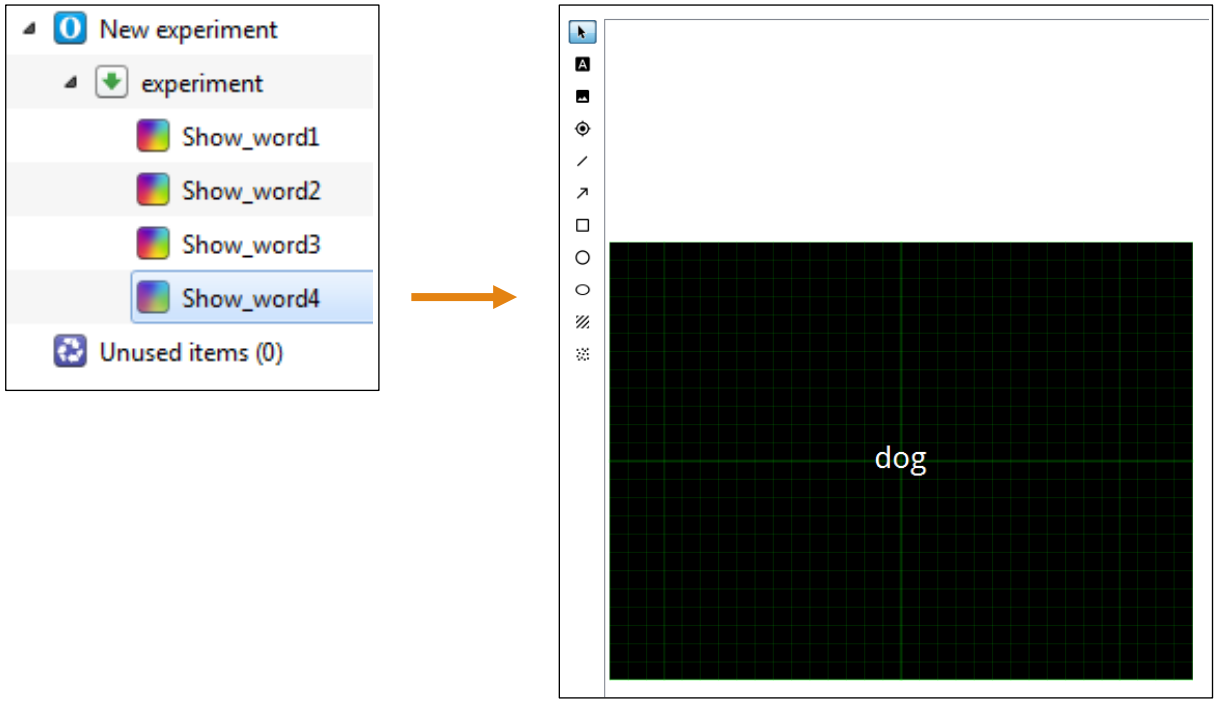
Create your First Experiment

- Open OpenSesame with a new, blank experiment (1)
- In the Overview, double-click on the sketchpad item, “welcome”
- This already has some text on it, as an example (it’s the OpenSesame version number)
- Double-click on this text to edit it, and change the text
- Click the “Run” button in the menu bar (2)
- The experiment waits for a key to be pressed
- This is the default for a sketchpad, we could also give a duration, or wait for a mouse button to be pressed

Expanding The Stimuli List

How would we show four words in sequence?

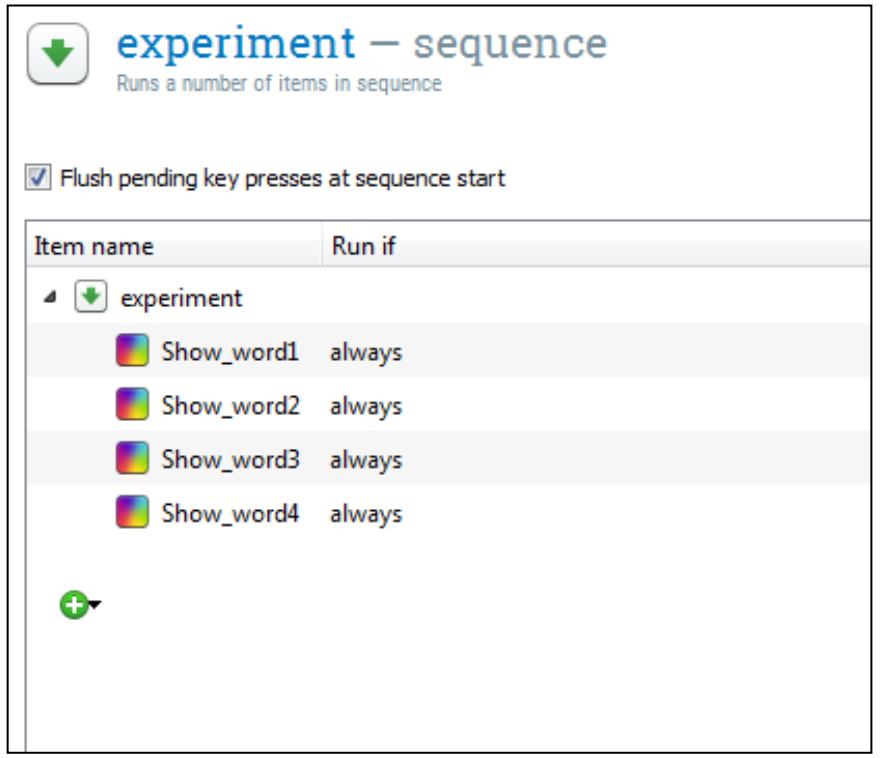
- We could do it with four sketchpad objects, each showing one word of text



The Experiment Sequence

Double-click on the Experiment Item in the Overview to see the experiment sequence

- The sequence shows the items and the order they will be shown in.



