Inquisit 4 Help

Welcome to Inquisit 4 Help. You can browse through the table of contents for categories of help, or you can search for help based on keywords using the Index or the Search tabs. In addition, the Inquisit script editor supports context sensitive help - just put the cursor inside any script element and press F1, and the help topic for that element will open. For more information about Inquisit, you may want to join the Millisecond Online Forums, a virtual community where Inquisit users can post questions and share information about Inquisit. In addition, you may visit our web site at http://www.millisecond.com or email us at

Getting Started

Introduction - an overview of Inquisit and how it works.

Inquisit Tutorials - walk through the steps of creating an Inquisit script.

Designing Experiments

Language Reference - a complete guide to Inquisit's commands.

How To - programming tips and tricks, and answers to frequently asked questions.

Additional Online Resources

User Forums - a message board for questions and answers from the Inquisit community.

Inquisit Task Library - download sample scripts demonstrating how to program a variety of tasks in Inquisit.

Introducing Inquisit 4

Inquisit is a general purpose psychological experimentation application for designing and administering psychological experiments and measures. Inquisit can run a given script locally on a Windows PC or Mac, or it can be used to administer tasks over the web. Inquisit can be used to implement a wide range of psychological measures, including reaction time tasks, psychophysiological experiments, attitude measures, surveys, games, learning and memory tasks, judgement and decision making paradigms, and more.

Overview

An Inquisit experiment is specified using Inquisit's powerful and intuitive scripting language. The script defines all of the pieces of the experiment such as the stimuli, questionaire items, trials, blocks of trials, instructions, as well as the logic determining the flow of events. An Inquisit script is saved as a plain text UTF-8 file with the *.iqx file extension. The file format is unicode, so it can store and present characters from any locale, including east Asian, Hebrew, Arabic, and Cyrillic character sets.

To edit a script, simply open the script file using the Open command on the File menu. Once you've opened a script, you can edit it in the rich text editor, or validate the syntax, and run it using the corresponding commands from the Experiment menu.

The Inquisit Scripting Language

The Inquisit language was designed to be easy and approachable to nonprogrammers who are familiar with the basics of experimental psychology. The structure of the Inquisit scripting language should be familiar to anyone who has programmed html and javascript. However, some of the cumbersome aspects of html syntax have been streamlined to make Inquisit scripts easier to read and write.

The Inquisit scripting language consists of *elements* and *attributes*, which enable you declare and configure the various parts that make up the task. Elements are the basic building blocks of a script. Commonly used elements include
survey
surveypage
expt (experiment)
block
trial
picture
text
video
html
data
just to name a few.

Each element, in turn, has a set of attributes that determine exactly how that element behaves. For example, Inquisit's text element, which defines a set a text stimuli, has attributes that specify the color, font, and the location of the screen to present the text.

Some elements, such as the expt, block, and trial elements, include event handler attributes that are triggered when the element is run. These enable you to dynamically get and set properties on any element as the script is running using a simple expression syntax similar to Javascript. These special event handler attributes are useful for defining more

sophisticated paradigms in which the flow of the task changes based on the subject's performance or other conditions.

Writing an Inquisit script is simply a matter of defining the elements of your experiment and setting their attributes to the desired values. Once you understand this basic idea, it's just a matter of familiarizing yourself with the details of the elements and attributes. To get started learning how to write Inquisit scripts, read through the tutorials.

Running Scripts

For experiments run on a dedicated Windows PC or Mac, scripts are written and run using the Inquisit application. Once you have written script, downloaded one from the Inquisit Task Library, or obtained one from some other source, you can open the script in Inquisit run the entire experiment or right click on a particular element to run just that piece. For web experiments, scripts are run by uploading them to the Millisecond server from your account and then starting them from the launch web page.

When a script is run, Inquisit first parses its commands. If the script contains no errors, it runs. Otherwise, Inquisit reports the errors in the output window at the bottom of the screen. If you click the error, the editor will jump to the line of code that caused the problem. Note that Inquisit does not compile a script into an executable file that can be run by itself. Running a script thus requires the Inquisit application to be installed on the machine, or that it be launched from an Inquisit web page that is specially designed to run it over the web.

Recording Data

As Inquisit Lab runs an experiment, it writes the data to a file. By default, the data file is located in the same folder as the script file using the same name as the script file except that the file extension is changed to "dat". By default, Inquisit Web saves data files to the Inquisit web server where you can log in to your Millisecond account and download the files.

For cognitive tasks, each line of data in the file corresponds to a single trial. In addition, a task can be configured to recorded a single line of summary data for each participant using the summarydata element. For surveys, all responses from each participant are stored on a single line. Inquisit data files can be imported directly into programs like SPSS and Excel for analysis. Inquisit can be configured to record metrics such as mean and median response latencies, standard deviations, percentage of correct response, and even custom statistics, but for most purposes, it is necessary to analyze the data using a statistical analysis program.

Learning Resources

To learn Inquisit, we suggest the following:

1. Read through the tutorials.
2. Download and run scripts from the Inquisit Task Library.
3. Make minor modifications to a scripts from the library using the language reference as your guide (tip: from the editor, press F1 and the reference topic for the currently selected element will open).
4. Read through the How To topics.
5. If you get stuck, go to millisecond.com and enter your question in the search box (powered by Google). If you are unable to find the information you need, you can post a question to our online forums or email support@millisecond.com.

Inquisit Tutorials

The following tutorials will guide you through the process of implementing a variety of different data collection procedures.

Creating an experiment or survey is a simple matter of editing script containing instructions and configuration settings telling Inquisit what to do, when to do it, and which data to record (e.g. reaction times, survey responses).

The text that Inquisit uses to perform a set of operations is called a script, typically saved as a file with the *.iqx file extension. If you installed Inquisit using the default options, the scripts for the tutorials were installed under the *C:\Program Files\Millisecond Software\Inquisit 4\tutorials* directory.

Simplified Implicit Attitude Task This is a stripped down nonstandard version of the IAT that illustrates basic Inquisit programming concepts. The script for this tutorial is in the file *iat_tutorial.iqx*.

Standard IAT This shows how to modify a standard IAT using your own attribute and target categories. The script for this tutorial is in the file *Standard IAT.iqx*.

Demographic Survey The script for this tutorial is in the file *demographics.iqx*.

Standard Picture IAT This builds a standard picture IAT from scratch. The tutorial is in the file *pictureiat.iqx*.

Subliminal Priming Task The script for this tutorial is in the file *subliminal_tutorial.iqx*.

Covert Attention Task The script for this tutorial is in the file *ca_tutorial.iqx*.

Dot probe Task The script for this tutorial is in the file *ca_tutorial.iqx*.

Tutorial: Standard Implicit Attitude Task

Download script for this tutorial.

This tutorial demonstrates how to create a standard Implicit Attitude Task (IAT) as developed by Tony Greenwald et al. The tutorial starts with an IAT that measures implicit attitudes towards flowers and insects, and shows how to adapt the task to measure other target categories.

On the following pages, Inquisit commands are printed in blue, and comments are printed in black:

Steps

Modifying Attribute Categories ▶

Modifying Attribute Categories

The first step in creating your custom IAT is to open the sample IAT task that ships with Inquisit. Open the sample by clicking the Window Start menu and selecting All Programs->Inquisit 4->Tutorial Scripts->Standard IAT. The Standard IAT measures attitudes towards flowers verses insects. In this tutorial, we will adapt the IAT to measure attitudes towards other target categories (we'll use the example of men verses women, but you can just as easily substitute any category of interest).

The Standard IAT script was organized so that the portions to be modified are conveniently located at the top of the document. The first thing you'll see at the top is a comment with helpful instructions on modifying the stimuli:

```
************************************************************
********
This sample IAT can be easily adapted to different target
categories
and attributes. To change the categories, you need only change
the
stimulus items and labels immediately below this line.

************************************************************
********
```

This text is simply a comment for someone authoring a script. It is not a part of the IAT itself, and does not have any impact on how the script runs.

The next section of the script shows attribute labels along with the stimulus items that serve as examples of either attribute category:

```
<item attributeAlabel>
/1 = "Good"
</item>

<item attributeA>
/1 = "Marvelous"
/2 = "Superb"
/3 = "Pleasure"
/4 = "Beautiful"
/5 = "Joyful"
/6 = "Glorious"
/7 = "Lovely"
/8 = "Wonderful"
</item>

<item attributeBlabel>
/1 = "Bad"
</item>

<item attributeB>
/1 = "Tragic"
/2 = "Horrible"
/3 = "Agony"
/4 = "Painful"
/5 = "Terrible"
```

```
/6 = "Awful"
/7 = "Humiliate"
/8 = "Nasty"
</item>
```

For our IAT, we will change the attributes labels to "Strong" and "Weak" in order to measure how attitudes towards men and women conform to gender stereotyping, and we'll change the stimulus items to examples of these categories.

```
<item attributeAlabel>
/1 = "Strong"
</item>

<item attributeA>
/1 = "Power"
/2 = "Command"
/3 = "Dominant"
/4 = "Succeed"
/5 = "Assert"
/6 = "Confident"
/7 = "Control"
/8 = "Bold"
</item>

<item attributeBlabel>
/1 = "Weak"
</item>

<item attributeB>
/1 = "Timid"
/2 = "Submissive"
/3 = "Fragile"
/4 = "Follow"
/5 = "Fail"
/6 = "Obey"
/7 = "Hesitant"
/8 = "Uncertain"
</item>
```

There, that was pretty easy. At this point, we have an IAT that measures implicity associations of flowers and insects as weak or strong. While this may be of interest to botanists and entomologists, the next step for us is to modify the target categories to measure attiitudes towards men and women.

Overview Modifying Target Categories

Modifying Target Categories

The next section of the IAT script contains the defintions of the target category labels and stimulus items. The syntax is identical to the attribute definitions, only the items and item names are different:

```
<item targetAlabel>
/1 = "Flowers"
</item>

<item targetA>
/1 = "Orchid"
/2 = "Lily"
/3 = "Violet"
/4 = "Daisy"
/5 = "Tulip"
/6 = "Poppy"
/7 = "Daffodil"
/8 = "Lilac"
</item>

<item targetBlabel>
/1 = "Insects"
</item>

<item targetB>
/1 = "Ant"
/2 = "Locust"
/3 = "Bee"
/4 = "Wasp"
/5 = "Beetle"
/6 = "Termite"
/7 = "Roach"
/8 = "Moth"
</item>
```

The labels are defined in <item targetAlabel> and <item targetBlabel>, and the stimulus items are defined in <item targetA> and <item targetB>. First, we'll change our target labels and stimuli for category A, men, as follows:

```
<item attributeAlabel>
/1 = "Men"
</item>

<item attributeA>
/1 = "James"
/2 = "Robert"
/3 = "Steve"
/4 = "Henry"
/5 = "Tony"
/6 = "Sean"
/7 = "John"
/8 = "William"
</item>
```

Next we'll create change the label and stimuli for category B, women:

```
<item attributeBlabel>
/1 = "Women"
</item>

<item attributeB>
/1 = "Debbie"
/2 = "Shelly"
/3 = "Karen"
/4 = "Anya"
/5 = "Susan"
/6 = "Wendy"
/7 = "Michelle"
/8 = "Jane"
</item>
```

If you're goal is to simply to adapt the IAT to a particular set of attributes and targets, I have good news. You're done! To run your IAT, just select the Run command on Inquisit's Experiment menu. Now go collect some data.

In the next section, we'll cover where task instructions for in the IAT are defined in case you need to modify the text or translate the instructions to another language.

◀Modifying Attribute Categories

Modifying Task Instructions ▶

Modifying Task Instructions

The IAT sample includes general instructions that have been written to apply to any standard IAT, regardless of the attributes or targets. However, if you are administering the IAT to a population that doesn't speak English, or that would benefit from additional or specially worded instructions, you can easily modify the text to suit your needs.

If you scroll down below the target category definitions, you'll find the following element, which specifies the text for 7 pages of instructions that appear throughout the IAT. Instructions are defined using the <item> element, just as the attribute and target stimuli were. One difference, however, is that the instruction items formatted with line breaks, which helps make them more readable when presented on the screen.

```
<item instructions>
/ 1 = "Put your middle or index fingers on the E and I keys of
your keyboard. Words representing the categories at the top
will appear one-by-one in the middle of the screen. When the
item belongs to a category on the left, press the E key; when
the item belongs to a category on the right, press the I key.
Items belong to only one category. If you make an error, an X
will appear - fix the error by hitting the other key.

This is a timed sorting task. GO AS FAST AS YOU CAN while
making as few mistakes as possible. Going too slow or making
too many errors will result in an uninterpretable score. This
task will take about 5 minutes to complete."
/ 2 = "See above, the categories have changed. The items for
sorting have changed as well. The rules, however, are the same.

When the item belongs to a category on the left, press the E
key; when the item belongs to a category on the right, press
the I key. Items belong to only one category. An X appears
after an error - fix the error by hitting the other key. GO AS
FAST AS YOU CAN."
/ 3 = "See above, the four categories you saw separately now
appear together. Remember, each item belongs to only one group.
For example, if the categories flower and good appeared on the
separate sides above - words meaning flower would go in the
flower category, not the good category.

The green and white labels and items may help to identify the
appropriate category. Use the E and I keys to categorize items
into four groups left and right, and correct errors by hitting
the other key."

/ 4 = "Sort the same four categories again. Remember to go as
fast as you can while making as few mistakes as possible.

The green and white labels and items may help to identify the
appropriate category. Use the E and I keys to categorize items
into the four groups left and right, and correct errors by
hitting the other key."
/ 5 = "Notice above, there are only two cateogries and they
```

```
have switched positions. The concept that was previously on the
left is now on the right, and the concept that was on the right
is now on the left. Practice this new configuration.

Use the E and I keys to catgorize items left and right, and
correct errors by hitting the other key."
/ 6 = "See above, the four categories now appear together in a
new configuration. Remember, each item belongs to only one
group.

The green and white labels and items may help to identify the
appropriate category. Use the E and I keys to categorize items
into the four groups left and right, and correct errors by
hitting the other key."
/ 7 = "Sort the same four categories again. Remember to go as
fast as you can while making as few mistakes as possible.

The green and white labels and items may help to identify the
appropriate category. Use the E and I keys to categorize items
into the four groups left and right, and correct errors by
hitting the other key."
</item>
```

You can modify the instruction pages just as you did the attributes and category items, by simply editing the text within quotation marks.

If you make significant change to the instructions, you might also need to change the size and location at which the text is presented on the screen. The element that controls how instruction text is presented is the following:

```
<text instructions>
/ items = instructions
/ hjustify = left
/ size = (90%, 60%)
/ position = (50%, 85%)
/ valign = bottom
/ select = instructions
</text>
```

The <text> element is used to define how a set of text items are presented. The first command in the element, / items = instructions, specifies that the actual text items are defined in an <item> element called "instuctions", which is the <item instruction> element we just covered above. The / hjustify = left command specifies that text should be left justified. You can also set this to "center" or "right" (e.e., for right to left languages like Hebrew). The / size = (90%, 60%) specifies the size of the bounding rectangle in which the text should be presented (and words are wrapped). In this case, the width is 90% of the screen, and the height is 60%. By using percentages, the size will scale across monitors with different display resolutions. The /position = (50%, 85%) command specifies the position on the screen, which is the located horizontally at the midpoint of the screen and 85% of the way veritically towards the bottom. The /valign = bottom command specifies that the bottom of the bounding rectangle containing the text should align with the point on the screen specified by the position command. The rest we'll ignore for now.

Note that if you need to resize the text itself, you can do so using the /fontstyle command. To change the fontstyle, insert the cursor inside the <text instructions> element and select the

"Font Wizard" command from the Tools menu. This will launch a graphical font picker that will allow you to choose the font parameters and insert the corresponding /fontstyle command into the script.

Modifying Target Categories

Changing Response Keys

Changing Response Keys

By default, the IAT uses the E and I keys to indicate a left and right response. The response keys are defined using the <trial> element, which is rseponsible for presenting stimuli and gathering responses. The IAT has six different <trial> elements. The first two, shown below, present stimuli from attribute A and attribute B respectively:

```
<trial attributeA>
/ validresponse = ("E", "I")
/ correctresponse = ("E")
/ stimulusframes = [1 = attributeA]
/ posttrialpause = 250
</trial>

<trial attributeB>
/ validresponse = ("E", "I")
/ correctresponse = ("I")
/ stimulusframes = [1 = attributeB]
/ posttrialpause = 250
</trial>
```

The validresponse command defines two permissible responses for either trial, "E" and "I". The correctresponse defines which of these responses is considered correct for purposes of scoring and error feedback. For attribute A, the "E" key is always correct. For attribute B, the "I" key is correct. You can change the keys used for responding by replacing "E" and "I" with whatever character you like. If you are using another input device such as a response box, you can replace these with the numeric values corresponding to the buttons.

The remaining four trials present targets A and B. Recall that the IAT presents the targets with both compatible and incompatible attribute pairings, so there are two trials defined for each target category that vary in whether "E" or "I" is considered the correct response. Again, the particular keys used can be modified as they were with the attribute trials.

```
<trial targetBleft>
/ validresponse = ("E", "I")
/ correctresponse = ("E")
/ stimulusframes = [1 = targetB]
/ posttrialpause = 250
</trial>

<trial targetBright>
/ validresponse = ("E", "I")
/ correctresponse = ("I")
/ stimulusframes = [1 = targetB]
/ posttrialpause = 250
</trial>

<trial targetAleft>
/ validresponse = ("E", "I")
/ correctresponse = ("E")
/ stimulusframes = [1 = targetA]
/ posttrialpause = 250
</trial>
```

```
<trial targetAright>
/ validresponse = ("E", "I")
/ correctresponse = ("I")
/ stimulusframes = [1 = targetA]
/ posttrialpause = 250
</trial>
```

The tutorial is now complete! You can run the IAT by selecting the "Run" command on the "Experiment" menu.

Modifying Instructions Back to Overview

Tutorial: Standard Picture IAT

Download script for this tutorial.

This tutorial builds an Implicit Attitude Task (IAT) modeled after the version that runs on the Project Implicit web site (www.projectimplicit.org). This version of the task measures implicit attitudes towards flowers and insects as represented by pictures.

This tutorial walks through the process of building an IAT from scratch. If your goal is simply to adapt the IAT to your own attribute and target categories, you need only make a few simple modifications to the sample script as indicated at the end of the section on creating text stimuli; you can skip the rest. This tutorial will be of interest to anyone interested in the details of the IAT procedure, or who wishes to modify the procedure. The tutorial also illustrates a number of intermediate and advanced concepts that are relevant to other procedures besides the IAT.

On the following pages, Inquisit commands are printed in blue, and comments are printed in black:

Steps

Creating Text Stimuli ▶

Creating Text and Picture Stimuli

The first step in creating our script is to define the various stimuli that will be presented in the IAT. In this case, the stimuli will be a mix of text (good and bad words) and pictures (flowers and insects). Other stimuli include task instructions, a big red "X" for an error message, and category labels to remind participants which response keys map to which categories.