Expanding The Stimuli List

We now have four stimuli and we know the order in which they'll be shown. But…

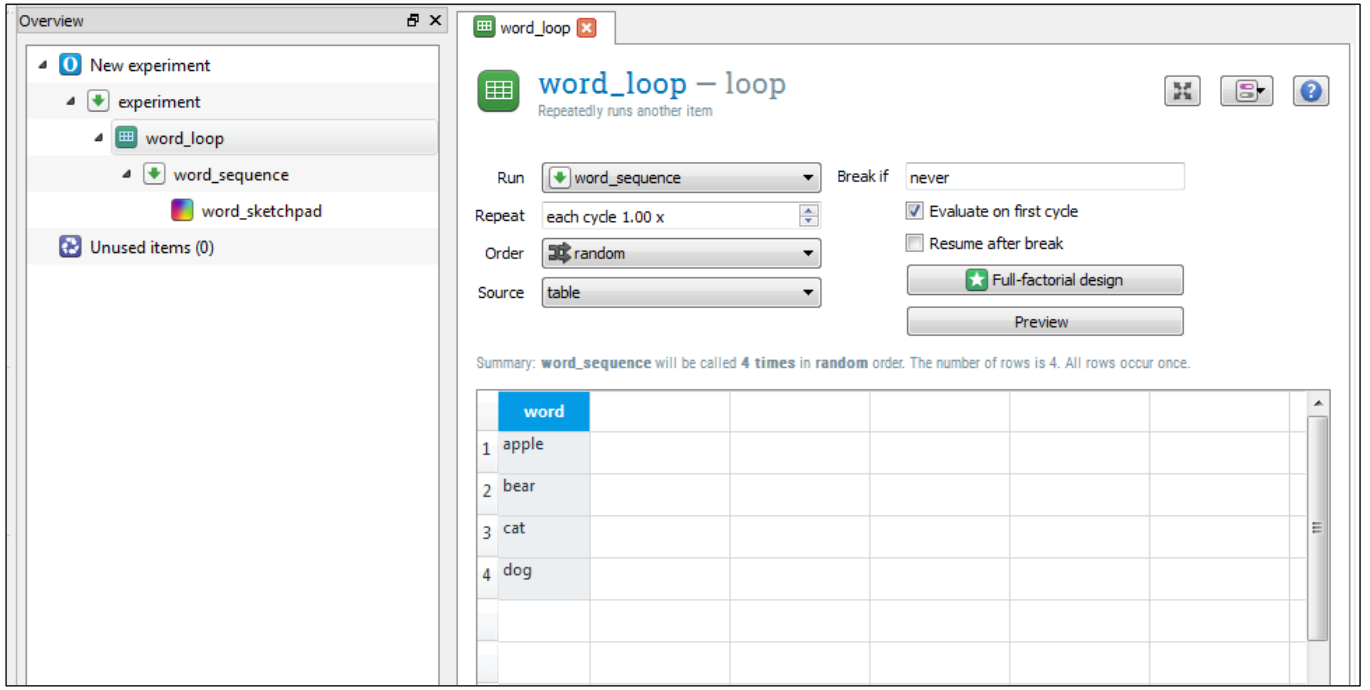
- What if we have hundreds?
- What if we want to repeat some?
- What about randomisation?

Instead, we can use a Loop item

Loop Items

A Loop Item is just a table of values that can be shown sequentially or randomly

- In this example, the words in the “word” column should be shown in order
- How will that happen, when there's only one sketchpad item?



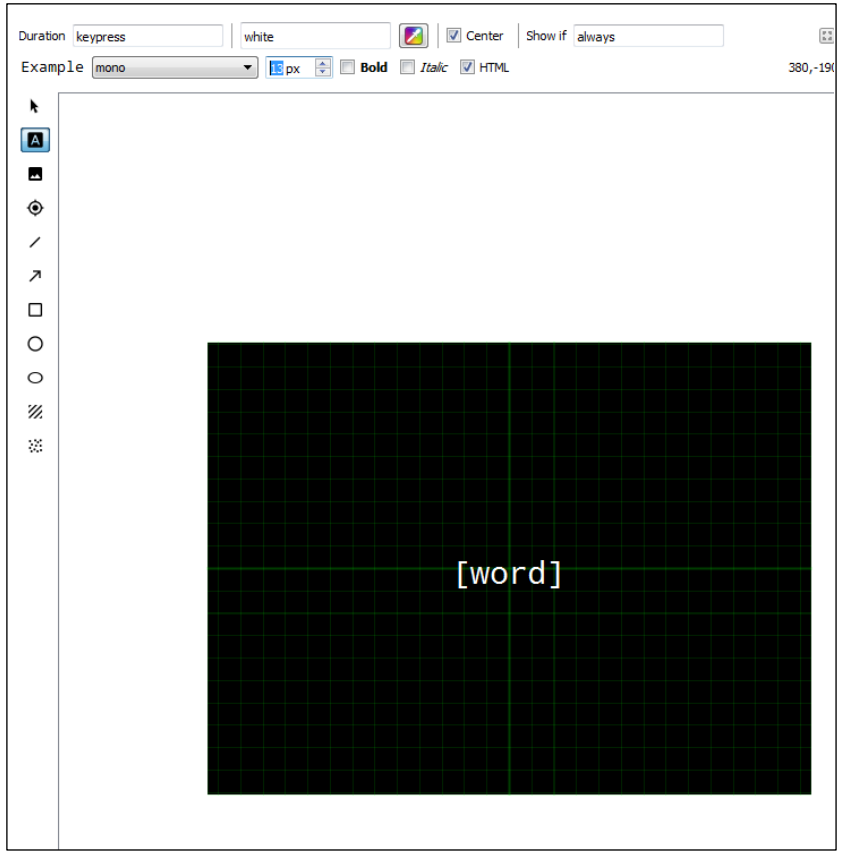
Loop Items

How does OpenSesame know what to show?

- In our sketchpad, we can put the name of the column in square brackets […]
- This tells OpenSesame to use that column for the loop

A Loop Item allows you to run an item or a sequence a number of times

- In this example we run the sequence four times, once for each row in the table
- If you want to just loop a single item you can place it in the loop or if you want to loop multiple items, place them in a new sequence inside the loop



Create Your Second Experiment

Now let's try using a loop to create the this experiment

- Create a new loop in your experiment
- To do this, the same way you added the sketchpad item, drag and drop a loop item  over on to “experiment” in the Overview

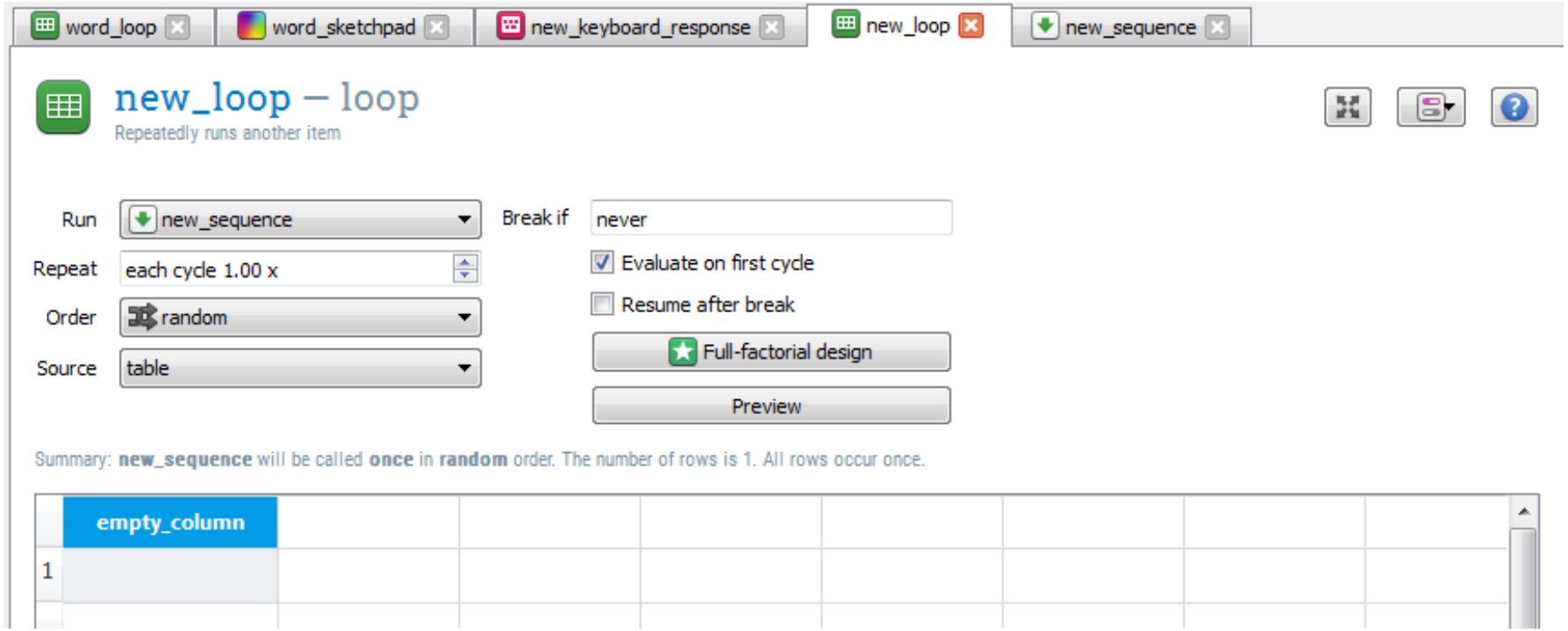
- Create a new sequence inside the loop
- To do this, drag a sequence  over to where the loop is in the Overview
- When prompted, choose “Insert into ....”

- Now drag a sketchpad item  onto the new sequence
- When prompted, choose “Insert into ....”

- Finally, let's go back to the loop item you created, click on it in the Overview