The good and bad text stimuli are defined as follows:

```
<text attributeA>
/ items = attributeA
/ txcolor = (0, 255, 0)
</text>

<text attributeB>
/ items = attributeB
/ txcolor = (0, 255, 0)
</text>
```

The *txcolor* attribute sets the red, green, and blue components of the text color. Green is set to the maximum value, wherease red and blue are 0, so both sets of words will appear green. The actual words in the set are specified separately in item elements called "attributeA" and "attributeB", which are defined below. We'll use generic names like "attribruteA" throughout the script to illustrate that the script contains mostly generic IAT logic that can be easily adapted to different target categories and attributes.

Next, we'll define the pictures representing the target categories, flowers and insects:

```
<picture targetB>
/ items = targetB
/ size = (20%, 20%)
</picture>

<picture targetA>
/ items = targetA
/ size = (20%, 20%)
</picture>
```

Like the text elements, the items are defined in separate item elements. The size of the pictures is set to 20% of the height and width of the screen. In fact, all sizes for pictures and text in this script will be defined in terms of percentage of the screen. This allows the IAT to scale proportionally to different monitor sizes, making it suitable for the web where users run a wide range of display systems.

Now we'll define the category labels that appear in the upper left and right corners of the screen. The attribute labels are as follows:

```
<text attributeAleft>
/ items = attributeAlabel
/ valign = top
/ halign = left
/ position = (5%, 5%)
/ txcolor = (0, 255, 0)
</text>

<text attributeBright>
```

```
/ items = attributeBlabel
/ valign = top
/ halign = right
/ position = (95%, 5%)
/ txcolor = (0, 255, 0)
</text>
```

The first label is presented in the upper left corner at a 5% margin from the upper and left edges of the screen as defined by the *position* attribute. The second label is presented in the upper right corner of the screen, again with 5% margins. The color of both labels is green, just like the stimuli themselves. The *items* attribute specifies that the actual label text is defined in an item elements below.

Now for the target labels. These are similar to the attribute labels, except that they are presented in the default text color (we'll set the default to white later in the tutorial).

```
<text targetAleft>
/ items = targetAlabel
/ valign = top
/ halign = left
/ position = (5%, 5%)
</text>

<text targetBright>
/ items = targetBlabel
/ valign = top
/ halign = right
/ position = (95%, 5%)
</text>
```

Recall that in the IAT, the target categories switch sides midway through the test, so we'll also define labels that place category A on the right and B on the left:

```
<text targetBleft>
/ items = targetBlabel
/ valign = top
/ halign = left
/ position = (5%, 5%)
</text>

<text targetAright>
/ items = targetAlabel
/ valign = top
/ halign = right
/ position = (95%, 5%)
</text>
```

Next we'll create category labels for the critical trials where the targets and attributes are mixed together, for example, "Flowers or Good" and "Insects or Bad". On these trials, we'll present the target labels we created above. Just below those labels we'll present the word "or", and just below those the attribute labels will be presented:

```
<text orleft>
/ items = ("or")
/ valign = top
/ halign = left
/ position = (5%, 12%)
```

```
</text>

<text attributeAleftmixed>
/ items = attributeAlabel
/ valign = top
/ halign = left
/ position = (5%, 19%)
/ txcolor = (0, 255, 0)
</text>
```

These labels are similar to those above, except that the *position* attribute specifies that the "or" label be presented 12% of the way from the top of the screen just below the target label. The attribute label appears 19% of the way down the screen below the "or". Now we'll create the corresponding labels for the right side of the screen:

```
<text orright>
/ items = ("or")
/ valign = top
/ halign = right
/ position = (95%, 12%)
</text>

<text attributeBrightmixed>
/ items = attributeBlabel
/ valign = top
/ halign = right
/ position = (95%, 19%)
/ txcolor = (0, 255, 0)
</text>
```

That does it for the labels. Now we'll define instruction text:

```
<text instructions>
/ items = instructions
/ hjustify = left
/ size = (90%, 60%)
/ position = (50%, 85%)
/ valign = bottom
/ select = instructions
/ fontstyle = ("Arial", 3.5%)
</text>
```

The instructions text element differs from the others above in that it uses the *size* attribute to define a rectangle within which the presented text is word-wrapped. This is useful for displaying sentences and paragraphs. The *hjustify* command specifies that text should be left justified within this rectangle. Whereas the previous text elements use the default font, the instructions element specifies the "Arial" font at 3.5% of the screen height.

The final difference to note is the *select* attribute. There are a total of 7 instruction items (defined below). Each time this text element is presented, a different item is selected for presentation. The *select* attribute specifies that the rules for selecting the next item are contained in a counter element named instructions, which is defined as follows:

```
<counter instructions>
/ resetinterval = 20
/ select = sequence(1, 2, 3, 4, 5, 6, 7)
</counter>
```

The counter element allows you to create a customized selection algorithm. In this case, the counter's *select* attribute specifies that items should be selected in sequence (1, 2, 3, 4, 5, 6, 7). What does the *resetinterval* mean? By default, counters only remember selection for the duration of a single block. Once that block is over, the counter is reset, its memory erased, so that next time it is used for selection, it will start the sequence from the begining. The resetinterval attribute specifies how many blocks the counter memory lasts. We want the counter to track the state of the sequence for the duration of the experiment, so we've set it here to an arbitrary high number of 20. Any number greater than the number of blocks in the IAT would do the trick here.

Next we'll create a simple text that tells participants to hit the space bar to advance past the instructions. This appears in the lower middle of the screen beneath the instructions text.

```
<text spacebar>
/ items = ("Press the SPACE BAR to begin.")
/ position = (50%, 95%)
/ valign = bottom
/ fontstyle = ("Arial", 3.5%)
</text>
```

Just one last text element to create and we'll move on to the actual item sets used by some of the stimuli above.

```
<text error>
/ position = (50%, 75%)
/ items = ("X")
/ color = (255, 0, 0)
/ fontstyle = ("Arial", 10%, true)
</text>
```

The element above creates an error stimulus, which is a big red "X", presented in a bold Arial font that is 10% of the height of the screen. Hard for our participants to miss that.

If you're goal is simply to adapt the IAT to a specific set of target and attribute categories, the last section below is by far the most interesting. This section defines the labels and members of each category. The logic contained in the rest of the script is generic to any category. Thus, in order to change the categories, we can make all of our modifications here and leave the rest of the IAT procedure as is.

First we'll define the label and members of the "Good" category:

```
<item attributeAlabel>
/1 = "Good"
</item>

<item attributeA>
/1 = "Marvelous"
/2 = "Superb"
/3 = "Pleasure"
/4 = "Beautiful"
/5 = "Joyful"
/6 = "Glorious"
/7 = "Lovely"
/8 = "Wonderful"
</item>
```

Next we'll define the label and members of the "Bad" category:

```
<item attributeBlabel>
/1 = "Bad"
</item>

<item attributeB>
/1 = "Tragic"
/2 = "Horrible"
/3 = "Agony"
/4 = "Painful"
/5 = "Terrible"
/6 = "Awful"
/7 = "Humiliate"
/8 = "Nasty"
</item>
```

Our IAT will test participants' preferences for flowers or insects, so the following specify the labels and pictures files for these categories:

```
<item targetAlabel>
/1 = "Flowers"
</item>

<item targetA>
/1 = "flower1.jpg"
/2 = "flower2.jpg"
/3 = "flower3.jpg"
/4 = "flower4.jpg"
/5 = "flower5.jpg"
/6 = "flower6.jpg"
/7 = "flower7.jpg"
/8 = "flower8.jpg"
</item>

<item targetBlabel>
/1 = "Insects"
</item>

<item targetB>
/1 = "insect1.jpg"
/2 = "insect2.jpg"
/3 = "insect3.jpg"
/4 = "insect4.jpg"
/5 = "insect5.jpg"
/6 = "insect6.jpg"
/7 = "insect7.jpg"
/8 = "insect8.jpg"
</item>
```

That's does it for stimuli. This section has demonstrated a number of concepts, including presenting pictures and text, controlling stimulus size and position on the screen, specifying size, color, and face of a font, using a custom algorithm for stimulus item selection, and more.

◀Overview Creating Instructions ▶

Creating Instructions

Instructions can be presented as text stimuli like those created in the previous section. Inquisit also provides a built-in facility for presenting instruction pages in html or plain text. In this tutorial, we will use this facility to present a summary of the participant's performance.

The summary page is defined as follows:

```
 <page summary>
^Below is a summary of your average response time for two
different configurations.
^^Configuration 1: <% item.targetAlabel.1 %> with <%
item.attributeAlabel.1 %>, <% item.targetBlabel.1 %> with <%
item.attributeBlabel.1 %>
^    <%block.compatibletest.meanlatency%> milliseconds
^^Configuration 2: <% item.targetAlabel.1 %> with <%
item.attributeBlabel.1 %>, <% item.targetBlabel.1 %> with <%
item.attributeAlabel.1 %>
^    <%block.incompatibletest.meanlatency%> milliseconds
^^Did you respond much more quickly on one of the
configurations than the other? If so, that configuration may be
more consistent with your attitudes about these categories.
^^Thank you for your participation. Please press 'Continue' to
end the test.
</page>
```

The "^" character is used to force a line break when the page is presented on screen. The page also includes several properties enclosed in "<% %>". When the page is displayed, these properties are replaced by the actual underlying property values. For example, <% block.compatibletest.meanlatency %> is replaced by the mean latency on the block named "compatibletest", and <% item.targetAlabel.1 %> is replaced by the first item in the item set named "targetAlabel".

Next we'll create the instruct element which determines how instruction pages are presented, and how the user navigates through them.

```
<instruct>
/ nextlabel = "Continue"
/ lastlabel = "Continue"
/ prevkey = (0)
/ inputdevice = mouse
/ windowsize = (90%, 90%)
/ screencolor = (0,0,0)
/ fontstyle = ("Arial", 3%)
/ txcolor = (255, 255, 255)
</instruct>
```

The inputdevice attribute specifies that users can navigate through the instructions by clicking the mouse. The nextlabel and lastlabel specifies the text label for the navigation button that advances to the next page, or that advances past the last page. By setting prevkey to "0", we ensure that users can not navigate backwards through the pages. Finally, we've defined look and feel of instruction pages using the screencolor, fontstyle, and

windowsize commands.

Creating Text Stimuli Creating Trials

Creating Trials

The IAT task requires that we create trial elements that present the stimuli representing the target and attribute categories and gather classification responses to those stimuli. There are six types of trials used in this task depending on which category of stimulus is presented and which response key is assigned as the correct classification of the category.

First, let's define trials involving good words:

```
<trial attributeA>
/ validresponse = ("E", "I")
/ correctresponse = ("E")
/ stimulusframes = [1 = attributeA]
/ posttrialpause = 250
</trial>
```

The trial element's name is attributeA, which is also the name of the text element containing the good attribute words. The *validresponse* command indicates that participants may respond by pressing the "E" or the "I" key on the keyboard. The "E" key is considered a correct response as specified by the *correctresponse*command. The *posttrialpause* attribute specifies that after the response, Inquisit inserts a 250 ms pause before advancing to the next trial.

The definition of the other trial elements are the similar to attributeA , differing only in the type of stimulus presented and the response that's considered correct.

Here's the definition of trials with bad words where "I" is a correct response:

```
<trial attributeB>
/ validresponse = ("E", "I")
/ correctresponse = ("I")
/ stimulusframes = [1 = attributeB]
/ posttrialpause = 250
</trial>
```

Next come trials with insect pictures classified with the "E" key:

```
<trial targetBleft>
/ validresponse = ("E", "I")
/ correctresponse = ("E")
/ stimulusframes = [1 = targetB]
/ posttrialpause = 250
</trial>
```

Trials with insect pictures classified with the "I" key:

```
<trial targetBright>
/ validresponse = ("E", "I")
/ correctresponse = ("I")
/ stimulusframes = [1 = targetB]
/ posttrialpause = 250
</trial>
```

Trials with flower pictures classified with the "E" key:

```
<trial targetAleft>
/ validresponse = ("E", "I")
/ correctresponse = ("E")
/ stimulusframes = [1 = targetA]
/ posttrialpause = 250
</trial>
```

Trials with flower pictures classified with the "I" key:

```
<trial targetAright>
/ validresponse = ("E", "I")
/ correctresponse = ("I")
/ stimulusframes = [1 = targetA]
/ posttrialpause = 250
</trial>
```

The trials above capture the different combinations of stimulus category and correct response in the IAT. Our script will define one additional trial used to present task instructions to participants. This trial is defined as follows:

```
<trial instructions>
/ stimulustimes = [1=instructions, spacebar]
/ correctresponse = (" ")
/ errormessage = false
/ recorddata = false
</trial>
```

The *stimulustimes* attribute specifies that the trial presents two text stimuli, one called "instructions" which contains the IAT task instructions, and another called "spacebar" which informs the participant they can press the spacebar to advance to the next trial. The *correctresponse* attribute indicates that pressing the spacebar key is the only correct response, and since the trial contains no *validresponse* definition, the spacebar is the only valid response as well. No error feedback is presented on this trial. Since the trial does not gather any data of interest, we've set *recorddata* to false so that the data for this trial (e.g., response, latency, stimuli, etc.) are not recorded to the data file. This helps us keep our data files concise and clean, and it saves us the trouble of having to filter out this data later.

Creating Instructions Creating Blocks

Creating Blocks

Next we'll define the different kinds of blocks of trials used in the IAT. Blocks represent sequences of trials that can be in random or predetermined order. For this experiment, 11 block elements will be defined, 7 for practice at the IAT task, 2 for IAT data collection, and 2 for presenting task instructions.

First, let's define the practice block element for classification of the attribute categories, good and bad.

```
<block attributepractice>
/ bgstim = (attributeAleft, attributeBright)
/ trials = [1=instructions;2-21 = noreplace(attributeA,
attributeB)]
/ errormessage = true(error,200)
/ responsemode = correct
/ recorddata = false
</block>
```

This block element is named "attributepractice". The *trials* attribute specifies that the block runs 1 instruction trial followed by 20 trials randomly selected without replacement from the two trial types "attributeA" and "attributeB", which present good and bad words respectively. The selection algorithm guarantees that both trial types will be run 10 time each. The *bgstim* attribute specifies that the "attributeA" and "attributeB" category labels are presented on the screen as background stimuli to remind participants how the response keys map to the categories. The *errormessage* attribute presents the stimulus named "error" (our big red X) for 200 ms whenever subjects respond incorrectly. The *responsemode* for the block is set to correct, which means participants must give the correct response to advance to the next trial, even if their initial resposne was incorrect. Finally, *recorddata* is set to false so that our data file isn't cluttered up with practice data from this block.

The rest of the blocks have a similar pattern. Next, lets define the practice blocks used for target categories. There are two such blocks for the two possible key assignments. Here is the practice block on which insects are classified with the right key and flowers with the left:

```
<block targetcompatiblepractice>
/ bgstim = (targetAleft, targetBright)
/ trials = [1=instructions;2-21 = noreplace(targetAleft,
targetBright)]
/ errormessage = true(error,200)
/ responsemode = correct
/ recorddata = false
</block>
```

Now, lets define a practice block on which insects are classified with the left key and flowers with the right:

```
<block targetincompatiblepractice>
/ bgstim = (targetAright, targetBleft)
/ trials = [1=instructions;2-21 = noreplace(targetAright,
targetBleft)]
/ errormessage = true(error,200)
/ responsemode = correct
/ recorddata = false
```

```
</block>
```

Next, lets define the practice blocks used after the key assignments for the target categories are switched. First, we'll define the block on which insects are classified with the left key and flowers with the right:

```
<block targetincompatiblepracticeswitch>
/ bgstim = (targetAleft, targetBright)
/ trials = [1=instructions;2-41 = noreplace(targetAleft,
targetBright)]
/ errormessage = true(error,200)
/ responsemode = correct
/ recorddata = false
</block>
```

Next we'll define the opposite key assignments:

```
<block targetincompatiblepracticeswitch>
/ bgstim = (targetAright, targetBleft)
/ trials = [1=instructions;2-41 = noreplace(targetAright,
targetBleft)]
/ errormessage = true(error,200)
/ responsemode = correct
/ recorddata = false
</block>
```

Notice that there are 40 practice trials in these blocks rather than 20. The extra trials are included to help subjects unlearn the key assignments from the previous blocks.

We've defined two blocks for the initial key assignment, and two more blocks or the key assignment after the switch. Since each subject can only have one initial assignment and one switched assignment, each subject will only encounter one of them depending on which key assignment condition they are assigned to.

The practice blocks above handle single category judgements, so we still need to define the practice for the mixed judgment blocks in which participants have to classify both attribute and target stimuli:

```
<block compatiblepractice>
/ bgstim = (targetAleft, orleft, attributeAleftmixed,
targetBright, orright, attributeBrightmixed)
/ trials = [1=instructions;
  3,5,7,9,11,13,15,17,19,21= noreplace(targetAleft,
targetBright);
  2,4,6,8,10,12,14,16,18,20 = noreplace(attributeA,
attributeB)]
/ errormessage = true(error,200)
/ responsemode = correct
/ recorddata = false
</block>

<block incompatiblepractice>
/ bgstim = (targetBleft, orleft, attributeAleftmixed,
targetAright, orright, attributeBrightmixed)
```

```
/ trials = [1=instructions;
  3,5,7,9,11,13,15,17,19,21 = noreplace(targetBleft,
targetAright);
  2,4,6,8,10,12,14,16,18,20 = noreplace(attributeA,
attributeB)]
/ errormessage = true(error,200)
/ responsemode = correct
/ recorddata = false
</block>
```

These are similar to previous practice blocks. One notable difference is that the *bgstim* attribute presents both target and attribute labels. Another difference is how the sequence of trials are defined. On odd numbered trials (excluding the instructions trial), the block runs a randomly selected target classification trial. On even numbered trials, a randomly selected attribute trial is run. This ensures that the participant does not encounter a run of trials in which they are making only flower/insect judgments or only bad/good judgments.

That does it for practice blocks. Lets define the test blocks. There are two such blocks, one using a "compatible" (i.e., stereotype consistent) pairing of target and attribute categories, and the other using the incompatible pairing:

```
<block compatibletest>
/ bgstim = (targetAleft, orleft, attributeAleftmixed,
targetBright, orright, attributeBrightmixed)
/ trials = [
  2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40 =
noreplace(targetAleft, targetBright);
  1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39 =
noreplace(attributeA, attributeB)]
/ errormessage = true(error,200)
/ responsemode = correct
</block>

<block incompatibletest>
/ bgstim = (targetBleft, orleft, attributeAleftmixed,
targetAright, orright, attributeBrightmixed)
/ trials = [
  2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40 =
noreplace(targetBleft, targetAright);
  1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39 =
noreplace(attributeA, attributeB)]
/ errormessage = true(error,200)
/ responsemode = correct
</block>
```

These blocks differ from the practice blocks in that they run 40 trials rather than 20, they do not have *recorddata* set to false, and they include no instruction trials. Instructions are instead displayed in a special instructions block. The reason for presenting the instruction trial in a separate block is because our summary page that we created earlier reports the average response latency score for the entire test block. If the test block included an instruction trial, the latency on this trial would also be included in the average. Since we want to report the average latency for test trials only and not instruction trials, we pulled the instruction trial out of the test block and put it into its own instruction block. The instruction blocks are defined below:

```
<block compatibletestinstructions>
/ bgstim = (targetAleft, orleft, attributeAleftmixed,
targetBright, orright, attributeBrightmixed)
/ trials = [1=instructions]
/ recorddata = false
</block>

<block incompatibletestinstructions>
/ bgstim = (targetBleft, orleft, attributeAleftmixed,
targetAright, orright, attributeBrightmixed)
/ trials = [1=instructions]
/ recorddata = false
</block>
```

That concludes our block definitions.