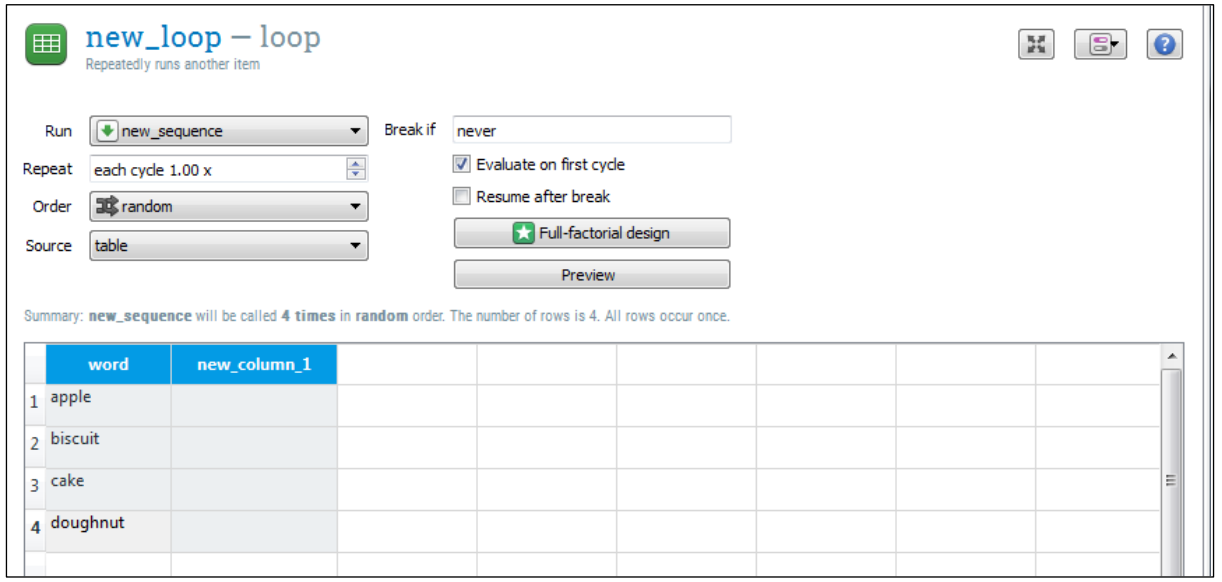
Create Your Second Experiment

You should see something like this



Create Your Second Experiment

- Double-click on the ‘empty_column’ header and rename it to ‘word’ (without the quotes)
- In the cells below, enter four different words



Create Your Second Experiment

- Finally, select the new sketchpad item
- Click on the icon for new text 
- Click on the grid to place the new text
- In the box that appears, type [word] (with the square brackets)

- You're all set. Click Save and then Run

Quitting An Experiment

- Press the escape key (Esc) to pause the experiment
- Once the experiment has paused, press the Q key to quit

Undo

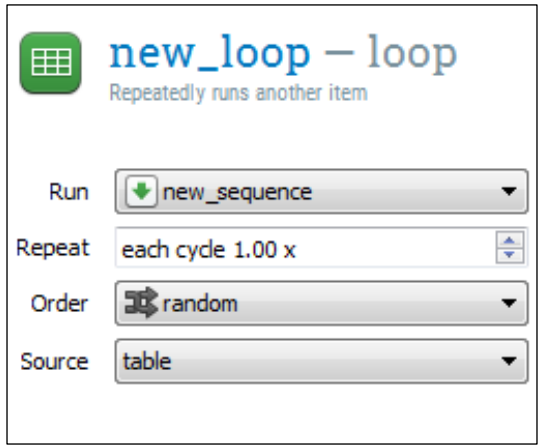
- You can undo almost any change in OpenSesame with Undo
- Click on the Undo button  to roll back changes
- Click on the Redo button  to reverse the Undo.

Time To Save

- Save this experiment
- We'll use it as an example later
- When you get to the exercises, for each exercise, please start a new OpenSesame experiment
- You can start from a copy of one of your previous experiments, if that's useful

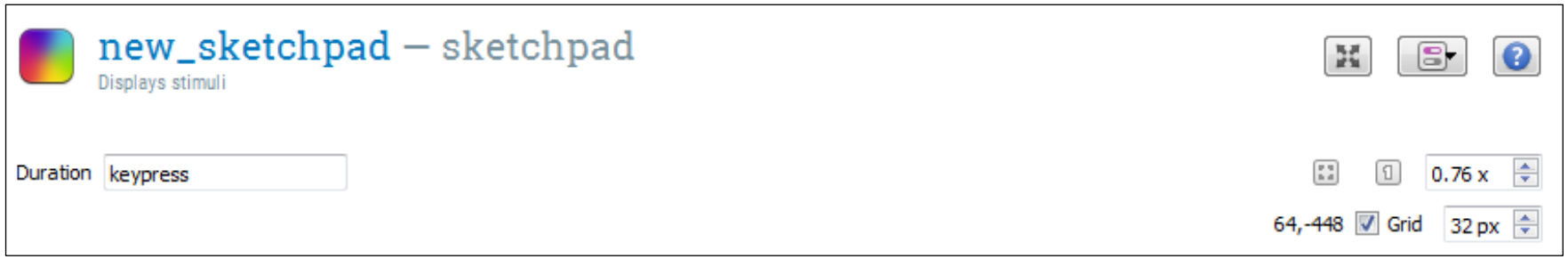
Randomisation

- By default OpenSesame goes through the items in the list in random order
- You can also make them happen sequentially
- This is controlled by the drop down list, “Order” in your loop



Getting Responses

- By default, sketchpad objects take a keyboard response
- Note that “Duration” is set to “keypress”
- This means “wait for a keypress”
- To give a timed stimulus, change this to a number of milliseconds

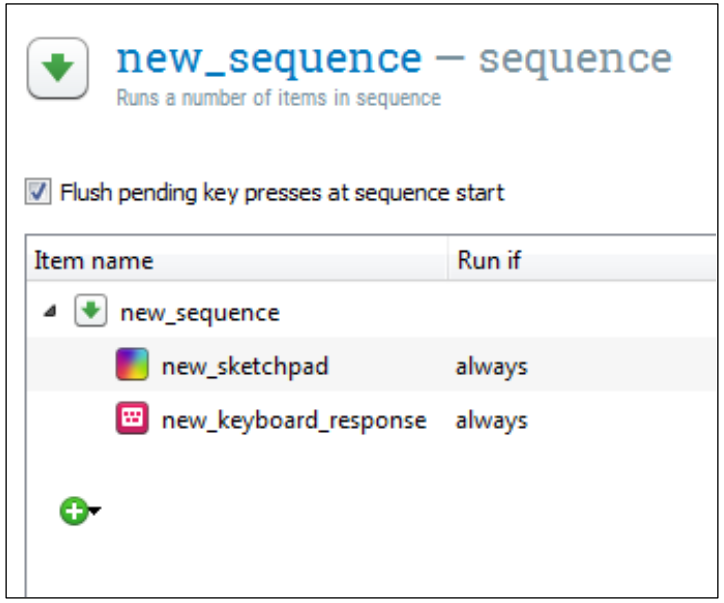


Getting Responses

- That sketchpad will wait indefinitely for any key to be pressed
- To limit the allowed time for response, set the Duration of te Sketchpad to 0 (zero)
- Add a Keyboard Response item after the Sketchpad and within the sequence
- Change the Timeout on the Keyboard Response to a number of milliseconds (e.g. 1000) and press Enter