Creating Trials Creating an Expt

Creating an Expt

The expt element defines the sequence in which blocks are run. For our picture IAT, the expt element is defined as follows:

```
<expt>
/ blocks = [1=attributepractice; 2=block2; 3=block3; 4=block4;
5=block5; 6=block6; 7=block7; 8=block8; 9=block9]
/ postinstructions = (summary)
</expt>
```

The expt element is pretty simple. The *blocks* attribute specifies a sequence of 9 blocks. The first block is "attributepractice" block in which subjects practice classifying the good and bad word stimuli. Blocks 2 through 9 are set to between-subject variables named "block2", "block3", "block4", "block5", etc. When the script is run, these variables will be set to the names of real blocks depending on the subject number that is assigned. By using between-subject variables, the script counterbalances the order in which the test blocks are run across subjects so that half our subjects run the compatible pairing first, and the other half runs the incompatible pairing.

The between-subject variables are defined as follows:

```
<variables>
/ group = (1 of 2) (block2=targetcompatiblepractice;
block3=compatiblepractice; block4=compatibletestinstructions;
block5=compatibletest; block6=targetincompatiblepractice;
block7=incompatiblepractice;
block8=incompatibletestinstructions; block9=incompatibletest]
/ group = (2 of 2) (block2=targetincompatiblepractice;
block3=incompatiblepractice;
block4=incompatibletestinstructions; block5=incompatibletest;
block6=targetcompatiblepractice; block7=compatiblepractice;
block8=compatibletestinstructions; block9=compatibletest]
</variables>
```

The *variables* element defines between-subject variables based on the subject number that was entered when the experiment is run. The first *group* attribute specifies the variable values for odd numbered subjects (i.e., the first of every two subjects). For odd-numbered subjects, *block2* is targetcompatiblepractice, *block3* is compatiblepractice, *block4* is compatibletestinstructions, and so on. Thus, odd numbered subjects perform classifications with the compatible pairing first. For even-numbered subjects, the incompatible pairing comes first.

By default, Inquisit will save a lot of data to the data file, much of which isn't relevant to the IAT. Although there's not much harm in having this data around, we can save ourselves some time and disk space by telling Inquisit to save just the data we care about. We do this in the data element as follows:

```
<data>
/ columns = (date time subject blockcode blocknum trialcode
trialnum response correct latency stimulusnumber1 stimulusitem1
stimulusnumber2 stimulusitem2)
</data>
```

The *columns* attribute lists the data columns to save. All other data columns will not be saved.

Finally, we'll specify some default settings that apply to this script using the *defaults* element.

```
<defaults>
/ screencolor = (0,0,0)
/ txbgcolor = (0,0,0)
/ txcolor = (255, 255, 255)
/ fontstyle = ("Arial", 5%)
</defaults>
```

The *screencolor* attribute sets the color of the screen throughout the experiment to black. The *txcolor* and *txbgcolor* attributes specify the foreground and background colors for text stimuli as white text on a black background. The *fontstyle* attribute specifies that all text elements should be presented in Arial font at 5% of the screen height unless otherwise specified.

Our Picture IAT is now complete. You can run the experiment by selecting the "Run" command on the "Experiment" menu.

Creating Blocks Back to Overview

Tutorial: Simple Implicit Attitude Task

Download script for this tutorial.

This tutorial builds a simplified Implicit Attitude Task (IAT). A number of standard IAT procedures have been been omitted for the sake of illustrating basic Inquisit programming concepts. *The script produced by this tutorial is provided for instructional purposes only and should not be used for research.* To learn how to create a standard IAT, please see the Standard IAT Tutorial or the Picture IAT Tutorial.

On the following pages, Inquisit commands are printed in blue, and comments are printed in black:

Steps

1. Creating Text Stimuli
2. Creating Instructions
3. Creating Trials
4. Creating Blocks
5. Creating an Experiment

Creating Text Stimuli ▶

Creating Text Stimuli

The first step in building an experiment is to define all of the stimuli. Stimuli include text or pictures to be shown on a given trial, background text that remains on the screen throughout a block of trials, or a feedback text shown to the subject to indicate when to respond and whether their response was correct or incorrect.

First, let's define the pleasant words:

```
<text pleasant>
/ items = pleasant
</text>
```

This text element defines a set of text stimuli named "pleasant" that has one attribute, *items* . The items attribute indicates where the text items are defined. In this case, they are defined in an item element named "pleasant" somewhere else in the script (more on this below). There are a number of other attributes that could be specified for our text stimulus, including attributes for controling the color, background color, screen position, and font. However, we'll just use the defaults of black text on a white background presented in the middle of the screen.

Now, lets define the items for this text element:

```
<item pleasant>
/ 1 = "         HONOR         "
/ 2 = "         LUCKY         "
/ 3 = "        DIAMOND        "
/ 4 = "         LOYAL         "
/ 5 = "        FREEDOM        "
/ 6 = "        RAINBOW        "
/ 7 = "          LOVE         "
/ 8 = ”         HONEST         "
/ 9 = "         PEACE         "
/10 = "         HEAVEN        "
</item>
```

This item element is named "pleasant", which matches the name specified in the items attribute of the text element above. The item set consists of ten pleasant words. Note that the words are padded with spaces so that they are all of equal length when presented in a fixed width font.

Now, lets define the rest of the stimulus categories. First, we'll define the unpleasant words:

```
<text unpleasant>
/ items = unpleasant
</text>
```

and the unpleasant items.

```
<item unpleasant>
/ 1 = "          EVIL         "
/ 2 = "         CANCER        "
/ 3 = "        SICKNESS       "
/ 4 = "        DISASTER       "
/ 5 = "        POVERTY        "
/ 6 = "         VOMIT         "
/ 7 = "          BOMB         "
```

```
/ 8 = "         ROTTEN        "
/ 9 = "         ABUSE         "
/10 = "         MURDER        "
</item>
```

Next, we'll define the flowers:

```
<text flower>
/ items = flowers
</text>
```

and the flower items.

```
<item flowers>
/ 1 = "         ROSE          "
/ 2 = "        BEGONIA        "
/ 3 = "        VIOLET         "
/ 4 = "         DAISY         "
/ 5 = "       GERANIUM        "
/ 6 = "         TULIP         "
/ 7 = "       CARNATION       "
/ 8 = "       DAFFODIL        "
/ 9 = "         LILAC         "
/ 10=  "         PANSY         "
</item>
```

Finally, we'll define the insects:

```
<text insect>
/ items = insects
</text>
```

and insect items.

```
<item insects>
/ 1 = "          ANT          "
/ 2 = "        LOCUST         "
/ 3 = "          BEE          "
/ 4 = "        HORNET         "
/ 5 = "         WASP          "
/ 6 = "        SPIDER         "
/ 7 = "       CENTIPEDE       "
/ 8 = "       COCKROACH       "
/ 9 = "        BEDBUG         "
/ 10= "        LADYBUG        "
</item>
```

When creating an IAT, it's a good idea to include instruction text that reminds participants how to respond to the various stimulus categories. We can do this by presenting text on the screen that are shown in the background throughout a block of trials. So, let's create the instruction text stimuli that remind the subject to press the "a' key for unpleasant and the "5' key for pleasant.

```
<text pleasantreminder>
/ items = ("Press 'a' for pleasant")
/ position = (75, 25)
/ txcolor = (0, 0, 255)
</text>
```

The reminder stimulus is a bit different than the previous stimuli. First, rather than defining the items in a separate element, we've simply listed the single item directly in the attribute.

This inline syntax is a convenient way to define small item sets for things like instrutions, focus stimuli, and masks. Also, the *position* attribute specifies that the text should be displayed on the upper right of the screen rather than in the default center position. Specifically, the stimulus is positioned 75% of way across the screen (from left to right), and 25% percent of the way down the screen (from top to bottom). Finally,the *txcolor* attribute specifies that the text should be blue rather than the default color black. Colors in Inquisit are specified as a mix of red, green, and blue components; the *txcolor* attribute specifies 0 intensity for red and green components, and the maximum intensity 255 for the blue component, producing a nice blue color.

Now, lets define the unpleasant reminder, which will be displayed in the upper left quadrant of the screen.

```
<text unpleasantreminder>
/ items = ("Press '5' for unpleasant")
/ position = (25, 25)
/ txcolor = (0, 0, 255)
</text>
```

and the rest of the reminders:

```
<text flowerleft>
/ items = ("Press 'a' for flowers")
/ position = (25, 25)
/ txcolor = (0, 0, 255)
</text>
<text flowerright>
/ items = ("Press '5' for flowers")
/ position = (75, 25)
/ txcolor = (0, 0, 255)
</text>
<text insectleft>
/ items = ("Press 'a' for insects")
/ position = (25, 25)
/ txcolor = (0, 0, 255)
</text>
<text insectright>
/ items = ("Press '5' for insects")
/ position = (75, 25)
/ txcolor = (0, 0, 255)
</text>
<text pleasant_flower>
/ items = ("Press '5' for pleasant or flowers")
/ position = (75, 25)
/ txcolor = (0, 0, 255)
</text>
<text pleasant_insect>
/ items = ("Press '5' for pleasant or insects")
/ position = (75, 25)
/ txcolor = (0, 0, 255)
</text>
<text unpleasant_flower>
/ items = ("Press 'a' for unpleasant or flower")
/ position = (25, 25)
/ txcolor = (0, 0, 255)
```

```
</text>
<text unpleasant_insect>
/ items = ("Press 'a' for unpleasant or insect")
/ position = (25, 25)
/ txcolor = (0, 0, 255)
</text>
```

Finally, lets define an error message stimulus to show subjects whenever they incorrectly classify a target stimulus:

```
<text errormessage>
/ items = ("        ERROR        ")
/ txcolor = (255, 0, 0)
</text>
```

The "errormessage" text element uses the *txcolor* attribute to set the red component to 255 and the green and blue components to 0, producing a rich red color.

Overview Creating Instructions

Creating Instructions

Now lets define a set of instruction pages that inform the subject how to perform the task. Defining the instruction pages is easy using the page element. First, we'll define a simple welcome page.

```
 <page intro>
 ^^^^^^^ Implicit Association Test
 ^^Welcome and thank you for participating.
</page>
```

Note that the "^" character is used to force a line break. Otherwise, lines of text are word-wrapped. Now we'll define the rest of the instruction pages:

```
<page up>
The tasks that you will be doing in this experiment involve
CATEGORY JUDGMENT. On each trial, a stimulus will be displayed,
and you must assign it to one of two categories. You should
respond AS RAPIDLY AS POSSIBLE in categorizing each stimulus,
but don't respond so fast that you make many errors.
(Occasional errors are okay.)^^
The two categories that you are to distinguish are:^^
UNPLEASANT vs. PLEASANT words.^^
Press the "a' key if the stimulus is an UNPLEASANT word.^^
But press "5' key if the stimulus is a PLEASANT word.^^
</page>

<page if>
The two categories that you are to distinguish are:^^
INSECTS vs. FLOWERS.^^
Press the "a' key if the stimulus is an INSECT.^^
But press "5' key if the stimulus is a FLOWER.^^
</page>

<page fi>
The two categories that you are to distinguish are:^^
FLOWERS vs. INSECTS.^^
Press the "a' key if the stimulus is a FLOWER.^^
But press "5' key if the stimulus is an INSECT.^^
</page>

<page compatible>
The four categories that you are to distinguish are:^^
UNPLEASANT vs. PLEASANT words^
or^
INSECTS vs. FLOWERS.^^
Press the "a' key if the stimulus is^
an UNPLEASANT word or an INSECT.^^
But press "5' key if the stimulus is^
a PLEASANT word or a FLOWER.^^
</page>
```

```
<page incompatible>
The four categories that you are to distinguish are:^^
UNPLEASANT vs. PLEASANT words^
or^
FLOWERS vs. INSECTS.^^
Press the "a' key if the stimulus is^
an UNPLEASANT word or a FLOWER.^^
But press "5' key if the stimulus is^
a PLEASANT word or an INSECT.^^
</page>

<page end>
The Implicit Association Test is now concluded.
If you have any questions or reactions to the
experiment, please discuss them with the experimenter.
</page>
```

Finally, we'll specify how participants can navigate through the instruction pages using the instruct element. A script should have only one such element.

```
<instruct>
/ nextkey = ("5")
/ prevkey = ("a")
</instruct>
```

The *nextkey* attribute indicates that participants must press the "5" key to advance to the next page, and the *prevkey* attribute specifies pressing the "a" key goes back to the previous key.

◀Creating Text Stimuli Creating Trials ▶

Creating Trials

The next step is to define the different kinds of trials that will be used in the IAT task. Trial elements control which stimuli are presented and how the subject may respond to those stimuli. There are six types of trials used in this task depending on which semantic category of stimulus is presented and which response key is assigned as the correct classification of the category.

First, let's define trials involving pleasant words, which are always assigned to the right response key.

```
<trial pleasant>
/ stimulusframes = [1=pleasant]
/ validresponse = ("a", "5")
/ correctresponse = ("5")
</trial>
```

The trial element's name is *pleasant* . On each line of data in the data file corresponding to this type of trial, this trial name is written.

The *stimulusframes* attribute defines the stimulus presentation sequence of the trial. The entire presentation sequence will consist of as many frames as are specified in the frames attribute (only 1 in this case). A pleasant word is presented on the first frame, after which Inquisit begins waiting for (and timing) the subject's response.

The *validresponse* attribute indicates that the subject may respond by pressing either the "a ' or the "5' key, after which Inquisit will advance to the next trial. The *correctresponse* attribute indicates that only the "5' key is considered a correct response on this type of trial.

The definition of the other trial elements are the similar to *pleasant* , differing only in the type of stimulus presented and the response that's considered correct.

Here's the definition of trials with unpleasant words where "a" is a correct response:

```
<trial unpleasant>
/ validresponse = ("a", "5")
/ correctresponse = ("a")
/ stimulusframes = [1=unpleasant]
</trial>
```

Next come trials with insect names classified with the "5" key:

```
<trial insright>
/ validresponse = ("a", "5")
/ correctresponse = ("5")
/ stimulusframes = [1=insect]
</trial>
```

Trials with insect names classified with the "a" key:

```
<trial insleft>
/ validresponse = ("a", "5")
/ correctresponse = ("a")
/ stimulusframes = [1=insect]
</trial>
```

Trials with flower names classified with the "5" key:

```
<trial flowright>
```

```
/ validresponse = ("a", "5")
/ correctresponse = ("5")
/ stimulusframes = [1=flower]
</trial>
```

Trials with flower names classified with the "a" key:

```
<trial flowleft>
/ validresponse = ("a", "5")
/ correctresponse = ("a")
/ stimulusframes = [1=flower]
</trial>
```

The trials above capture the different combinations of stimulus category and correct response in the IAT.

Creating Instructions Creating Blocks

Creating Blocks

The next step is to define the different kinds of blocks that will be used in the experiment. Blocks represent sequences of trials that can be in random or fixed order. For this experiment, 5 block elements will be defined, 3 for practice trials and 2 for data collection.

First, let's define the practice block element for classification of pleasant and unpleasant words.

```
<block up_practice>
/ trials = [1-20 = noreplace(pleasant, unpleasant)]
/ bgstim = (pleasantreminder, unpleasantreminder)
/ preinstructions = (up)
/ errormessage = (errormessage, 200)
/ blockfeedback = (latency, correct)
</block>
```

This block element is named "up_practice". The *trials* attribute specifies that the block runs 20 trials randomly selected without replacement from the two trial types "pleasant" and "unpleasant". The selection algorithm guarantees that both trial types will be run an equal number of times (10 time each). The *bgstim* attribute specifies that the "pleasantreminder" and "unpleasantreminder" instruction text stimuli are presented on the screen as background stimuli. The *preinstructions* attribute displays 3 pages of instructions ("intro1", "intro2", and "intro3") before running the trials. The *errormessage* attribute presents the "errormessage" stimulus for 200 ms whenever subjects respond incorrectly. Finally, the *blockfeedback* attribute specifies that after the block is over, subjects will be shown their mean latency and percent correct for the block.

The rest of the blocks have a similar pattern. Next, lets define a practice block on which insects are classified with the left key and flowers with the right:

```
<block if_practice>
/ trials = [1-20 = noreplace(insleft, flowright)]
/ bgstim = (insectleft, flowerright)
/ preinstructions = (if)
/ errormessage = (errormessage, 200)
/ blockfeedback = (latency, correct)
</block>
```

Now, lets define a practice block on which insects are classified with the right key and flowers with the left:

```
<block fi_practice>
/ trials = [1-20 = noreplace(insright, flowleft)]
/ bgstim = (insectright, flowerleft)
/ preinstructions = (fi)
/ errormessage = (errormessage, 200)
/ blockfeedback = (latency, correct)
</block>
```

Next, lets define the "compatible" test block. Note that on test blocks we no longer dispay an error message for incorrect responses:

```
<block compatible>
/ trials = [1-40 = noreplace(insleft, flowright, pleasant,
unpleasant)]
```

```
/ bgstim = (unpleasant_insect, pleasant_flower)
/ preinstructions = (compatible)
/ blockfeedback = (latency, correct)
</block>
```

Finally, lets define the "incompatible" block:

```
<block incompatible>
/ trials = [1-40 = noreplace(insright, flowleft, pleasant,
unpleasant)]
/ bgstim = (pleasant_insect, unpleasant_flower)
/ preinstructions = (incompatible)
/ blockfeedback = (latency, correct)
</block>
```

Creating Trials Creating an Expt

Creating an Expt

The next step is to define an expt element that defines the flow of blocks in the experiment. The expt element is defined as follows:

```
<expt>
/ preinstructions = (intro)
/ postinstructions = (end)
/ blocks = [1=up_practice; 2=block2; 3=block3; 4=block4;
5=block5]
</expt>
```

The expt element is simple. The *preinstructions* attribute begings the expt by showing subjects a page of instructions, "intro". The *postinstructions* attribute specifies final instruction page named "end" to be displayed at the conclusion of the experiment. The *blocks* attribute specifies a total of 5 blocks. The first block is the "up_practice" block in which subjects practice classifying the pleasant and unpleasant stimuli. Blocks 2 through 5 are set to between-subject variables named "block2", "block3", "block4", and "block5", all of which are defined below. These between-subject variables allow the experiment to counterbalance the order in which the test blocks are run across subjects.

Next, we'll define the between-subject variables used above:

```
<variables>
/ group = (1 of 2) (block2=fi_practice, block3=incompatible,
block4=if_practice, block5=compatible)
/ group = (2 of 2) (block2=if_practice, block3=compatible,
block4=fi_practice, block5=incompatible)
</variables>
```

The *variables* element defines between-subject variables based on the subject number that was entered when the experiment is run. The first *group* attribute specifies the variable values for odd numbered subjects. For odd-numbered subjects, *block2* is *fi_practice*, *block3* is *incompatible*, *block4* is *if_practice*, and *block5* is *compatible*. For even-numbered subjects, *block2* is *if_practice*, *block3* is *compatible*, *block4* is *fi_practice*, and *block5* is *incompatible*.

With that, the script is essentially complete. However, we'll do a little fine tuning by specifying some default settings using the *defaults* element.

```
<defaults>
/ screencolor = (175, 175, 255)
/ fontstyle = ("Courier New", 14pt)
</defaults>
```

The *screencolor* attribute sets the color of the screen throughout the experiment to light blue. The *fontstyle* attribute specifies that all stimulus and instruction text should be displayed in a 14pt Courier New font. You can specify the font attribute using Inquisit's Font Wizard, avaiable from the Tools menu. The wizard allows you to pick a font using the standard font dialog, and will spit the corresponding attribute definition into your script.

The experiment is now complete! You can run the experiment by selecting the "Run" command on the "Experiment" menu.

◀Creating Blocks Back to Overview ▶

Tutorial: Subliminal Priming Task

Download script for this tutorial.

This tutorial explains how to build a simple subliminal priming experiment such as that described by Draine and Greenwald (Journal of Experimental Psychology: General, 1998). On each trial, subjects are shown a subliminal (masked) prime word followed immediately by a target word. Primes and targets are divided into two definitional categories: pleasant (e.g., love) or unpleasant (e.g., death). Subjects are instructed to ignore the primes and classify the targets as pleasant (by pressing the "5" key on the number pad) or unpleasant (by pressing the "a" key). Each trial falls into one of four experimental conditions depending on the category (pleasant or unpleasant) of prime and target presented:

1. pleasant prime with pleasant target (congruent)
2. pleasant prime with unpleasant target (incongruent)
3. unpleasant prime with pleasant target (incongruent)
4. unpleasant prime with unpleasant target (congruent)

Longer Reaction Times and/or higher error rates on trials in which the prime and target are *incongruent* compared to the condition in which the prime and target are *congruent,* suggest the presence of subliminal priming.

Steps

Creating Text Stimuli ▶

Creating Text Stimuli

The first step in building an experiment is to create the experimental stimuli and specify how they should be presented. Stimuli will typically consist of text or pictures presented during a trial, instruction text that remains on the screen throughout a block of trials, and feedback messages that indicate when to respond and whether or not a response was correct.

First, let's create a text element that defines the pleasant prime words:

```
<text pleasantprime>
/ items = pleasant
</text>
```

The text element's name is "pleasantprime". The element could be named anything we wish, but it's a good idea to picks a simple, descriptive name. It has a single attribute called "items" that specifies where the actual items are located. In this case, we have specified that the items are located in an item element called "pleasant" that we will create a bit later.

The text element allows us to define other attributes including color and screen lcoation. In this element, we will use the default values. (The default color is black, and the default position is the center of the screen.) Later, we'll demonstrate how to change these values.

In the example above, we defined pleasant prime stimuli. Next, we'll define pleasant target stimuli:

```
<text pleasanttarget>
/ items = pleasant
</text>
```

With the exception of it's name, this text element is identical to the pleasantprime element. Note that the *items* attribute is set to the same item list (that we'll create in a moment) named "pleasant". This element will use those same items as targets.

Now, lets define the items used by both the pleasantprime and pleasanttarget text elements:

```
<item pleasant>
/ 1 = "         HONOR         "
/ 2 = "         LUCKY         "
/ 3 = "        DIAMOND        "
/ 4 = "         LOYAL         "
/ 5 = "        FREEDOM        "
/ 6 = "        RAINBOW        "
/ 7 = "          LOVE         "
/ 8 = ”         HONEST         "
/ 9 = "         PEACE         "
/10 = "         HEAVEN        "
</item>
```

Pretty simple isn't it? Notice the opening and closing lines: <item pleasant> and </item> The name of this element is pleasant. Notice that there are 8 spaces on either side of the items (words). This is done to center the words in the presentation box during a given trial.

Now, lets define the unpleasant primes and targets:

```
<text unpleasantprime>
/ items = unpleasant
</text>
```

```
<text unpleasanttarget>
/ items = unpleasant
</text>
```

These text elements similar to the previous ones, except that they use "unpleasant" items. Let's create the unpleasant items:

```
<item unpleasant>
/ 1 = "          EVIL        "
/ 2 = "         CANCER       "
/ 3 = "        SICKNESS      "
/ 4 = "        DISASTER      "
/ 5 = "        POVERTY       "
/ 6 = "         VOMIT        "
/ 7 = "          BOMB        "
/ 8 = "         ROTTEN       "
/ 9 = "         ABUSE        "
/10 = "         MURDER       "
</item>
```

Let's review what we've covered so far.

1. Inquisit uses a set of instructions to control the flow of an experiment called a script.
2. A script consists of elements.
3. Each element has its own name by which other elements can refer to it.
4. Elements have attributes that control specific properties of the element (e.g. font size and color).
5. Some attributes of an element can refer to other elements in the script by name.

We aren't done with the stimuli yet. We still need to define the forward and backward, the error messages, and create background messages. Here is the text element that will serve as the forward masks of the primes, called "forwardmask":

```
<text forwardmask>
/ items = ("    KQHYTPDQFPBYL    ", "    PYLDQFBYTQKPH    ")
</text>
```

This text element consists of two items, "KQHYTPDQFPBYL" and "PYLDQFBYTQKPH". Note that the items in this case are defined directly inside the forwardmask text element. You can define items this way or by using an items element as was done previously. A good rule of thumb is to use the items element for large item sets, or for item sets that will be shared by multiple text elements (for example, the pleasant items were used by both pleasantprime and pleasanttarget). For small item sets such as the two forward masks, or for items sets that are only used by one text element, it is usually more convenient to define such items directly inline.

Here is the text element that will define the stimuli that will serve as backward masks of the primes. Let's call it "backwardmask". The backward mask is very similar to the forward mask:

```
<text backwardmask>
/ items = ("    PYLDQFBYTQKPH    ", "    KQHYTPDQFPBYL    ")
/ select = current (forwardmask)
</text>
```

Note the addition of the *select* attribute set to the *current* option. By default, the select attribute is set to *noreplace* and items are selected without replacement on each trial. The *current* setting links the selection of the backwardmask item on each to that of the

forwardmask item. Thus, for trials on which both a forward and backward mask are presented, if the first forward mask item is selected and presented on that trial, then the first backward mask item will also be presented. If the second forward mask was selected and presented, then the second backward mask will also be presented. Thus, each forward mask item has a complimentary backward mask item that always appears in conjunction with it. By linking these two stimuli, the forward and backward masks on a given trial will never be identical since the order of the two items is reversed.

Now, lets create stimuli (text) to be shown in the background throughout an entire block of trials. These stimuli will serve as reminders to the subject to press the "a" key for unpleasant and the "5" key for pleasant.

```
<text pleasantreminder>
/ items = ("5 = pleasant")
/ position = (75, 25)
</text>
```

This stimulus is similar to the previous stimuli, except the *position* attribute is no longer set to the default (center). Inquisit specifies screen position using a coordinates system ranging from 0 to 100 on both the horizontal and vertical axes. The upper left corner of the screen is (0, 0), and the lower right corner of the screen is (100, 100). The center of the screen is (50, 50). So, the coordinates of (75, 25) used above in pleasantreminder will place the stimuli above and to the right of the center of the screen.

Now, lets define the unpleasant reminder, which will be displayed on the upper left region of the screen.

```
<text unpleasantreminder>
/ items = ("a = unpleasant")
/ position = (25, 25)
</text>
```

Finally, lets define a stimulus to show subjects whenever they incorrectly classify a target stimulus:

```
<text errormessage>
/ items = ("        ERROR        ")
/ color = (255, 0, 0)
</text>
```

The errormessage text element uses the *color* attribute. The color attribute takes three integers between 0 and 255 that define the intensity of the red, green, blue components of the color respectively. The red component is the maximum intensity, 255, whereas the green and blue components are 0. This combination produces a rich red color.

Overview Creating Instructions

Creating Instructions

Next, let's define the instruction pages. First, we'll create an introduction page:

```
<page intro1>
The tasks that you will be doing in this experiment involve
CATEGORY JUDGMENT.
On each trial, a stimulus will be displayed, and you must
assign it to one of
two categories. You should respond AS RAPIDLY AS POSSIBLE in
categorizing each stimulus,
but don't respond so fast that you make many errors.
(Occasional errors are okay.)
^^
The two categories that you are to distinguish are:
^^
UNPLEASANT vs. PLEASANT words.
^^
Press the "a" key if the stimulus is an UNPLEASANT word.
^^
But press "5" key if the stimulus is a PLEASANT word.
^^
</page>
```

The page element doesn't have any attributes, but simply contains the content of the page. The special character “^” will force a line break when the page is displayed on the screen. Otherwise, the instructions are word wrapped inside the page area.

Now let's define the rest of the pages in the script:

```
<page intro2>
Just before each word that you are to categorize you will see
one or more words and letter strings briefly flashed.^^
It is your task to IGNORE these briefly flashed stimuli.
Respond only to the last, clearly visible word shown on each
trial.
</page>
<page intro3>
When you press the "5' key, you will see a stimulus to which
you should respond.^^
As a reminder of the instructions for responding:^^
Press the "a" key if the stimulus is an UNPLEASANT word.^^
Press "5' key if the stimulus is a PLEASANT word.^^
</page>
<page ready>
When you press the "5" key, a new block of trials at the same
task as the last block will start.^^
Be ready for the first stimulus when you press the key.
</page>
<page end>
The experiment is now concluded. If you have any questions or
reactions to the experiment, please discuss them with the
experimenter.
</page>
```

Finally, we'll define an instruct element that specifies how subjects can navigate from page to page. A script should have only one such element.

```
<instruct>
/ nextkey = ("5")
/ prevkey = (“a”)
</instruct>
```

The *nextkey* attribute specifies that subjects can press the "5" key to advance to the next instruction page, and "a" key to go back to a previous page.

Creating Text Stimuli Creating Trials

Creating Trials

The next step is to define the different kinds of trials that will be used in the experiment. The types of trials you define will correspond to the different conditions of the experiment. This experiment has four conditions, one condition for each of the four possible combinations of prime and target categories.

First, let's define trials involving pleasant primes and pleasant targets by creating the following trial element.

```
<trial pp>
/ pretrialpause = 300
/ validresponse = ("a", "5")
/ correctresponse = ("5")
/ stimulusframes = [1=forwardmask; 10=pleasantprime;
13=backwardmask; 14=pleasanttarget]
/ posttrialpause = 100
</trial>
```

The trial element is called "pp", which is short for "pleasant pleasant" because the trial presents both a pleasant prime and pleasant target.

The *posttrialpause* attribute tells Inquisit to pause 300 milliseconds before each trial is executed.

The *validresponse* attribute specifies which keys a subject can press to register their response. Remember we already talked about these responses when the instructions were created. When the participant responds by pressing the "a" or the "5" key, Inquisit will advance to the next trial.

The *correctresponse* attribute tells Inquisit which responses are considered correct. In this trial, "5" is correct.

the *stimulusframes* attribute is slightly more technical because it is closely connected to how digital monitors operate. Computer monitors repaint the screen from top to bottom according to a fixed interval called a "frame" (a.k.a., vertical retrace interval). Most standard monitors repaint the screen about every 10 to 17 milliseconds. To determine the frequency at which your monitor repaints the screen, select the "Check Hardware" command from Inquisit's Tools menu. Inquisit will run at any frequency. If you decide you would like to change the retrace frequency of your video system, you should check the manufacturer's documentation for the specifics on your monitor. Typically, the frame rate can be controlled from Display settings within Windows.

Thus, the stimulus presentation sequence is defined in terms of discrete frames rather than times. The entire presentation sequence consists of as many frames as are specified in the frames attribute (14 in this case). So, a forwardmask is presented at the onset of the first frame of the trial. This forwardmask remains on the screen until it is overwritten by a prime stimulus on the 10th frame. The prime stimulus remains on the screen for 3 frames (50 ms on a 60 hz monitor), before it is overwritten by a backward mask on the 13th frame. Finally, a target is presented on the 14th frame and remains on the screen until the subject responds.

So you see, you have to do a little calculating here to decide the time each frame is to be presented. 3 frames on a 60 hz monitor is the equivalent of 50 ms because:
3 (frames) x 16.7 (ms) = 50.1 (ms).

Finall, the *posttrialpause* atribute tells Inquisit to wait 100 ms after this trial before advancing to the next trial.

Remember, this was just one type of trial. We need to define 3 more trial types. The rest of the trials will be very similar to the first. Many experiments change only minor details from trial to trial; a word list, an order of presentation, response variables, etc. Once you have the first trial coded, you are ready to make the rest. It's very easy to do that in Inquisit. You can copy and paste your code for trial one and then just change the minor variables. Let's see what the other trial codes look like.

```
<trial pu>
/ pretrialpause = 300
/ validresponse = ("a", "5")
/ correctresponse = ("a")
/ stimulusframes = [1=forwardmask; 10=pleasantprime;
13=backwardmask; 14=unpleasanttarget]
/ posttrialpause = 100
</trial>

<trial up>
/ pretrialpause = 300
/ validresponse = ("a", "5")
/ correctresponse = ("5")
/ stimulusframes = [1=forwardmask; 10=unpleasantprime;
13=backwardmask; 14=pleasanttarget]
/ posttrialpause = 100
</trial>
<trial uu>
/ pretrialpause = 300
/ validresponse = ("a", "5")
/ correctresponse = ("a")
/ stimulusframes = [1=forwardmask; 10=unpleasantprime;
13=backwardmask; 14=unpleasanttarget]
/ posttrialpause = 100
</trial>
```

The three trials above differ from the original only by which stimuli they present and which response is considered correct. Together, the four trials capture the four combinations of pleasant and unpleasant prime and target stimuli.

Creating Instructions Creating Blocks

Creating Blocks

The next step is to define the different kinds of blocks that will be used in the experiment. For this experiment, two block elements will be defined, one for practice trials and the other for data collection.

First, let's define the practice block element.

```
<block practice>
/ bgstim = (pleasantreminder, unpleasantreminder)
/ preinstructions = (intro1, intro2, intro3)
/ trials = [1-40 = noreplace(pp, pu, up, uu)]
/ errormessage = (errormessage, 200)
/ blockfeedback = (latency, correct)
</block>
```

The block is called "practice".

The *bgstim* attribute tells Inquisit to keep the pleasantreminder and unpleasantreminder on the screen during the block. Remember these stimulus elements were defined previously, we wanted to keep "a=unpleasant" and "5=pleasant" on the screen during the trials in the upper left and right quadrants respectively.

The *preinstructions* attribute refers lists some of the instructions pages created in the previous section. This command tells Inquisit to display the pages named intro1, intro2, and intro3 at the beginning of the block.

The *trials* attribute defines trials (40) for this practice block that are randomly without replacement selected from the four trial types: pp, pu, up, uu. This guarantees that each trial type will be presented 10 times.

The *errormessage* attribute indicates that when the participant responds incorrectly in this practice block, the errormessage text stimulus (previously defined) will be displayed for 200 ms. Giving feedback during a practice trial is a good idea because you generally want the participant to learn the right way to perform their task. As you'll see, we remove this feedback in the data collection blocks.

The *blockfeedback* attribute specifies that after the block is over, subjects will be shown their mean latency and percent correct.

Now, lets define a data collection block.

```
<block data>
/ screencolor = (175, 175, 255)
/ bgstim = (pleasantreminder, unpleasantreminder)
/ preinstructions = (ready)
/ trials = [1-40 = random(pp, pu, up, uu)]
/ blockfeedback = (latency, correct)
</block>
```

This element is just like the practice element except that the participant is no longer given the feedback because we removed the *errormessage* attribute. Also, the block begins with a different instruction page called "ready".

◀Creating Trials Creating an Expt ▶

Creating an Expt

Next, we'll need to define an expt element that specifies which blocks to run.

```
<expt>
/ blocks = [1 = practice; 2-5 = data]
/ postinstructions = (end)
</expt>
```

The expt element runs a total of 5 blocks. The first block is "practice", and the next for blocks are "data'. After all the blocks have been run, a single page of instructions called *end* is displayed.

Finally, we'll want to set the default font and screen color for the experiment using the defaults element:

```
<defaults>
/ fontstyle = ("Courier New", 14pt)
/ screencolor = (150, 150, 150)
</defaults>
```

The *fontstyle* attribute sets the default font for all text stimuli and instruction pages to 14pt Courier New. You can use Inquisit's Font Wizard to generate the font selection for you. To use the Font Wizard, place your cursor at the location in the script where you wish the font attribute to appear, then select the Font Wizard command from the Tools menu. A standard font dialog will appear, allowing you to select the font of your choice. The wizard will then inject the corresponding attribute definition into you script.

The *screencolor* attribute works just like the *txcolor* attribute we configured earlier. In this case, the red, green, and blue components are all set to 150, making the screen grey.

The experiment is complete!

Creating Blocks Overview

Tutorial: Covert Attention Task

Download script for this tutorial.

This tutorial builds a covert attention task. The task measures the effect of an unattended cue on spatial position judgments. Subjects perform the task by indicating whether a critical stimulus is presented on the left or right side of the screen by pressing the 'a' or 's' key on the keyboard respectively. Subjects are instructed to fixate their gaze on the center of the screen while performing the task, where an arrow is presented on each trial. On 80% of the trials, the arrow points in the direction where the critical stimulus is presented (compatible). On the remaining 20% of the trials, the arrow points in the opposite direction (incompatible). Covert attention to the arrow is measured by comparing the average response latency of the compatible and incompatible trials. Shorter mean latencies on compatible as compared to incompatible trials indicates that subjects are influenced by the unattended arrow stimulus.

Steps

1. Creating Text Stimuli
2. Creating Instructions
3. Creating Trials
4. Creating Blocks
5. Creating an Experiment

Creating Text Stimuli ▶

Creating Text and Picture Stimuli

The first step in building an experiment is to define all of the stimuli. Stimuli include text or pictures to be shown on a given trial, background text that remains on the screen throughout a block of trials, or a feedback text shown to the subject to indicate when to respond and whether their response was correct or incorrect.

Inquisit allows you to specify global default settings for stimuli and other parts of the experiment using the <defaults> element. For this script, we will set the default font for all text stimuli that we present, and we'll also set the background color for the screen to black.

```
<defaults>
/ screencolor = (0, 0, 0)
/ fontstyle = ("Arial", 20pt)
</defaults>
```

Now, let's create the arrow stimuli to be presented at the fixation point in the center of the screen:

```
<picture leftarrow>
/ items =
("http://www.millisecond.com/download/library/covertattention/l
eftarrow.jpg")
</picture>

<picture rightarrow>
/ items =
("http://www.millisecond.com/download/library/covertattention/r
ightarrow.jpg")
</picture>
```

That was pretty easy. We simply created two picture stimuli called "leftarrow" and "rightarrow". Both stimuli consist of a single item picture item contained in the picture files "rightarrow.jpg" and "lefttarrow.jpg" respectively. In this case, the files are downloaded from http://www.millisecond.com/samples/covertattention, but typically you would keep the files in the same folder as the script. By default, Inquisit presents the pictures in the center of the screen.