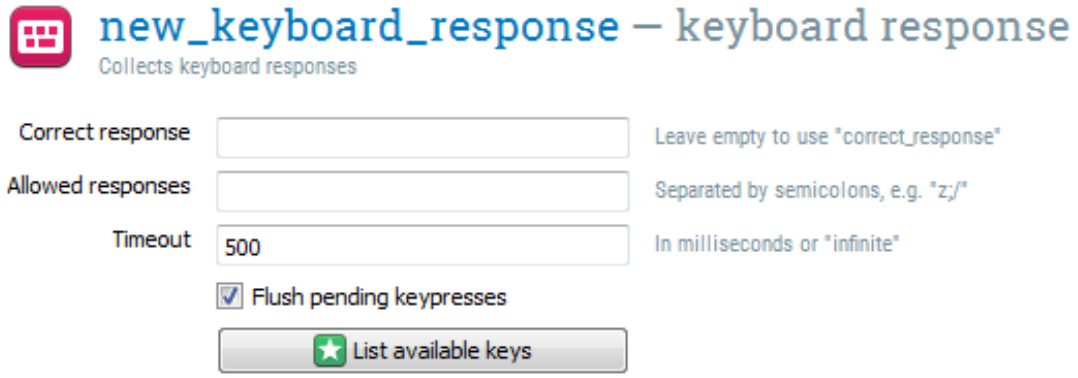
Getting Responses

- Your sequence inside the loop should now look like this:



Getting Responses

- “Allowed responses” is a list of allowed response keys, separated by semicolons, e.g. a;b;c;d
- Leave blank to allow any key as a response
- There are special values you can use, e.g. SPACE, DOWN



Try It

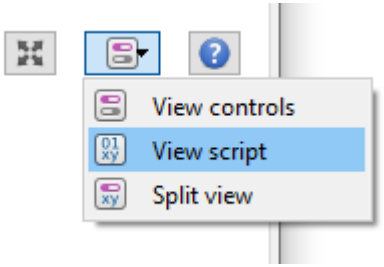
- In your current experiment (list of words):
  - Make the words appear in sequential order
  - Set a time limit for responses of 750ms
  - Allow only keyboard responses a, b, c or d

Weight

- If your list item has lots of repetition of samples you can use weights to save time
- Weight tells OpenSesame to display more or less of any particular row in a loop table
  - Add a new variable to your loop table to contain the number of repeated samples
  - Put a small number in the new column, next to each word (say between 1 and 5)

Weight

- Open “View script ” and add *weight w* (Where w is the name of the column)



- Then press ‘Apply’. Running the experiment will now show multiple samples of the rows in your table displaying each word *w* times.

```
set source_file ""
set source table
set repeat 1
set order random
set description "Repeatedly runs another item"
set cycles 4
set continuous no
set break_if_on_first yes
set break_if never
setcycle 0 word apple
setcycle 0 w 4
setcycle 1 word bear
setcycle 1 w 2
setcycle 2 word car
setcycle 2 w 3
setcycle 3 word dog
setcycle 3 w 2
weight w
run new_sequence

```

Logging Results

- Your experiment is running but it's not saving any results.
- In order to record results (like responses and reaction time), you must add a logger item  to your experiment
- Add this at the end of the inner sequence (after your new sketchpad item) and it will record every time the sequence runs

The Results File

- Open the results file using the link in the Finished tab.
- There's a lot there!
- Once you know what the recorded variables are called, you can find the details you need such as the key pressed and the response time
- For example if your keyboard response item is called “keypress1” you would get output variables:
  - response_keypress1
  - response_time_keypress1
- As you might guess, these represent the key pressed and the time in ms from stimulus to response

The Results File

- The data are saved in CSV format
  - (comma separated values)
- This format is universal and is easy to import into Excel or SPSS, or a custom analysis program

Break - Any Questions

Exercise 1 – Reaction Timer

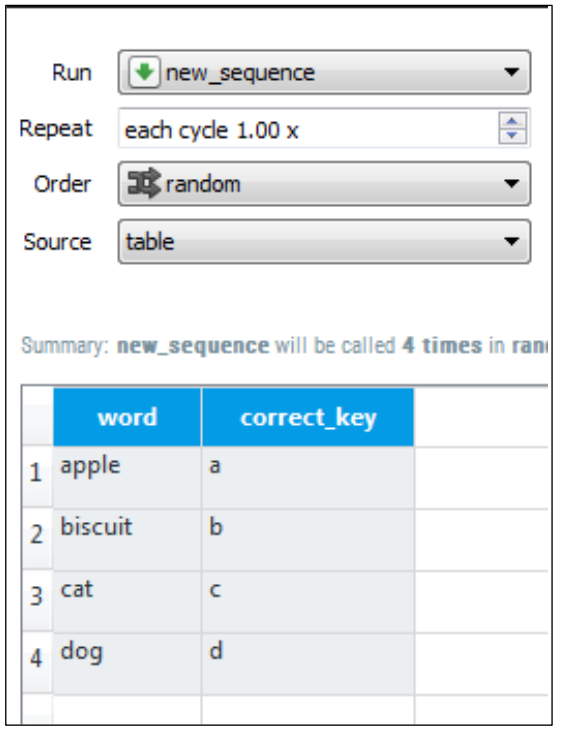
- In a new OpenSesame Experiment
  - Create a Loop Item with an empty table
  - Create a new Sequence by dragging it onto this loop
  - Add a Sketchpad to the Sequence that shows the word “NOW” in a large font
  - Set the duration of the Sketchpad to zero
  - Add a Keyboard Response Item that
    - Waits for keyboard input
    - Accepts SPACE as the only valid response
  - Make sure the reaction time is logged
  - Add another Sketchpad after the logger that is blank and has a duration of 2s
  - Edit the loop to run the experiment many times (e.g. 20)