Now, let's define a text stimulus to serve as the fixation point itself.

```
<text fixation>
/ items = ("+")
/ color = (255, 255, 255)
/ txbgcolor = (0,0,0)
/ fontstyle = ("Arial", 30pt)
/ erase = false
</text>
```

The text is called "fixation" and it consists of a single item, "+". The foreground color is white, with the red, green, and blue values set to the maximum value of 255. You can use Inquisit's Color Wizard available on the Tools menu to get the red, green, and blue values for any color. The background color is black, with red, green, and blue values set to the minimum value of 0. The font is Arial. You can select a font using Inquisit's Font Wizard,

also available on the Tools menu. Finally, the erase command indicates that the fixation point should not be erased.

Now, let's define text stimuli to be presented just below the fixation point that will serve as instruction reminders.

```
<text instructleft>
/ items = ("Press A if the brightened box is on the left.")
/ position = (50, 60)
/ color = (255, 255, 255)
/ txbgcolor = (0,0,0)
</text>

<text instructright>
/ items = ("Press S if the brightened box is on the right.")
/ position = (50, 65)
/ color = (255, 255, 255)
/ txbgcolor = (0,0,0)
</text>
```

The instruction stimuli use the position command to present the stimuli just below the fixation point. Position is specified in terms of x and y coordinates. The unit of measurement is percentage, with 0 = top/left, 50 = center, and 100 = bottom right. The instruction reminders are presented horizontally centered and vertically 10 percentage points below center.

Now, let's define the target pictures. We will create four target stimuli, each of which presents a picture of a light yellow rectangle in one of the four corners of the screen.

```
<picture toplefttarget>
/ items =
("http://www.millisecond.com/download/library/covertattention/t
argetrectangle.jpg")
/ position = (0, 0)
/ valign = top
/ halign = left
</picture>

<picture bottomlefttarget>
/ items =
("http://www.millisecond.com/download/library/covertattention/t
argetrectangle.jpg")
/ position = (0, 100)
/ valign = bottom
/ halign = left
</picture>

<picture toprighttarget>
/ items =
("http://www.millisecond.com/download/library/covertattention/t
argetrectangle.jpg")
/ position = (100, 0)
/ valign = top
/ halign = right
```

```
</picture>

<picture bottomrighttarget>
/ items =
("http://www.millisecond.com/download/library/covertattention/t
argetrectangle.jpg")
/ position = (100, 100)
/ valign = bottom
/ halign = right
</picture>
```

Finally, we'll create the distractor stimuli. There are four distractors, each of which presents a dark yellow rectangle in the four corners of the screen.

```
<picture topleft>
/ items =
("http://www.millisecond.com/download/library/covertattention/r
ectangle.jpg")
/ position = (0, 0)
/ valign = top
/ halign = left
</picture>

<picture bottomleft>
/ items =
("http://www.millisecond.com/download/library/covertattention/r
ectangle.jpg")
/ position = (0, 100)
/ valign = bottom
/ halign = left
</picture>

<picture topright>
/ items =
("http://www.millisecond.com/download/library/covertattention/r
ectangle.jpg")
/ position = (100, 0)
/ valign = top
/ halign = right
</picture>

<picture bottomright>
/ items =
("http://www.millisecond.com/download/library/covertattention/r
ectangle.jpg")
/ position = (100, 100)
/ valign = bottom
/ halign = right
</picture>
```

Those are all the stimuli that we'll present in this script. Next, we'll create the instructions.

Creating Instructions

Now lets define how we will present instructions to subjects using the <instruct> element. A script should have only one such element.

```
<instruct>
/ fontstyle = ("Arial", 18pt, true)
/ nextlabel = "Press the spacebar to continue"
/ lastlabel = "Press the spacebar to continue"
/ nextkey = (" ")
</instruct>
```

We've set the font to 18pt Arial bold. We've also defined the labels that will appear on the buttons that allow subjects to proceed forward through our instruction pages. Finally, we've specified the spacebar key (represented by the space character, " ") as the key to press to advance.

Once we've defined how instruction pages will be presented, we have to create the pages themselves. This part is pretty easy. Note that the "^" character forces a line break. Otherwise, lines of text are word-wrapped.

```
<page inquisit>
^^The following sample illustrates how to create a covert
attention task using Inquisit.
</page>

<page intro1>
^Four boxes will be presented in each corner of the screen, and
a fixation point will appear in the center of the screen. Keep
your eyes focused on the fixation point throughout the entire
experiment.
^^On each trial, the fixation point will change to an arrow
pointing left or right. On 80% of the trials, the arrow points
to the side of the screen on which one of the boxes will
brighten. On the remaining 20% of the trials, the arrow points
in the opposite direction.
</page>

<page intro2>
^Your task is to focus on the fixation point in the center of
the screen and indicate whether a box brightened on the left or
right side of the screen. If a box on the left brightens, hit
the "A" key. If a box on the right brightens, hit the "S" key.
^^Remember: the arrow will usually point in the direction of
the screen with the brighter box, so it is to your advantage to
focus on the center fixation point.
^^Press the space bar to begin practicing the task.
</page>

<page begin>
^^Practice is now complete. Press the space bar to begin the
task.
```

```
</page>

<page finish>
^^Thank you for participating. The demo is now finished.
</page>
```

Last, we'll define a special instruction page that we'll use to report performance feedback to our subjects.

```
<page performance>
^Performance Summary:
^^You gave the correct answer on <%
block.covertattention.percentcorrect %> percent of the trials.
^^Your average response time was <%
block.covertattention.meanlatency %> milliseconds.
</page>
```

Note the commands "<% block.covertattention.percentcorrect %>" and "<% block.covertattention.meanlatency %>" that appear in the page. These commands will be replaced by the percent correct and mean response latency for all trials in the block called "coverattention", which we will define a little bit later. Inquisit allows you to present a variety of accuracy and latency data to the subject in this way. See help on the page element for more information.

Creating Text Stimuli Creating Trials

Creating Trials

Now it's time to define the trials for the covert attention task. The trial element specifies which stimuli should be presented, when they are presented, and how the subject should respond. The trial element brings all of the pieces together into a task.

First, we'll define a set of practice trials for the spatial judgment task. The practice trials present our instructions text stimuli that remind the subject how to perform the task.

```
<trial topleftpractice>
/ stimulustimes = [0=fixation; 500=leftarrow;
700=toplefttarget, bottomleft, topright, bottomright;
1000=instructleft, instructright]
/ correctresponse = ("a")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>
```

The "stimulustime" command defines the sequence of stimuli to be presented. The trials presents the fixation point at the beginning of the trial, followed 500 milliseconds later by the left arrow picture. After another 200 milliseconds, the trial presents the target stimulus in the topleft corner and distractor stimuli in other corners. Finally, 300 milliseconds later, the instruction text is presented.

On this trial, the subject can respond by pressing either the "s" or "a" key as defined by the validresponse command. A response of "s" is considered correct as defined by the correctresponse command.

Finally, the beginresponsetime command indicates that Inquisit should start measuring the subject's response 700 milliseconds into the stimulus sequence. This corresponds exactly to the time at which the target and distractor stimuli are presented. Response latencies will be reported relative to this point in time. Responses given before this point are ignored.

The remaining practice trials are similar, except that they present the target in different screen locations and therefore. Depending on whether the target is presented on the left or right side of the screen, either "s" or "a" is defined as the correct response.

```
<trial bottomleftpractice>
/ stimulustimes = [0=fixation; 500=leftarrow; 700=topleft,
bottomlefttarget, topright, bottomright; 1000=instructleft,
instructright]
/ correctresponse = ("a")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>

<trial toprightpractice>
/ stimulustimes = [0=fixation; 500=rightarrow; 700=topleft,
bottomleft, toprighttarget, bottomright; 1000=instructleft,
instructright]
/ correctresponse = ("s")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
```

```
</trial>

<trial bottomrightpractice>
/ stimulustimes = [0=fixation; 500=rightarrow; 700=topleft,
bottomleft, topright, bottomrighttarget; 1000=instructleft,
instructright]
/ correctresponse = ("s")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>
```

Now it's time to define the data collection trials. First, we'll define the congruent trials in which the arrow points in the same direction as the target.

```
<trial topleftcongruent>
/ stimulustimes = [0=fixation; 500=leftarrow;
700=toplefttarget, bottomleft, topright, bottomright]
/ correctresponse = ("a")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>
```

This trial presents the fixation point followed by the left arrow. The target is presented in the top left corner and the distractors in the remaining corners. Since this is a test trial, we no longer present the instruction reminder stimuli. The following three trials are the same except that the target is presented in the other three corners respectively.

```
<trial bottomleftcongruent>
/ stimulustimes = [0=fixation; 500=leftarrow; 700=topleft,
bottomlefttarget, topright, bottomright]
/ correctresponse = ("a")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>

<trial toprightcongruent>
/ stimulustimes = [0=fixation; 500=rightarrow; 700=topleft,
bottomleft, toprighttarget, bottomright]
/ correctresponse = ("s")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>

<trial bottomrightcongruent>
/ stimulustimes = [0=fixation; 500=rightarrow; 700=topleft,
bottomleft, topright, bottomrighttarget]
/ correctresponse = ("s")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>
```

Notice that when the target is in the upper or lower left corner, the correctresponse is defined as the "a" key. When the target is in the upper or lower right, the correctresponse is the "s" key. By including both "a" and "s" in the validresponse command, the experiment will

recognize either key press as a response to the trial. All other key presses are ignored.

Finally, we'll define the four types of incongruent trials.

```
<trial topleftincongruent>
/ stimulustimes = [0=fixation; 500=rightarrow;
700=toplefttarget, bottomleft, topright, bottomright]
/ correctresponse = ("a")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>

<trial bottomleftincongruent>
/ stimulustimes = [0=fixation; 500=rightarrow; 700=topleft,
bottomlefttarget, topright, bottomright]
/ correctresponse = ("a")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>

<trial toprightincongruent>
/ stimulustimes = [0=fixation; 500=leftarrow; 700=topleft,
bottomleft, toprighttarget, bottomright]
/ correctresponse = ("s")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>

<trial bottomrightincongruent>
/ stimulustimes = [0=fixation; 500=leftarrow; 700=topleft,
bottomleft, topright, bottomrighttarget]
/ correctresponse = ("s")
/ validresponse = ("s", "a")
/ beginresponsetime = 700
</trial>
```

We're finished with the trials. Now let's define the blocks.

Creating Instructions Creating Blocks

Creating Blocks

The next step is to define the different kinds of blocks that will be used in the experiment. For this experiment, we will define 2 blocks, 1 to run the practice trials and 1 for data collection.

First, let's define the practice block element.

```
<block covertattentionpractice>
/ trials = [1-4 = noreplace(topleftpractice,
bottomleftpractice, topleftpractice, bottomrightpractice)]
/ bgstim = (fixation)
</block>
```

This block element, named *covertattentionpractice*, will run just 4 trials randomly selected from the 4 practice trial types. We've specified that the block should randomly select from the 4 trials without replacement. Since we are only running 4 trials and there are 4 to select from, that means that each type of trial will be run exactly one time in the block, and the order in which the 4 types are selected will randomly vary.

Now, lets define the data collection block:

```
<block covertattention>
/ preinstructions = (begin)
/ trials = [1-20 = noreplace(topleftcongruent,
bottomleftcongruent, topleftcongruent, bottomrightcongruent,
                             topleftcongruent,
bottomleftcongruent, topleftcongruent, bottomrightcongruent,
                             topleftcongruent,
bottomleftcongruent, topleftcongruent, bottomrightcongruent,
                             topleftcongruent,
bottomleftcongruent, topleftcongruent, bottomrightcongruent,
                             topleftincongruent,
bottomleftincongruent, topleftincongruent,
bottomrightincongruent)]
/ bgstim = (fixation)
/ postinstructions = (performance)
</block>
```

The block begins by presenting the instruction page named *begin* as specified by the preinstructions command. It then runs a total of 20 trials randomly selected from the list of data collection trials. Finally, after all the trials have been run it presents an instruction page called *performance*.

You may have noticed that the congruent trial types appear 4 times each in the trial list, whereas incongruent trials appear only once. Why did we repeat some of the trials? The answer is that we want 80% of the trials in this block to be congruent and remaining 20% incongruent, so we've created a random selection pool where the proportion of congruent to incongrent trials is 4 to 1. Since we are selecting without replacement, we are guaranteed that the proportion of selected trials will match the proportions in the selection pool. Of the 20 trials, a randomly selected 16 will be congruent and 4 incongruent.

That does it for the blocks. Now let's define the experiment.

Creating an Expt

```
<expt>
/ preinstructions = (inquisit, intro1, intro2)
/ blocks = [1=covertattentionpractice; 2=covertattention]
/ postinstructions = (finish)
</expt>
```

The *expt* element is quite simple. The expt begins by showing a series of three instruction pages, *inquisit*, *intro1*, and *intro2*.

Next, it runs our practice block, followed by the data collection block. Each block is run exactly one time.

Finally, it displays a single instruction page called *finish*,

Last of all, we'll customize the format in which the data is saved using the *data* element.

```
<data>
/ format = tab
</data>
```

The *data* element allows me to control what data is recorded, the order of data columns, whether or not to include column labels on the first row, and what character should serve as the column delimiter. In this experiment, we'll specify that the columns should be separated by tab characters, which is a standard text data format recognized by any data analysis software, including Excel and SPSS. For everything else, we'll just use the default settings.

That's it. We're done!

Creating Blocks Back to Overview

Tutorial: Dot Probe Task

Download script for this tutorial.

This tutorial builds a simple version of the Dot Probe Task, a commonly used measure of attention. Subjects are presented two words, one above the other, and they are instructed to pronounce the upper word. Occassionally, the upper or lower word is replaced by a "!", in which cases subjects are instructed to press the spacebar as quickly as possible. Typically, reaction times to the "!" are shorter when it appears in the upper position because that is where subjects are attending.

This tutorial covers the following Inquisit features:
- voicekey and keyboard responding
- text presentation
- use of "responsetrial" command to link different types of trials

On the following pages, Inquisit commands are printed in blue, and comments are printed in black:

Steps

1. Creating Stimuli
2. Creating Instructions
3. Creating Trials
4. Creating Blocks
5. Creating an Experiment

Creating Text Stimuli ▶

Creating Text Stimuli

The first step in building an experiment is to define all of the stimuli. Stimuli include text or pictures to be shown on a given trial, background text that remains on the screen throughout a block of trials, or a feedback text shown to the subject to indicate when to respond and whether their response was correct or incorrect.

First, let's define the pleasant words appearing in the upper and lower positions:

```
<text pleasanttop>
/ items = pleasant
/ position = (50%, 40%)
</text>
<text pleasantbottom>
/ items = pleasant
/ position = (50%, 60%)
</text>
```

This text element defines two sets of text stimuli, "pleasanttop" and "pleasantbottom", both of which have two attributes defined, *items* and *position* . The items attribute indicates where the text items are defined. In this case, they are defined in an item element named "pleasant" somewhere else in the script (more on this below). The position attribute specifies where on the screen the text should be presented. Both are presented at the 50% horizontal point of screen (i.e., the horizontal center). The pleasanttop stimulus is presented at the vertical 40% mark, which is 10% of the screen width above center. The pleasantbottom is presented 10% below center.

Now, lets define the items for this text element:

```
<item pleasant>
/ 1 = "         HONOR        "
/ 2 = "         LUCKY        "
/ 3 = "        DIAMOND       "
/ 4 = "         LOYAL        "
/ 5 = "        FREEDOM       "
/ 6 = "        RAINBOW       "
/ 7 = "          LOVE        "
/ 8 = ”         HONEST        "
/ 9 = "         PEACE        "
/10 = "         HEAVEN       "
</item>
```

This item element is named "pleasant", which matches the name specified in the items attribute of the text element above. The item set consists of ten pleasant words. Note that the words are padded with spaces so that they are all of equal length when presented in a fixed width font.

Now, lets define the rest of the stimulus categories. First, we'll define the unpleasant words:

```
<text unpleasanttop>
/ items = unpleasant
/ position = (50%, 40%)
</text>
<text unpleasantbottom>
/ items = unpleasant
/ position = (50%, 60%)
```

```
</text>
```

and the unpleasant items.

```
<item unpleasant>
/ 1 = "          EVIL         "
/ 2 = "         CANCER        "
/ 3 = "        SICKNESS       "
/ 4 = "        DISASTER       "
/ 5 = "        POVERTY        "
/ 6 = "         VOMIT         "
/ 7 = "          BOMB         "
/ 8 = "         ROTTEN        "
/ 9 = "         ABUSE         "
/10 = "         MURDER        "
</item>
```

It's a good idea to include instruction text that reminds participants how to respond to the various stimuli. We can do this by presenting text on the screen that are shown in the background throughout a block of trials. So, let's create the instruction text stimulus that reminds the subject to pronounce the upper word and press the spacebar if they see '!'.

```
<text taskreminder>
/ items = ("Pronounce the top word and press the spacebar if
you see the '!'")
/ position = (50, 15)
/ txcolor = (0, 0, 255)
/ fontstyle = ("Courier New", 12pt)
</text>
```

The reminder stimulus is a bit different than the previous stimuli. First, rather than defining the items in a separate element, we've simply listed the single item directly in the attribute. This inline syntax is a convenient way to define small item sets for things like instrutions, focus stimuli, and masks. Also, the *position* attribute specifies that the text should be displayed at the top of the screen. Finally,the *txcolor* attribute specifies that the text should be blue rather than the default color black. Colors in Inquisit are specified as a mix of red, green, and blue components; the *txcolor* attribute specifies 0 intensity for red and green components, and the maximum intensity 255 for the blue component, producing a nice blue color.

Now, lets define the target stimuli '!'. To do this, we create two text stimuli, one of which presents the target in the upper position, and the other which presents it in lower position:

```
<text targettop>
/ items = ("          !          ")
/ position = (50%, 40%)
</text>
<text targetbottom>
/ items = ("          !          ")
/ position = (50%, 60%)
</text>
```

Finally, lets define a focus stimuli that will appear in the center of the screen prior to the two words:

```
<text focuspoint>
/ items = ("          +          ")
</text>
```

Creating Instructions

Now lets define a set of instruction pages that inform the subject how to perform the task. Defining the instruction pages is easy using the page element. First, we'll define a simple welcome page.

```
<page intro>
^^^Dot Probe Task
^^Welcome and thank you for participating in this task.
^^This task requires that you have a working microphone
connected to your computer. If you do not have a microphone,
please press Ctrl+Q now to end the script.
</page>
```

Note that the "^" character is used to force a line break. Otherwise, lines of text are word-wrapped. Now we'll define the rest of the instruction pages:

```
<page task>
Dot Probe Task Instructions:^^
On each trial, two words will be displayed. Your task is to
pronounce the TOP word as rapidly as possible while ignoring
the BOTTOM word. ^^
Sometimes, one of the words will be replaced by "!". If you see
the "!", press the spacebar as quickly as possible.
</page>

<page taskreminder>
Reminder: Pronounce the TOP word as rapidly as possible while
ignoring the BOTTOM word. ^^
If you see the "!", press the spacebar as quickly as possible.
</page>

<page end>
The Dot Probe Task is now concluded.
^^This task illustrates the effect of attention on processing
visual stimuli. Typically, people respond to the "!" more
quickly when it appears in the top location because that's
where they are focusing their attention.
</page>
```

Finally, we'll specify how participants can navigate through the instruction pages using the instruct element. A script should have only one such element.

```
<instruct>
/ nextkey = (" ")
/ lastlabel = ("Press the spacebar to continue")
/ nextlabel = ("Press the spacebar to continue")
/ fontstyle = ("Arial", 16pt)
</instruct>
```

The *nextkey* attribute indicates that participants must press the spacebar key to advance to the next page. The *nextlabel* and *lastlabel* attributes specifies the text to display on the button label for advancing to the next instruction page, or past the last instruction page. Finally, the *fontstyle* attribute specifies that instructions should be presented in a 16pt Arial

font.

Creating Text Stimuli Creating Trials

Creating Trials

The next step is to define the different kinds of trials that will be used in the Dot Probe Task. Trial elements control which stimuli are presented and how the subject may respond to those stimuli. There are eight types of trials used in this task depending on which category of word is presented in the upper position, and whether the word is replaced by a "!" or another word.

First, let's define trials that do not replace the words with a '!'.

```
<trial pleasant>
/ stimulustimes = [1=focuspoint; 500=pleasanttop,
unpleasantbottom]
/ inputdevice = voicekey
</trial>
```

The trial element's name is *pleasant* . On each line of data in the data file corresponding to this type of trial, this trial name is written.

The *stimulustimes* attribute defines the stimulus presentation sequence of the trial. The focus stimulus is presented for 500 milliseconds, after which pleasant and unpleasant words are presented in the upper and lower positions respectively.

The *inputdevice* attribute specifies the type of input expected from the participant. In this case, the inputdevice is "voicekey", which means that Inquisit will treat any sound through the microphone as a valid response, regardless of whether the sound was a valid word. If we cared about whether the spoken response was an actual word, we could have set this parameter to "speech", in which case Inquisit will use a speech recognition engine to analyze the content of what was said.

Next, we'll define a trial elementsimilar to *pleasant*, differing only in the location where the pleasant and unpleasant stimulis are presented. Here's the definition of trials with unpleasant words in the top position:

```
<trial unpleasant>
/ stimulustimes = [1=focuspoint; 500=unpleasanttop,
pleasantbottom]
/ inputdevice = voicekey
</trial>
```

Next come the trials in which one of the words is replaced by a '!'.

```
<trial pleasanttargettop>
/ stimulustimes = [1=focuspoint; 500=pleasanttop,
unpleasantbottom]
/ inputdevice = voicekey
/ responsetrial = (anyresponse, targettoppleasant)
</trial>
```

This trial is similar to the two trials above, except that it includes the *responsetrial* command. The response trial specifies a follow up trial to run if a particular response is given. In this case, the followup trial is named "targettopleasant" and the response is any response. So, whenever this trial runs, it is immediately followed by a trial named "targettoppleasant" to be defined below. This follow up trial presents the '!' stimulus and times the spacebar press.

We will now define the other 2 such trials based on whether the pleasant word is in the

upper or lower position, and whether the target is in the upper or lower position.

Trials with insect names classified with the "a" key:

```
<trial unpleasanttargettop>
/ stimulustimes = [1=focuspoint; 500=unpleasanttop,
pleasantbottom]
/ inputdevice = voicekey
/ responsetrial = (anyresponse, targettopunpleasant)
</trial>
<trial pleasanttargetbottom>
/ stimulustimes = [1=focuspoint; 500=pleasanttop,
unpleasantbottom]
/ inputdevice = voicekey
/ responsetrial = (anyresponse, targetbottompleasant)
</trial>
<trial unpleasanttargetbottom>
/ stimulustimes = [1=focuspoint; 500=unpleasanttop,
pleasantbottom]
/ inputdevice = voicekey
/ responsetrial = (anyresponse, targetbottomunpleasant)
</trial>
```

Finally, we'll define the actual follow up trials that present the '!' in the upper or lower position. The first two such trials are identical except for the name. Note that they specify "keyboard" as the inputdevice (this is actually the default, so this command is optional), and spacebar is listed as the only valid and correct response.

```
<trial targettoppleasant>
/ stimulustimes = [1=targettop]
/ inputdevice = keyboard
/ correctresponse = (" ")
</trial>
<trial targettopunpleasant>
/ stimulustimes = [1=targettop]
/ inputdevice = keyboard
/ correctresponse = (" ")
</trial>
```

Since these two trials are identical, why did we define two such trials instead of one? The reason is so that we can easily determine in the data file whether the follow up trial was preceded by an unpleasant or pleasant word. Specifically, the "targettoppleasant" trial is always run after a pleasant word was presented in the upper position, and the "targettopunpleasant" is run after an unpleasant word was in the upper position. Thus, we can analyze the effect of pleasant vs unpleasant by looking at the trial name rather than what was presented on the previous trial.

Last, we'll define the two trials that present the target '!' in the lower position.

```
<trial targetbottompleasant>
/ stimulustimes = [1=targetbottom]
/ inputdevice = keyboard
/ correctresponse = (" ")
</trial>
<trial targetbottomunpleasant>
/ stimulustimes = [1=targetbottom]
/ inputdevice = keyboard
```

```
/ correctresponse = (" ")
</trial>
```

Again, these two trials are identical except for their name, but we can use the name to identify whether the preceding trial presented a pleasant or unpleasant word in the upper position.

Creating Instructions Creating Blocks

Creating Blocks

The next step is to define the different kinds of blocks that will be used in the experiment. Blocks represent sequences of trials that can be in random or fixed order. For this experiment, two block elements will be defined, one for practice trials and one for data collection.

First, let's define the practice block element for the task.

```
<block practice>
/ trials = [1-20 = noreplace(pleasant, pleasant, unpleasant,
unpleasant, pleasanttargettop, pleasanttargetbottom,
unpleasanttargettop, unpleasanttargetbottom)]
/ bgstim = (taskreminder)
</block>
```

This block element is named "practice". The *trials* attribute specifies that the block runs 20 trials randomly selected without replacement from a set of 8 different trials. You may have noticed that 2 of the trials, "pleasant" and "unpleasant", are listed twice. The reason is that we wanted exactly half of the trials in the block to be followed up with a target '!', and the other half not to have a follow up. As the *trials* attribute is specified, 2 of every 8 trials in the block will be "pleasant", 2 will be "unpleasant", 1 will be "pleasanttargettop", 1 will be pleasanttargetbottom, 1 will be unpleasanttargettop, and 1 will be unpleasanttargetbottom.

The *bgstim* attribute specifies that the "taskreminder" instruction text stimulus is presented on the screen as background.

The nonpractice block below (named "critical") is quite similar:

```
<block critical>
/ preinstructions = (taskreminder)
/ trials = [1-36 = noreplace(pleasant, pleasant, pleasant,
pleasant, unpleasant, unpleasant, unpleasant, unpleasant,
pleasanttargettop, pleasanttargetbottom, unpleasanttargettop,
unpleasanttargetbottom)]
</block>
```

One difference is that the critical block presents the "taskreminder" instruction page at the beginning of the block as specified by the "preinstructions" attribute. The other difference is that there are 4 "pleasant" and 4 "unpleasant" trials in the selection pool rather than 2 of each. The proportion of trials with follow up trials is now 4 out of 12, or 33%.

◀Creating Trials Creating an Expt ▶

Creating an Expt

The next step is to define an expt element that defines the flow of blocks in the experiment. The expt element is defined as follows:

```
<expt>
/ preinstructions = (intro, task, taskreminder)
/ postinstructions = (end)
/ blocks = [1=practice; 2,3=critical]
</expt>
```

The expt element is simple. The *preinstructions* attribute begings the expt by showing subjects the 3 pages of instructions, "intro", "task", and "taskreminder". The *postinstructions* attribute specifies final instruction page named "end" to be displayed at the conclusion of the experiment. The *blocks* attribute specifies that 1 practice block is run followed by 2 critical blocks.

Finally, we'll do a little fine tuning by specifying some default settings using the *defaults* element.

```
<defaults>
/ fontstyle = ("Courier New", 16pt)
/ posttrialpause = 500
</defaults>
```

The *fontstyle* attribute specifies that all stimulus and instruction text should be displayed in a 16pt "Courier New" font. The *postrialpause* attribute specifies that a 500 ms pause should occur at the end of each trial.

The experiment is now complete! You can run the experiment by selecting the "Run" command on the "Experiment" menu.

Creating Blocks Back to Overview

Tutorial: Demographic Survey

Download script for this tutorial.

This tutorial builds a simple demographic survey. The sample demonstrates how to design a survey using different types of questions, including dropdown, radiobutton, and textbox questions. It also shows how to place validation rules on textbox input, and to adjust the font and layout of the survey.

On the following pages, Inquisit commands are printed in blue, and comments are printed in black:

Steps

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Creating Survey Questions ▶

Creating Survey Questions

First, we'll create the questions that make up the survey. For any given question, there are a variety of user interface controls at our disposal that give participants a means of making a response. The choice of control depends on the style of question.

The first question on our survey asks respondents to indicate their sex. This is a multiple choice question with two mutually exclusive options. There are a few different controls we can use for this type of question - specifically radiobuttons, listbox, or dropdown. For this question, we'll use the dropdown control because of its space efficiency.

Here is the syntax for creating this dropdown survey item:

```
<dropdown sex>
/ caption = "Sex"
/ options = ("female", "male")
</dropdown>
```

The type of the element is *dropdown*. When users click the control, the list of response options "drops down", allowing them to click on their chosen option. The name of the item is "sex". We'll refer to this item by its name later on in the tutorial when we specify where the item should appear on the page. The *caption* attribute represents the question or instructions the respondents will see for that item. In this case, that caption is simply "Sex". Finally, the *options* attribute defines the response choices -- either "male" or "female" -- in the dropdown list. Pretty simple.

The next item will ask for the respondent's age. Since there are 100 or more possible responses to this question, a multiple choice format would be cumbersome. Instead, we'll use the textbox element, which simply allow users to type their age into a textbox (or as some call it, an edit box). Here is the definition of our age item:

```
<textbox age>
/ caption = "Age"
/ mask = positiveinteger
/ range = (7, 110)
</textbox>
```

Note the element type is *textbox* and the name is "age". This time, the caption says "Age". Since respondents occassionally make mistakes when typing, we want to make sure the text they enter is in fact a valid age. The *mask* attribute provides a power tool for constraining the type of input that is allowed. In this case, we've set the mask to "positiveinteger", which means that anything other than a positive integer will be considered invalid. However, we don't want to allow just any positive integer. If the respondent types "1" for example, we know that can't be correct because one year-olds don't typically respond to surveys. Similarly, a response of 230432 s invalid because people don't live that long. So, we'll use the *range* attribute to contrain the range of valid ages to a value from 7 to 110.

Next up is the respondent's ethnicity. Just as before, we'll use a dropdown, specifying a caption and the response choices:

```
<dropdown ethnicity>
/ caption = "Ethnicity"
/ options = ("Hispanic or Latino", "Not Hispanic or Latino",
"Unknown")
</dropdown>
```

The next question asks for the respondent's race. This is another multiple choice question, but it's slightly different than the previous ones because we'll want to include an "other" option that allows the respondent to enter a response that doesn't appear in the list of options. The dropdown question doesn't support the "other" option, but the radiobuttons control does, so we'll use that:

```
<radiobuttons race>
/ caption = "Race"
/ options = (
    "American Indian/Alaska Native",
    "East Asian",
    "South Asian",
    "Native Hawaian or other Pacific Islander",
    "Black or African American",
    "White",
    "More than one race - Black/White")
/ other = "Other"
</radiobuttons>
```

The radiobuttons* element has *caption* and *option* attributes that serve the same purpose as they do with the dropdown element. However, we've specified another attribute called *other* that tells Inquisit to add an "Other" option to the response choices. That options will include a textbox in which respondents can type their race if it isn't in the list.

*Sidenote: You may be wondering why this control is called "radiobuttons". If you were born before 1970, you might recall that the car radios at the time often had a row of punch buttons for selecting a preset radio station. When you punched in one button, the previously selected button popped out, thus assuring that only one station could be selected at a time. The radiobuttons user interface control functions in a similar way, so the name caught on.

Next, we'll ask for participant's political identity. This, too, is a multiple choice question, so either the dropdown or radiobuttons controls would work just fine. However, since liberal is generally associated with "left" and conservative with "right", we'll use a slider control in order to leverages this common association. With a slider control, users respond by sliding a button along a track until it is in the desired position. The track can offer a near-continuous array of positions, or it can force the button into a fixed number of discrete locations. Positions along the track can be labeled to indicate their meaning. With our slider control, respondents will move the button leftward to indicate increasingly liberal values and rightward to indicate increasingly conservative values. Our slider item is defined as follows:

```
<slider political>
/ caption = "Political Identity"
/ labels = (
    "strongly~nliberal", "moderately~nliberal",
"slightly~nliberal",
    "neutral", "slightly~nconservative",
"moderately~nconservative",
    "strongly~nconservative")
/ range = (1, 7)
/ slidersize = (60%, 5%)
/ showtooltips = false
</slider>
```

The *caption* attribute has the same function as in the previous items. The *labels* attribute specifies the labels that appear in equal distances from left to right along the slider track.

Note that labels include the characters "~n". This is not a typo, it is a special character sequence indicating that Inquisit should insert a line break in that position when displaying the label on the screen.

The *range* attribute defines the number of positions on the track. In this case, there are seven positions who's values range from 1 to 7. Since there also seven labels, each position will align with each of the labels. Next, we'll use to *slidersize* attribute define the width and height of the slider so that it is wide enough to accomodate all of the labels. We've set the width to be 60% of the width of the computer screen, which should give it plenty of room. Finally, we've set the *showtooltips* attribute to false, so that the control doesn't display the values of each position in a tooltip as the user moves the button along the slider.

For the respondent's occupation, we'll again use a dropdown control. The dropdown is particularly useful in this case because it allows us to display a large number of options in a small amount of screen space:

```
<dropdown occupation>
/ caption = "Occupation"
/ options = ("Administrative Support - Supervisors",
"Administrative Support - Financial Clerks",
 "Administrative Support - Information and Records",
 "Administrative Support - Recording, Scheduling, Dispatching,
Distributing",
 "Administrative Support - Secretaries and Assistants",
 "Administrative Support - Other Support (data entry, office
clerk, proofreaders)",
 "Arts/Design/Entertainment/Sports - Art and Design",
"Arts/Design/Entertainment/Sports - Entertainers and
Performers",
 "Arts/Design/Entertainment/Sports - Media and communication",
"Arts/Design/Entertainment/Sports - Media Equipment workers",
 "Business - Business Operations", "Business - Financial
Specialists", "Computer/Math - Computer Specialists",
 "Computer/Math - Math Scientists","Computer/Math - Math
Technicians", "Construction/Extraction - Supervisors",
 "Construction/Extraction - Construction
Trades","Construction/Extraction - Helpers, Construction
Trades",
 "Construction/Extraction - Extraction (e.g., mining, oil)",
"Construction/Extraction - Other",
 "Education - Postsecondary Teachers", "Education - Primary,
Secondary, and Special Ed Teachers",
 "Education - Other teachers and instructors", "Education -
Librarians, Curators, Archivists",
 "Education - Other education, training, and library
occupations", "Education - Student",
 "Engineers/Architects - Architects, Surveyors, Cartographers",
"Engineers/Architects - Engineers",
 "Engineers/Architects - Drafters, Engineering and Mapping
Technicians", "Farming, Fishing, Forestry - Supervisors",
 "Farming, Fishing, Forestry - Agriculture","Farming, Fishing,
Forestry - Fishing and Hunting",
 "Farming, Fishing, Forestry - Forest, Conservation, Logging",
"Farming, Fishing, Forestry - Other",
```

"Food Service - Supervisors", "Food Service - Cooks and food prep", "Food Service - Servers",
"Food Service - Other food service workers (e.g., dishwasher, host)",
"Healthcare - Diagnosing and Treating Practitioners (MD, Dentist, etc.)",
"Healthcare - Technologists and Technicians", "Healthcare - Nursing and Home Health Assistants",
"Healthcare - Occupational and Physical Therapist Assistants", "Healthcare - Other healthcare support",
"Homemaker or Parenting", "Legal - Lawyers, Judges, and related workers", "Legal - Legal support workers",
"Maintenance - Building and Grounds Supervisors", "Maintenance - Building workers","Maintenance - Grounds Maintenance",
"Management - Top Executives", "Management - Advertising, Sales, PR, Marketing","Management - Operations Specialists",
"Management - Other Management Occupations", "Military - Officer and Tactical Leaders/Managers",
"Military - First-line enlisted supervisor/manager", "Military - enlisted tactical, air/weapons, crew, other",
"Production - Supervisors", "Production - Assemblers and Fabricators","Production - Food processing",
"Production - Metal and Plastic", "Production - Printers", "Production - Textile, Apparel, Furnishings",
"Production - Woodworkers", "Production - Plant and System Operators", "Production - Other",
"Protective Service - Supervisors", "Protective Services - Fire fighting and prevention",
"Protective services - Law Enforcement", "Protective Services - Other (e.g., security, lifeguards, crossing guards)",
"Repair/Installation - Supervisors", "Repair/Installation - Electrical and Electronic",
"Repair/Installation - Vehicle and Mobile Equipment", "Repair/Installation - Other", "Retired",
"Sales - Supervisors", "Sales - Retail","Sales - Sales Representatives and Services",
"Sales - Wholesale and Manufacturing", "Sales - Other sales (e.g., telemarketers, real estate)",
"Science - Life Scientists", "Science - Physical scientists","Science - Social Scientists",
"Science - Life, Physical, Social Science Technicians", "Service and Personal Care - Supervisors",
"Service and Personal Care - Animal Care","Service and Personal Care - Entertainment attendants",
"Service and Personal Care - Funeral Service", "Service and Personal Care - Personal Appearance",
"Service and Personal Care - Transportation, Tourism, Lodging",
"Service and Personal Care - Other service (e.g., child care, fitness)",
"Social Service - Counselors, Social Workers, Community specialists", "Social Service - Religious Workers",
"Transportation - Supervisors", "Transportation - Air

```
Transportation","Transportation - Motor Vehicle Operators",
 "Transportation - Rail Transport", "Transportation - Water
Transport", "Transportation - Material Moving",
 "Transportation - Other", "Unemployed")
/ optionvalues = (
 "43-1000", "43-3000", "43-4000", "43-5000", "43-6000",
"43-9000", "27-1000", "27-2000", "27-3000",
 "27-4000", "13-1000", "13-2000", "15-1000", "15-2000",
"15-3000", "47-1000", "47-2000", "47-3000",
 "47-5000", "47-4000", "25-1000", "25-2000", "25-3000",
"25-4000", "25-9000", "25-9999", "17-1000",
 "17-2000", "17-3000", "45-1000", "45-2000", "45-3000",
"45-4000", "45-9000", "35-1000", "35-2000",
 "35-3000", "35-9000", "29-1000", "29-2000", "31-1000",
"31-2000", "31-9000", "00-0000", "23-1000",
 "23-2000", "37-1000", "37-2000", "37-3000", "11-0000",
"11-2000", "11-3000", "11-9000", "55-1000",
 "55-2000", "55-3000", "51-1000", "51-2000", "51-3000",
"51-4000", "51-5000", "51-6000", "51-7000",
 "51-8000", "51-9000", "33-1000", "33-2000", "33-3000",
"33-9000", "49-1000", "49-2000", "49-3000",
 "49-9000", "99-0001", "41-1000", "41-2000", "41-3000",
"41-4000", "41-9000", "19-1000", "19-2000",
 "19-3000", "19-4000", "39-1000", "39-2000", "39-3000",
"39-4000", "39-5000", "39-6000", "39-9000",
 "21-1000", "21-2000", "53-1000", "53-2000", "53-3000",
"53-4000", "53-5000", "53-7000", "53-6000",
 "99-9999")
</dropdown>
```

As you can see, there are a lot of choices in the list! You may have also noticed that we're using the *optionvalues* attribute. By default, Inquisit records the text of the selected option into the data file. The *optionvalues* attribute allows us to assign alternative values to each option to be used in recording the data. This is handy if you want to use numeric values or codes when analyzing the data rather than the sometimes long strings of text that are displayed for each response choice. In this case, each occupation will be recorded using the Standard Occupational Classification code as defined by the US Department of Labor.