Correct Answers

It's possible to tell OpenSesame what the correct answer is for a given stimulus

- Not applicable to all tasks
- Can save a lot of time in Analysis

- To specify the correct answer, add a new variable (column) in your Loop table
- In this case we use an _ between the words of the name.
- Variable names cannot contain spaces

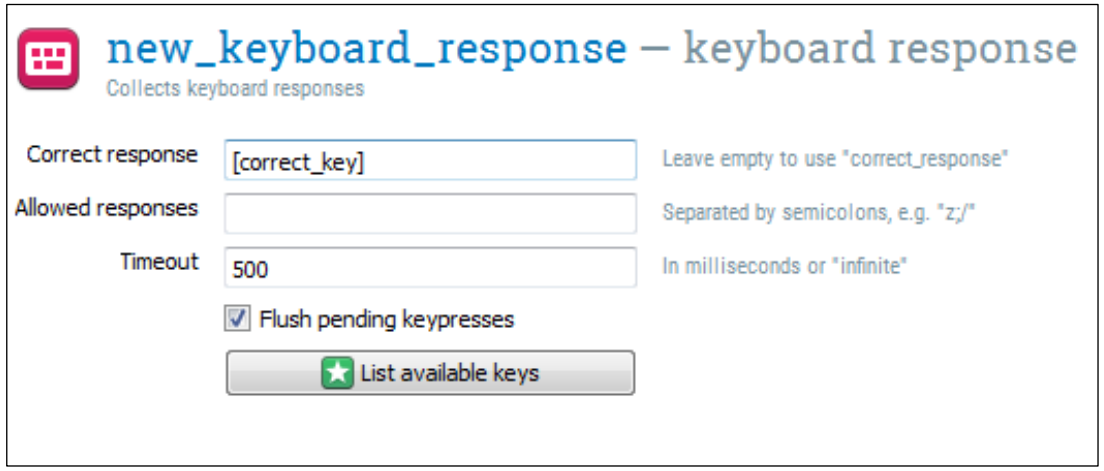


	word	correct_key
1	apple	a
2	biscuit	b
3	cat	c
4	dog	d

Correct Answers

This column can then be used in your Keyboard Response to specify the correct answer and it will vary for each stimulus.

As before, when referring to variables or columns, enclose the name in […]



Exercise 2 – Word Length

- In this experiment, participants see single words one at a time
- For each word, the participant should press a key corresponding to the number of letters in the word
- The question is whether it takes longer to respond to longer words

- Start a New Experiment
- To begin, create an experiment that shows a list of 20 words between 2 and 5 letters long and set it to show in random order.
- You will need a Loop, a Sequence within the Loop and a Sketchpad

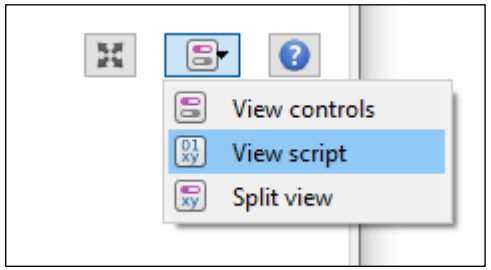
Exercise 2 – Word Length

- Now change your experiment to use a separate Keyboard Response
- Set the allowable responses to 2;3;4;5
- Add a blank Sketchpad after the Keyboard Response and set its duration to 2s
- Now add an extra variable to your Loop table for the correct answer.
- The values for this will be 2, 3, 4 or 5 depending on the length of the corresponding word.
- Set this variable to in the *Correct Response* section of your Keyboard Response
  - Don't forget the […]
- Add a logger
- Save and Run and take a look at the results

Other Way to Use Variables

Variables can be used almost anywhere that you have a fixed value

- Go back to the example experiment from the start that displays a list of words
- Open the Loop Item
- Add a new variable called ***textcolour***
- Fill in the names of simple colours as values and put a different one in each row (e.g. blue, yellow, red, green)
- Now in the Sketchpad we need to edit the script.
- Click on the Script menu and choose “View Script”
- In the script find the text ***color=white*** and replace it with ***color=[textcolour]***
- Save and Run



Exercise 3 – Stroop Task

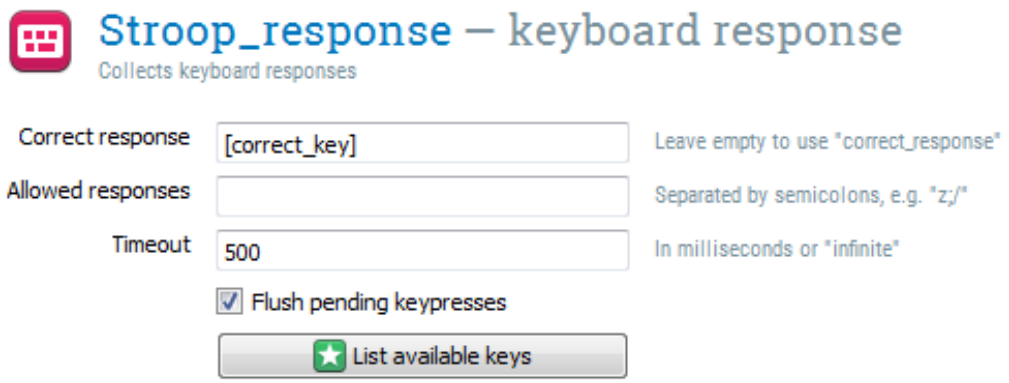
- Start a new Experiment
- To begin create an experiment that just shows the words “blue”, “green”, “red” and “yellow”
- As before, add a blank Sketchpad after the stimulus
- You’ll need a Loop and a couple of Sketchpads
- Now add another variable to your Loop table for the text colour
- Change the script of your Sketchpad to use this new variable to set the text colour
- Insert a Keyboard Response and set the allowed responses to be the first letters of the colours (b;g;r;y)

Exercise 3 – Stroop Task

- Now add another variable to your Loop table for the correct response
- The values for this should be the first letter of the ***Colour*** of the word

	word	textcolour	correct_key
1	red	blue	b

- Now change the Keyboard Response to use this as the correct response



Exercise 3 – Stroop Task

- Add a Logger after the Keyboard Response to make sure we're recording responses
- Finally, edit the Loop table to make sure that:
  - There are four different congruent trials (i.e. four rows where the word and colour are the same)
  - There are four different incongruent trials (i.e. four rows where the word and colour are different)
- Remember, you can also use weight to increase the total number of trials
  - Add a "w" column to your table
  - Add ***weight w*** to the loop's script

Entering and Seeing Text Onscreen

- In qualitative research you may want to collect a participant's recollection, interpretation or emotional response to a stimuli
- For instance, a participant listens to a song and is asked to recall lyrics.
- In OpenSesame you can create items which allow a participant to enter text.

Multiple Choice Questionnaire

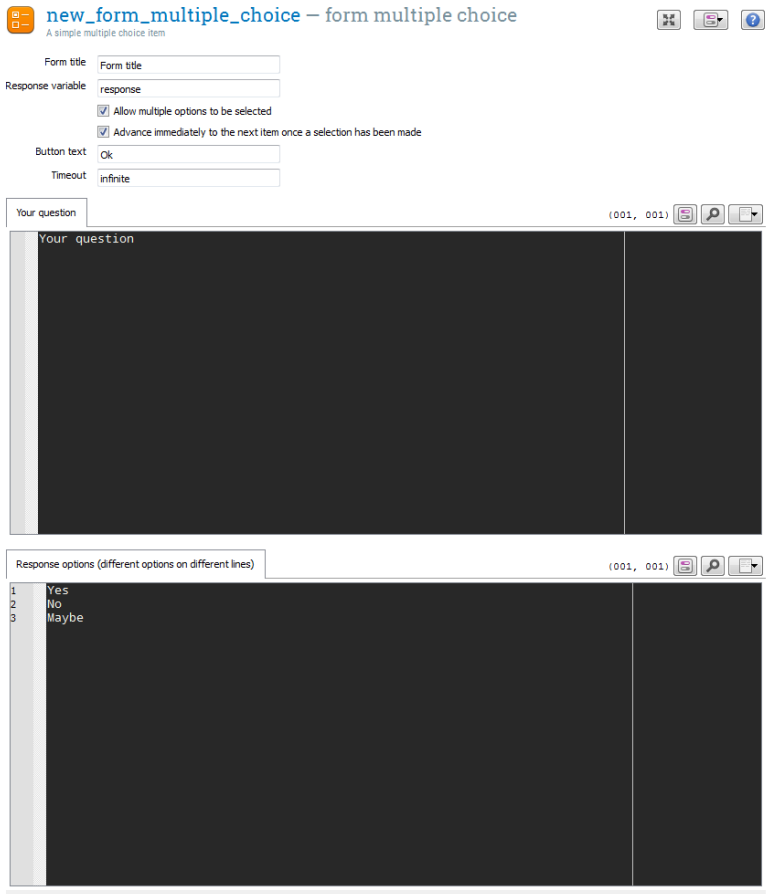
Consent Form Template

Input Text Form for more complex responses

Simple Display Text Form

Entering and Seeing Text Onscreen

- The forms have simple interfaces similar to those you have seen before.
- For instance in the multiple choice form.



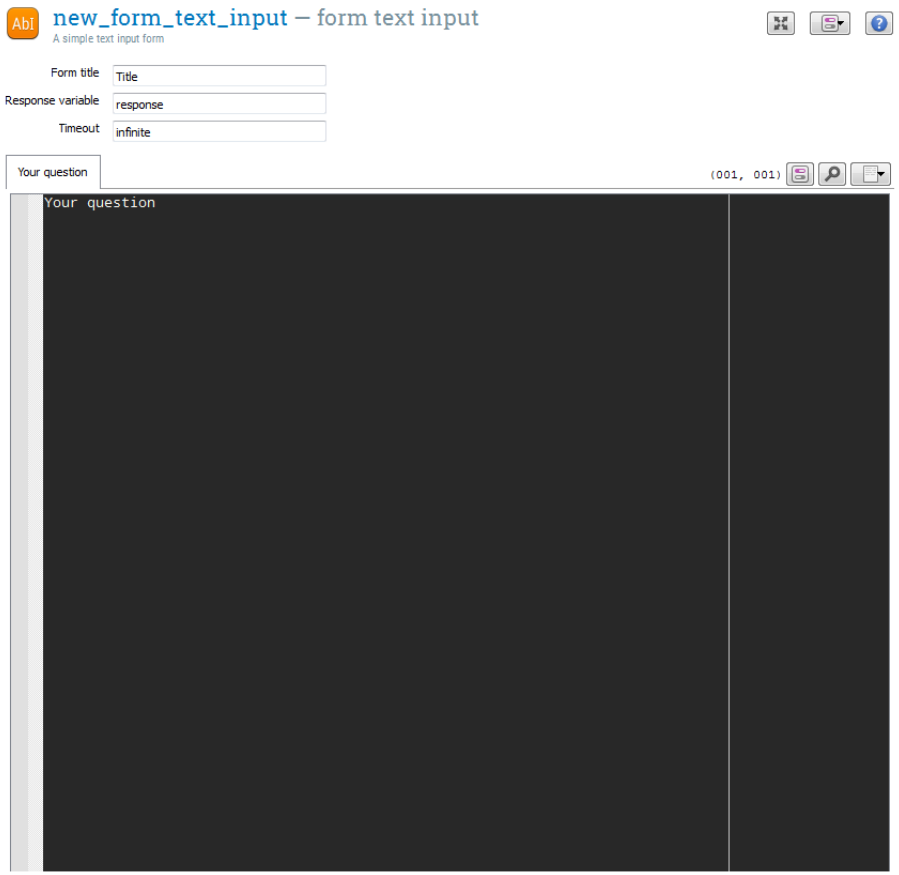
Editing Options such as title, Buttons and Variable Name