Creating Survey Questions (Continued)

The next item allows respondents to indicate their religion. Again, we'll use a dropdown given the large number of options.

```
<dropdown religion>
/ caption = "Religious Affiliation"
/ options = (
 "None", "African Methodist Episcopal Church", "African
Methodist Episcopal Zion Church", "Agnostic",
 "American Baptist Association", "American Baptist Churches in
the U.S.A.",
 "Antiochian Orthodox Christian Diocese of North America",
"Armenian Apostolic Church of America",
 "Assemblies of God", "Atheist", "Baha'i", "Baptist Bible
Fellowship International", "Baptist General Conference",
 "Baptist Missionary Association of America", "Buddhist",
"Christian and Missionary Alliance, The",
 "Christian Brethren (Plymouth Brethren)", "Christian Church
(Disciples of Christ)",
 "Christian Churches and Churches of Christ", "Christian
Congregation, Inc., The", "Christian Methodist Episcopal
Church",
 "Christian Reformed Church in North America", "Church of God
in Christ", "Church of God of Prophecy",
 "Church of God (Anderson, IN)", "Church of God (Cleveland,
TN)", "Church of Jesus Christ of Latter-day Saints, The",
 "Church of the Brethren", "Church of the Nazarene", "Churches
of Christ", "Conservative Baptist Association of America",
 "Coptic Orthodox Church", "Cumberland Presbyterian Church",
"Eastern Orthodox", "Eastern Orthodox", "Ecumenical",
 "Episcopal Church", "Evangelical Covenant Church, The",
"Evangelical Free Church of America, The",
 "Evangelical Lutheran Church in America", "Evangelical
Presbyterian Church",   "Free Methodist Church of North
America",
 "Full Gospel Fellowship of Churches and Ministers Intl",
"General Association of General Baptists",
 "General Association of Regular Baptist Churches", "General
Conference Mennonite Brethren Churches",
 "Grace Gospel Fellowship", "Greek Orthodox Archdiocese of
America", "Hindu", "Independent Fundamental Churches of
America",
 "International Church of the Foursquare Gospel",
"International Council of Community Churches",
 "International Pentecostal Holiness Church", "Jehovah's
Witnesses", "Jewish", "Lutheran Church-Missouri Synod, The",
 "Mennonite Church", "Muslim/Islamic", "National Assoc of
Congregational Christian Churches",
 "National Association of Free Will Baptists", "National
Baptist Convention of America, Inc.",
 "National Baptist Convention, USA, Inc.", "National Missionary
```

```
Baptist Convention of America", "Old Order Amish Church",
 "Orthodox Church in America", "Pentecostal Assemblies of the
World, Inc.", "Pentecostal Church of God",
 "Pentecostal Church of God", "Presbyterian Church in America",
"Presbyterian Church (U.S.A.)",
 "Progressive National Baptist Convention, Inc.", "Reformed
Church in America", "Religious Society of Friends
(Conservative)",
 "Reorganized Church of Jesus Christ of Latter Day Saints",
"Roman Catholic Church, The",
 "Romanian Orthodox Episcopate of America, The", "Salvation
Army,The", "Serbian Orthodox Church in the U.S.A. and Canada",
 "Seventh-day Adventist Church", "Sikh", "Southern Baptist
Convention", "Unitarian Universalist", "United Church of
Christ",
 "United Methodist Church, The", "Wesleyan Church, The",
"Wisconsin Evangelical Lutheran Synod", "Other")
</dropdown>
```

Next is education level, again using a dropdown.

```
<dropdown education>
/ caption = "Education"
/ options = ("elementary", "junior high", "some highschool",
"high school graduate", "some college",
 "associate's degree", "bachelor's degree", "some graduate
school", "masters degree", "M.B.A.",
 "J.D.", "M.D.", "Ph.D.", "other advanced degree")
</dropdown>
```

The next two items ask for country of citizenship and residence, respectively. The name of each country will be displayed in our dropdown list, as specified by the *options* attribute. The value recorded in the data file will be the two letter postal abbreviation for that country, as specified by the *optionsvalues* attribute.

```
<dropdown citizenship>
/ caption = "Country/Region of Primary Citizenship"
/ options = (
 "U.S.A.", "Afghanistan", "Albania", "Algeria", "American
Samoa", "Andorra", "Angola",
 "Anguilla", "Antarctica", "Antigua And Barbuda", "Argentina",
"Armenia", "Aruba",
 "Australia", "Austria", "Azerbaijan", "Bahamas, The",
"Bahrain", "Bangladesh", "Barbados",
 "Belarus", "Belgium", "Belize", "Benin", "Bermuda", "Bhutan",
"Bolivia", "Bosnia and Herzegovina",
 "Botswana", "Bouvet Island", "Brazil", "British Indian Ocean
Territory", "Brunei", "Bulgaria",
 "Burkina Faso", "Burundi", "Cambodia", "Cameroon", "Canada",
"Cape Verde", "Cayman Islands",
 "Central African Republic", "Chad", "Chile", "China",
"Christmas Island", "Cocos (Keeling) Islands",
 "Colombia", "Comoros", "Congo", "Congo, Democratic Republic of
the", "Cook Islands", "Costa Rica",
```

```
 "Cote D'Ivoire (Ivory Coast)", "Croatia (Hrvatska)", "Cuba",
"Cyprus", "Czech Republic", "Denmark",
 "Djibouti", "Dominica", "Dominican Republic", "East Timor",
"Ecuador", "Egypt", "El Salvador",
 "Equatorial Guinea", "Eritrea", "Estonia", "Ethiopia",
"Falkland Islands (Islas Malvinas)",
 "Faroe Islands", "Fiji Islands", "Finland", "France", "French
Guiana", "French Polynesia",
 "French Southern Territories", "Gabon", "Gambia, The",
"Georgia", "Germany", "Ghana", "Gibraltar",
 "Greece", "Greenland", "Grenada", "Guadeloupe", "Guam",
"Guatemala", "Guinea", "Guinea-Bissau",
 "Guyana", "Haiti", "Heard and McDonald Islands", "Honduras",
"Hong Kong S.A.R.", "Hungary",
 "Iceland", "India", "Indonesia", "Iran", "Iraq", "Ireland",
"Israel", "Italy", "Jamaica", "Japan",
 "Jordan", "Kazakhstan", "Kenya", "Kiribati", "Korea", "Korea,
North", "Kuwait", "Kyrgyzstan",
 "Laos", "Latvia", "Lebanon", "Lesotho", "Liberia", "Libya",
"Liechtenstein", "Lithuania", "Luxembourg",
 "Macau S.A.R.", "Macedonia, Former Yugoslav Republic of",
"Madagascar", "Malawi", "Malaysia",
 "Maldives", "Mali", "Malta", "Marshall Islands", "Martinique",
"Mauritania", "Mauritius", "Mayotte",
 "Mexico", "Micronesia", "Moldova", "Monaco", "Mongolia",
"Montserrat", "Morocco", "Mozambique",
 "Myanmar", "Namibia", "Nauru", "Nepal", "Netherlands
Antilles", "Netherlands, The", "New Caledonia",
 "New Zealand", "Nicaragua", "Niger", "Nigeria", "Niue",
"Norfolk Island", "Northern Mariana Islands",
 "Norway", "Oman", "Pakistan", "Palau", "Panama", "Papua New
Guinea", "Paraguay", "Peru",
 "Philippines", "Pitcairn Island", "Poland", "Portugal",
"Puerto Rico", "Qatar", "Reunion",
 "Romania", "Russia", "Rwanda", "Saint Helena", "Saint Kitts
And Nevis", "Saint Lucia",
 "Saint Pierre and Miquelon", "Saint Vincent And The
Grenadines", "Samoa", "San Marino",
 "Sao Tome and Principe", "Saudi Arabia", "Senegal",
"Seychelles", "Sierra Leone", "Singapore",
 "Slovakia", "Slovenia", "Solomon Islands", "Somalia", "South
Africa",
 "South Georgia And The South Sandwich Islands", "Spain", "Sri
Lanka", "Sudan", "Suriname",
 "Svalbard And Jan Mayen Islands", "Swaziland", "Sweden",
"Switzerland", "Syria", "Taiwan", "Tajikistan",
 "Tanzania", "Thailand", "Togo", "Tokelau", "Tonga", "Trinidad
And Tobago", "Tunisia", "Turkey",
 "Turkmenistan", "Turks And Caicos Islands", "Tuvalu",
"Uganda", "Ukraine", "United Arab Emirates",
 "United Kingdom", "U.S.A.", "United States Minor Outlying
Islands", "Uruguay", "Uzbekistan",
 "Vanuatu", "Vatican City State (Holy See)", "Venezuela",
```

```
"Vietnam", "Virgin Islands (British)",
 "Virgin Islands (US)", "Wallis And Futuna Islands", "Yemen",
"Yugoslavia", "Zambia", "Zimbabwe")
/ optionvalues = (
 "US", "AF", "AL", "DZ", "AS", "AD", "AO", "AI", "AQ", "AG",
"AR", "AM", "AW", "AU", "AT", "AZ", "BS",
 "BH", "BD", "BB", "BY", "BE", "BZ", "BJ", "BM", "BT", "BO",
"BA", "BW", "BV", "BR", "IO", "BN", "BG",
 "BF", "BI", "KH", "CM", "CA", "CV", "KY", "CF", "td", "CL",
"CN", "CX", "CC", "CO", "KM", "CG", "CD",
 "CK", "CR", "CI", "HR", "CU", "CY", "CZ", "DK", "DJ", "DM",
"DO", "TP", "EC", "EG", "SV", "GQ", "ER",
 "EE", "ET", "FK", "FO", "FJ", "FI", "FR", "GF", "PF", "TF",
"GA", "GM", "GE", "DE", "GH", "GI", "GR",
 "GL", "GD", "GP", "GU", "GT", "GN", "GW", "GY", "HT", "HM",
"HN", "HK", "HU", "IS", "IN", "ID", "IR",
 "IQ", "IE", "IL", "IT", "JM", "JP", "JO", "KZ", "KE", "KI",
"KR", "KP", "KW", "KG", "LA", "LV", "LB",
 "LS", "LR", "LY", "li", "LT", "LU", "MO", "MK", "MG", "MW",
"MY", "MV", "ML", "MT", "MH", "MQ", "MR",
 "MU", "YT", "MX", "FM", "MD", "MC", "MN", "MS", "MA", "MZ",
"MM", "NA", "NR", "NP", "AN", "NL", "NC",
 "NZ", "NI", "NE", "NG", "NU", "NF", "MP", "NO", "OM", "PK",
"PW", "PA", "PG", "PY", "PE", "PH", "PN",
 "PL", "PT", "PR", "QA", "RE", "RO", "RU", "RW", "SH", "KN",
"LC", "PM", "VC", "WS", "SM", "ST", "SA",
 "SN", "SC", "SL", "SG", "SK", "SI", "SB", "SO", "ZA", "GS",
"ES", "LK", "SD", "SR", "SJ", "SZ", "SE",
 "CH", "SY", "TW", "TJ", "TZ", "TH", "TG", "TK", "TO", "TT",
"TN", "tr", "TM", "TC", "TV", "UG", "UA",
 "AE", "UK", "US", "UM", "UY", "UZ", "VU", "VA", "VE", "VN",
"VG", "VI", "WF", "YE", "YU", "ZM", "ZW")
</dropdown>

<dropdown residence>
/ caption = "Country/Region of Residence"
 "U.S.A.", "Afghanistan", "Albania", "Algeria", "American
Samoa", "Andorra", "Angola",
 "Anguilla", "Antarctica", "Antigua And Barbuda", "Argentina",
"Armenia", "Aruba",
 "Australia", "Austria", "Azerbaijan", "Bahamas, The",
"Bahrain", "Bangladesh", "Barbados",
 "Belarus", "Belgium", "Belize", "Benin", "Bermuda", "Bhutan",
"Bolivia", "Bosnia and Herzegovina",
 "Botswana", "Bouvet Island", "Brazil", "British Indian Ocean
Territory", "Brunei", "Bulgaria",
 "Burkina Faso", "Burundi", "Cambodia", "Cameroon", "Canada",
"Cape Verde", "Cayman Islands",
 "Central African Republic", "Chad", "Chile", "China",
"Christmas Island", "Cocos (Keeling) Islands",
 "Colombia", "Comoros", "Congo", "Congo, Democratic Republic of
the", "Cook Islands", "Costa Rica",
 "Cote D'Ivoire (Ivory Coast)", "Croatia (Hrvatska)", "Cuba",
```

"Cyprus", "Czech Republic", "Denmark",
 "Djibouti", "Dominica", "Dominican Republic", "East Timor",
"Ecuador", "Egypt", "El Salvador",
 "Equatorial Guinea", "Eritrea", "Estonia", "Ethiopia",
"Falkland Islands (Islas Malvinas)",
 "Faroe Islands", "Fiji Islands", "Finland", "France", "French
Guiana", "French Polynesia",
 "French Southern Territories", "Gabon", "Gambia, The",
"Georgia", "Germany", "Ghana", "Gibraltar",
 "Greece", "Greenland", "Grenada", "Guadeloupe", "Guam",
"Guatemala", "Guinea", "Guinea-Bissau",
 "Guyana", "Haiti", "Heard and McDonald Islands", "Honduras",
"Hong Kong S.A.R.", "Hungary",
 "Iceland", "India", "Indonesia", "Iran", "Iraq", "Ireland",
"Israel", "Italy", "Jamaica", "Japan",
 "Jordan", "Kazakhstan", "Kenya", "Kiribati", "Korea", "Korea,
North", "Kuwait", "Kyrgyzstan",
 "Laos", "Latvia", "Lebanon", "Lesotho", "Liberia", "Libya",
"Liechtenstein", "Lithuania", "Luxembourg",
 "Macau S.A.R.", "Macedonia, Former Yugoslav Republic of",
"Madagascar", "Malawi", "Malaysia",
 "Maldives", "Mali", "Malta", "Marshall Islands", "Martinique",
"Mauritania", "Mauritius", "Mayotte",
 "Mexico", "Micronesia", "Moldova", "Monaco", "Mongolia",
"Montserrat", "Morocco", "Mozambique",
 "Myanmar", "Namibia", "Nauru", "Nepal", "Netherlands
Antilles", "Netherlands, The", "New Caledonia",
 "New Zealand", "Nicaragua", "Niger", "Nigeria", "Niue",
"Norfolk Island", "Northern Mariana Islands",
 "Norway", "Oman", "Pakistan", "Palau", "Panama", "Papua New
Guinea", "Paraguay", "Peru",
 "Philippines", "Pitcairn Island", "Poland", "Portugal",
"Puerto Rico", "Qatar", "Reunion",
 "Romania", "Russia", "Rwanda", "Saint Helena", "Saint Kitts
And Nevis", "Saint Lucia",
 "Saint Pierre and Miquelon", "Saint Vincent And The
Grenadines", "Samoa", "San Marino",
 "Sao Tome and Principe", "Saudi Arabia", "Senegal",
"Seychelles", "Sierra Leone", "Singapore",
 "Slovakia", "Slovenia", "Solomon Islands", "Somalia", "South
Africa",
 "South Georgia And The South Sandwich Islands", "Spain", "Sri
Lanka", "Sudan", "Suriname",
 "Svalbard And Jan Mayen Islands", "Swaziland", "Sweden",
"Switzerland", "Syria", "Taiwan", "Tajikistan",
 "Tanzania", "Thailand", "Togo", "Tokelau", "Tonga", "Trinidad
And Tobago", "Tunisia", "Turkey",
 "Turkmenistan", "Turks And Caicos Islands", "Tuvalu",
"Uganda", "Ukraine", "United Arab Emirates",
 "United Kingdom", "U.S.A.", "United States Minor Outlying
Islands", "Uruguay", "Uzbekistan",
 "Vanuatu", "Vatican City State (Holy See)", "Venezuela",
"Vietnam", "Virgin Islands (British)",

```
 "Virgin Islands (US)", "Wallis And Futuna Islands", "Yemen",
"Yugoslavia", "Zambia", "Zimbabwe")
/ optionvalues = (
 "US", "AF", "AL", "DZ", "AS", "AD", "AO", "AI", "AQ", "AG",
"AR", "AM", "AW", "AU", "AT", "AZ", "BS",
 "BH", "BD", "BB", "BY", "BE", "BZ", "BJ", "BM", "BT", "BO",
"BA", "BW", "BV", "BR", "IO", "BN", "BG",
 "BF", "BI", "KH", "CM", "CA", "CV", "KY", "CF", "td", "CL",
"CN", "CX", "CC", "CO", "KM", "CG", "CD",
 "CK", "CR", "CI", "HR", "CU", "CY", "CZ", "DK", "DJ", "DM",
"DO", "TP", "EC", "EG", "SV", "GQ", "ER",
 "EE", "ET", "FK", "FO", "FJ", "FI", "FR", "GF", "PF", "TF",
"GA", "GM", "GE", "DE", "GH", "GI", "GR",
 "GL", "GD", "GP", "GU", "GT", "GN", "GW", "GY", "HT", "HM",
"HN", "HK", "HU", "IS", "IN", "ID", "IR",
 "IQ", "IE", "IL", "IT", "JM", "JP", "JO", "KZ", "KE", "KI",
"KR", "KP", "KW", "KG", "LA", "LV", "LB",
 "LS", "LR", "LY", "li", "LT", "LU", "MO", "MK", "MG", "MW",
"MY", "MV", "ML", "MT", "MH", "MQ", "MR",
 "MU", "YT", "MX", "FM", "MD", "MC", "MN", "MS", "MA", "MZ",
"MM", "NA", "NR", "NP", "AN", "NL", "NC",
 "NZ", "NI", "NE", "NG", "NU", "NF", "MP", "NO", "OM", "PK",
"PW", "PA", "PG", "PY", "PE", "PH", "PN",
 "PL", "PT", "PR", "QA", "RE", "RO", "RU", "RW", "SH", "KN",
"LC", "PM", "VC", "WS", "SM", "ST", "SA",
 "SN", "SC", "SL", "SG", "SK", "SI", "SB", "SO", "ZA", "GS",
"ES", "LK", "SD", "SR", "SJ", "SZ", "SE",
 "CH", "SY", "TW", "TJ", "TZ", "TH", "TG", "TK", "TO", "TT",
"TN", "tr", "TM", "TC", "TV", "UG", "UA",
 "AE", "UK", "US", "UM", "UY", "UZ", "VU", "VA", "VE", "VN",
"VG", "VI", "WF", "YE", "YU", "ZM", "ZW")
</dropdown>
```

Finally, we'll ask participants to enter their postal code using a textbox:

```
<textbox zipcode>
/ caption = "Current Postal Code"
</textbox>
```

Note that Inquisit has a mask called "uszipcode" that constrains the input to be a valid United States zip code (5 digit format, plus 4 optional). If we expect respondents from other countries, however, we should leave off this constraint since postal codes throughout the world come in a variety of formats.