Question Text

Options for different responses

Entering and Seeing Text Onscreen

- The Text Box Form produces a box that has a Title and a Question



Editing Options

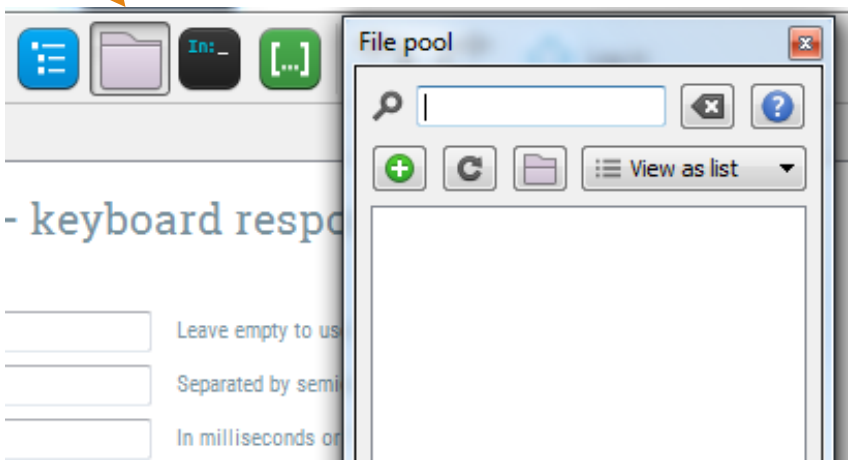
Text to be displayed

Presenting Visual and Audio Stimuli

- OpenSesame has a system known as a ‘file pool’
- This means that when you save your experiment you save all the associated stimuli files such as images and audio
- These are usually compressed as a Zip file to keep size down
  - Good: makes the presentation of stimuli easier to handle, keeping all relevant files together
  - Bad: The resulting experiment can be very large so sending it or transporting it on USB could be tricky.

Presenting Visual and Audio Stimuli

Open the File Pool

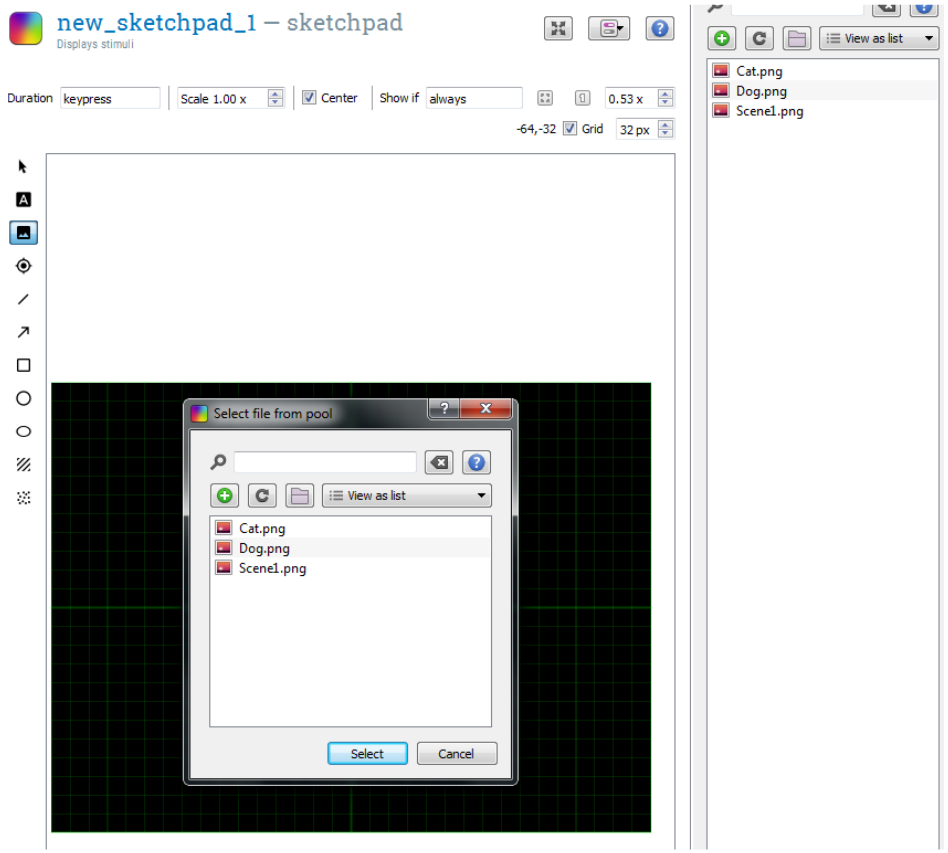


File Pool has options to add files, search the pool, etc.

Presenting Visual and Audio Stimuli

- Add a few files to the File Pool and then open a new Sketchpad and experiment with adding images to the Sketch
- You can use the Select tool to select your image after you place it and either move it or modify it's scaling and rotation

Add an image from the File Pool



Exercise 4 – Recall Experiment

- Use what you've learnt to create an experiment in which a participant sees a scene and then writes down what they recall from the experiment

- Present three scenes two times.
- Display each of the scenes and ask for a response in two blocks, one block with a duration of 1000ms and one with a duration of 2000ms
- For a response, ask the participant to describe the scene in a form.