Creating Survey Questions

Creating Survey Pages

Creating Survey Pages

Once you've defined the questions, the next step is to determine how to layout those questions on the pages of the survey. Inquisit allows you break out questions into separate pages/screens. Respondents can answer the questions on a single page and then click the "Next" button to answer more questions on the next page. The survey can be configured to allow them to navigate back to previous page and change their answers, or to allow forward only navigation.

Inquisit allows us to configure the font size of each question along with the spacing between questions. By using small fonts and spacings, we could try to squeeze all of the questions onto a single page. The result would look cramped, however, so we'll separate the questions into two pages.

The first page is specified here:

```
<surveypage demographics1>
/ caption = "Please answer the following demographic questions"
/ fontstyle = ("Verdana", -16, true, false, false, false, 5, 0)
/ questions = [1=sex; 2=age; 3=ethnicity; 4=race; 5=political;
6=occupation]
</surveypage>
```

The element type is surveypage, and the name of this page "demographics1". The *caption* attribute tells Inquisit to display a simple instruction at the top of the page. The *fontstyle* attribute specifies the font in which caption appears, 14pt Verdana in bold. Finally, the *questions* attribute lists the items that we defined previously that should be included on the page. In this case, we've specified six questions -- sex, age, ethnicity, race, political, and occupation -- presented in that order.

Now let's define the second page:

```
<surveypage demographics2>
/ caption = "Please answer the following demographic questions
(continued)"
/ fontstyle = ("Verdana", -16, true, false, false, false, 5, 0)
/ questions = [1=religion; 2=education; 3=citizenship;
4=residence; 5=zipcode]
</surveypage>
```

This page has a caption similar to the first page, although we've added "(continued)" to it. The fonstyle is the same as the first page. This page presents the remaining 5 questions that we previously created -- religion, education, citizenship, residence, and zipcode -- in that order.

That wasn't too painful.

◀Creating Survey Questions (Continued)

Creating the Survey ▶

Creating the Survey

Last but not least, we need to specify the order in which the pages are presented, along with some other global settings. For this, we use the *survey* element:

```
<survey demographics>
/ pages = [1=demographics1; 2=demographics2]
/ responsefontstyle = ("Verdana", -12, false, false, false,
false, 5, 0)
/ itemfontstyle = ("Verdana", -13, false, false, false, false,
5, 0)
/ itemspacing = 2%
/ showpagenumbers = false
</survey>
```

We've named our survey "demographics". The *pages* attribute specifies which pages appear in the survey and in what order. Our survey presents the surveypage called "demographics1" followed by the surveypage called "demographics2".

The *responsefontstyle* attribute specifies the font to use for response options in the survey. This font applies to the choices in our multple choice items, and the text that the user types in the textbox items.

The *itemfontstyle* attribute specifies the font used for the captions of our survey questions.

The *itemspacing* attribute specifies that the space between questions should be 2% of the height of the screen.

The *showpagenumbers* attribute specifies whether each page should be numbered. Since our survey is only two pages, we'll turn off page numbering by setting this attribute to false.

That's it - our survey is complete. You can run the survey by selecting the "Run" command on Inquisit's "Experiment" menu. Once you've completed the survey, the data will be recorded into a file called "demographics.iqdat". The name based on the name of the survey element. The data file will be located in the same folder as your script file.

Creating Survey Pages Back to Overview

Inquisit How To's

This section contains how-to topics on various Inquisit features. If you don't find what you are looking for here, please email your question or request to .

How to Run an Experiment

There are several ways to run an Inquisit experiment.

Using Inquisit's Menus

- On Windows, Launch Inquisit from the Start Menu. On Mac OSX, double-click Inquisit.app in the Applications folder.
- Select the Open command on Inquisit's File menu.
- Choose the script file you would like to run.
- Select the Run command on Inquisit's Experiment menu.
- When prompted, enter a group id and subject id and press the OK button.

Using Windows Explorer

- Find the script file you would like to run in Windows Explorer.
- Double click on the script file.
- When prompted, enter a subject number and press the OK button.

(You can also create shortcuts to Inquisit scripts, and launch the script by double clicking on the shortcut icon.)

Using the Commmand Prompt on Windows or the Terminal on Mac

For details on running Inquisit from a command prompt, see Running an Experiment from the Command Line

Interrupting an Experiment or Block in Progress

While the experiment is running,

- Press Ctrl+b to skip the rest of the trials of the current block.
- Press Ctrl+q to immediately end the experiment.

How to Launch Inquisit Using Command Line Parameters

With Inquisit Lab, you can launch an experiment by double-clicking the Inquisit application or shortcut, opening the script, and using the Run command from the Experiment menu. It is also possible to launch an Inquisit experiment using the Windows Command Prompt or the Mac OSX Terminal application.

When launching from a command prompt, you can supply arguments specifying the subject id, script, and other arguments so that the script will simply be launched without opening the editor or prompting for a subject id. This enables Inquisit experiments to be directly launched from external software programs or shells scripts.

The command line syntax is as follows:

```
>"inquisitpath" "scriptpath" [options]

Where options are:
-s <subjectid>
-g <groupid>
-p <password>
-m <monkey|human>
-h
```

The definition of each parameter is as follows:

inquisitpath	Quoted, fully qualified path to the Inquisit.exe file. For example, "C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe" or "/Applications/Inquisit.app".
scriptpath	Quoted, fully qualified path to the script file to run. For example, "C:\My Scripts\script.iqx".
groupid	The group id for this session.
subjectid	The subject id for this session.
monkey | *human*	If "monkey" is specified, the automatic hydromatic systematic test monkey runs the script. Otherwise, if "human" is specified, the script runs in standard interactive mode.
password	Specifies the password use to decrypt an encryptd script file. The password must exactly match the password given when the encrypted file was saved.
h	Show command line syntax help.

On Windows, the full path to Inquisit is usually:

```
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
```

On Mac OSX, the full path is usually:

```
/Applications/Inquisit.app
```

This path may vary if you have installed Inquisit to a different drive, volume, or folder.

If no other parameters besides the Inquisit path are specified, Inquisit will simply open.

If the full path to a script file is included in the command, Inquisit is launched, the script file is opened, the user is prompted for a group and subject id, and the experiment begins.

If the group and subject ids are included in the command, Inquisit is launched and the script is run using the specified ids. The group and subject id option are only valid when a script file is specified.

The following runs an IAT script using a subject id of 1000 and group id of 2 on a Windows command line.

```
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\MyInquisitScripts\IAT.iqx" -s 1000 -g 2
```

The following does the sampe on a Mac terminal prompt

```
"/Applications/Inquisit.app" "~/myscripts/IAT.iqx" -s 1000 -g 2
```

How to Run Blocks, Trials, and Stimuli

Inquisit 4 allows you to run individual elements in a script, such as blocks, trials, stimuli, or instruction pages. This can be very handy for demonstrating tasks and methods in lectures and presentations, and provides a convenient way to quickly test new elements.

To run a given element, simply right click anywhere within that element's definition in the script editor and select the Run command from the context menu. You will be prompted for a subject id and group id, after which the element you selected will run. If the element was a stimulus, it will display all of the stimulus items one at a time. If it is a trial or block, it will simply run it.

How to Present Stimuli Provided by Subjects

Inquisit supports defining stimulus sets based on input provided by the subject. This feature can be used, for example, to present text provided by the subject (e.g., the subject's stated name), or to present only stimuli selected by the subject on previous trials.

Presenting text entered by the subject

To create a set of items consisting of text entered by the subject, first we'll define an empty item set to store the items:

```
<item responseitems>
</item>
```

Next, we'll create a survey page with textbox items for gathering the respondent's first and last name:

```
<textbox firstname>
/ caption = "Please enter your first name:"
</textbox>

<textbox lastname>
/ caption = "Please enter your last name:"
</textbox>

<surveypage page1>
/ questions = [1=firstname; 2=lastname]
/ ontrialend =
[item.responseitems.insertitem(textbox.firstname.response, 1)]
/ ontrialend =
[item.responseitems.insertitem(textbox.lastname.response, 2)]
</surveypage>
```

This is a survey page with two items allowing respondents to enter their first and last names. The ontrialend attributes contain the commands that actually do the work of adding the names to the responseitems set. The first ontrialend command adds a new item to responseitems by setting the item property to the response for the firstname question. The second ontrialend command adds the last name in a similar fashion. Neither of these commands changes or removes the items that are already in the responseitems item set - they simply add new items. Using this technique, we can build up item sets of arbitrary length containing user-supplied content.

If we later want to change the first name item to something else (e.g., a nickname), we could do so using the following command:

```
<surveypage page2>
/ questions = [1=nickname]
/ ontrialend =
[item.responseitems.setitem(textbox.nickname.response, 1)]
</surveypage>
```

This time, the ontrialend command assigns the first item in the responseitems set to the middle name. This time, the command includes the index number "1", which refers specifically to the first item in the set. By specifying the index number, we can thus change item in that position. If the index number is omitted as in the first example, a new item is added.

Stimulus elements can use the responseitems element the same way they would use other item elements. For example:

```
<text responses>
/ txcolor = (0, 255, 0)
/ position = (25, 25)
/ items = responseitems
</text>
```

This text element presents the responseitems in the upper left corner of the screen in green.

Text items selected by the participant

In additional to allowing participants to type in new stimuli, it is also possible for them to choose items from a predetermined list. Imagine we want to create an item set containing three cities the participant has never visited. We'll store these items in an item set called "cities":

```
<item cities>
</item>
```

Next, we'll create a survey page with a checkboxes item with a list of cities for the participant to choose from:

```
<checkboxes cities>
/ caption = "Select three of the cities below that you have
never visited:"
/ options = ("Berlin", "London", "Tokyo", "Paris", "Rome",
"Sydney", "New York")
/ range = (3, 3)
</checkboxes>

<surveypage page1>
/ questions = [1=cities]
/ ontrialend = [ if (checkboxes.cities.checked.1 == true)
item.cities.item = checkboxes.cities.option.1 ]
/ ontrialend = [ if (checkboxes.cities.checked.2 == true)
item.cities.item = checkboxes.cities.option.2 ]
/ ontrialend = [ if (checkboxes.cities.checked.3 == true)
item.cities.item = checkboxes.cities.option.3 ]
/ ontrialend = [ if (checkboxes.cities.checked.4 == true)
item.cities.item = checkboxes.cities.option.4 ]
/ ontrialend = [ if (checkboxes.cities.checked.5 == true)
item.cities.item = checkboxes.cities.option.5 ]
/ ontrialend = [ if (checkboxes.cities.checked.6 == true)
item.cities.item = checkboxes.cities.option.6 ]
/ ontrialend = [ if (checkboxes.cities.checked.7 == true)
item.cities.item = checkboxes.cities.option.7 ]
</surveypage>
```

The checkboxes item lists seven cities and uses the *range* attribute to constrain the number of selections to 3. There are seven ontrialend commands, each of which evaluates whether its corresponding city is checked, and if so, adds it to the cities item list. The items can then be presented using a text element.

```
<text responses>
```

```
/ items = cities
</text>
```

Next, define an item element whose items will consist of the picture or text items selected by the subject on each run of the multiplechoice trial:

```
<item selecteditems>
/ items = (multiplechoice)
</item>
```

Each time a multiplechoice trial is run, Inqusit adds the item selected by the subject to the selecteditems item set. If the multiplechoice trial presented pictures, the selecteditems item element could be presented by picture elements in the script. If the multiplechoice trial presented text, the selecteditem item element could be presented by text elements.

Picture items selected by the participant

We'll use the cities example again, but modify it to create an item set of pictures. Again, we'll store these items in an item set called "cities":

```
<item cities>
</item>
```

Here is our checkboxes survey item with the list of cities. This time, we've added the *optionvalues* attribute to define, for each option, the name of the corresponding jpg file containing a picture of the city. The checkboxes item will still display the city names next to each the checkbox, not the underlying optionsvalues.

```
<checkboxes cities>
/ caption = "Select three of the cities below that you have
never visited:"
/ options = ("Berlin", "London", "Tokyo", "Paris", "Rome",
"Sydney", "New York")
/ optionvalues = ("berlin.jpg", "london.jpg", "tokyo.jpg",
"paris.jpg", "rome.jpg", "sydney.jpg", "newyork.jpg")
/ range = (3, 3)
</checkboxes>
```

Finally, here is the surveypage that displays the checkboxes item:

```
<surveypage page1>
/ questions = [1=cities]
/ ontrialend = [ if (checkboxes.cities.checked.1 == true)
item.cities.item = checkboxes.cities.optionvalues.1 ]
/ ontrialend = [ if (checkboxes.cities.checked.2 == true)
item.cities.item = checkboxes.cities.optionvalues.2 ]
/ ontrialend = [ if (checkboxes.cities.checked.3 == true)
item.cities.item = checkboxes.cities.optionvalues.3 ]
/ ontrialend = [ if (checkboxes.cities.checked.4 == true)
item.cities.item = checkboxes.cities.optionvalues.4 ]
/ ontrialend = [ if (checkboxes.cities.checked.5 == true)
item.cities.item = checkboxes.cities.optionvalues.5 ]
/ ontrialend = [ if (checkboxes.cities.checked.6 == true)
item.cities.item = checkboxes.cities.optionvalues.6 ]
/ ontrialend = [ if (checkboxes.cities.checked.7 == true)
```

```
item.cities.item = checkboxes.cities.optionvalues.7 ]
</surveypage>
```

For each city listed in the checkboxes item, the corresponding ontrialend command evaluates whether its checkbox is checked, and if so, adds the optionvalue (i.e., the picture file name) to item set. Now, we can create a picture element that will display these pictures:

```
<picture selectedcities>
/ items = cities
</picture>
```

One additional step is required to make this solution work. To maximize performance, Inquisit loads all pictures files used by a script at the very beginning as it parses the script. We therefore we need to tell Inquisit that the script uses these files, or it won't load them. We can do this by creating a picture element that lists these files as items. We won't actually use this element anywhere in the script - it's just there so that Inquisit will load the pictures:

```
<picture dummy>
/ items = ("berlin.jpg", "london.jpg", "tokyo.jpg",
"paris.jpg", "rome.jpg", "sydney.jpg", "newyork.jpg")
</item>
```

There you have it.

How to Present Stimulus Pairs

Often an experiment will require presentation of stimulus pairs. For example, a lexical priming task may have prime-target pairs such DOCTOR/NURSE that are meant to be presented together on a given trial.

Stimulus pairs are defined in Inquisit by creating two stimulus elements for the first and second members of each pair, then linking selection of the second with that of the first. For example:

```
<text firstname>
/ items = ("BILL", "LINDON")
/ select = noreplace
</text>

<text lastname>
/ items = ("CLINTON", "JOHNSON")
/ select = text.firstname.currentindex
</text>
```

For firstname, select = noreplace means that whenever firstname is presented, it randomly selects without replacement which specific item is shown. For lastname, select = current(firstname) indicates that whenever a lastname is presented, it selects the item corresponding to the currently selected firstname item.

The trial below presents both stimuli:

```
<trial person>
/ stimulustimes = [0 = firstname; 100 = lastname]
/ response = anyresponse
</text>
```

On each run of this trial, BILL is always followed by CLINTON and LINDON is always followed by JOHNSON.

How to Test a Script

The Test Monkey

Inquisit has a built in 'test monkey' who will happily perform even the longest, most tedious experiments in order to generate sample data. To run the monkey:

a) Open the experiment script in Inquisit.

b) Select the "Monkey" command from the Tools menu.

c) Enter a subject number when prompted and then press OK.

Now, go enjoy a cup of coffee as the monkey runs through the entire experiment without so much as a complaint. Consult your animal subjects ethics board to determine whether the monkey's informed consent is required.

Tuning the Test Monkey

You can use the monkey element to control the speed and accuracy with which the monkey responds.

On a given trial, you can also specify the monkeyresponse attribute on a given trial to specify the possible responses the monkey can randomly select when responding on a given trial.

If the monkeyresponse attribute is not specified, the monkey will randomly select from the responses specified in the validresponse and correctresponse attributes. The monkeyresponse attribute is thus required in order to use the monkey on trials that don't specify either of these attributes. For example, you would use the monkeyresponse attribute on trials that use the isvalidresponse or iscorrectresponse event handler attributes to identify valid and corred responding using dynamic expressions.

Inquisit Keyboard Commands

Aborting an Experiment

Inquisit has special built in keyboard shortcut that allows you to abort the rest of an experiment. This are useful, for example, when you are testing out a script, discover an error, and wish to end the session so that you can return to the editor and fix the problem. Note that any data collected up to that point will be saved. The command for aborting an experiment is:

```
Ctrl+Q
```

Skipping the Current Block

Inquisit also has a built in command that enable you to skip the current block. This is useful if you are wish to test a block that occurs later in the script and you don't want to respond to every trial on every preceding block. To skip the current block, use the following command:

```
Press Ctrl+B
```

Opening the Debugger Watch Window

Inquisit has a Debugger Watch Window that shows you the current values of every propery in the script at any point while it is running. This can be a useful advanced tool for debugging expressions that reference various property values. To launch the Debugger Watch Window, use the following command:

```
Press Ctrl+D
```

How to Erase Stimuli

By default, Inquisit erases all stimuli presented on a given trial after the subject has responded. Note that you can prevent a stimulus from being erased at the end of a trial by setting its erase attribute to *false*.

Some research tasks require that stimuli be presented for a fixed duration, after which it should be removed from the screen. To erase a stimulus after a fixed duration, you must create a separate 'blank' stimulus element and then present that blank at the appropriate interval in the stimulus presentation sequence so that it overwrites the stimulus you wish to erase.

There are a number of ways to create a blank stimulus. The easiest is to create a rectangular shape element, set its size large enough to cover the stimulus you wish to erase, and then set its color to the background color of the screen.

If you are erasing text items of various sizes, it may make sense to define a second text element that uses the same set of items, sets the select attribute as linked with the to-be-erased stimulus, but sets the txcolor and txbgcolor attributes to the background color of the screen. Each time this blank text stimulus is presented, it will present a erasing rectangle that is exactly the same size of the original text stimulus.

How to Analyze Recorded Voice Responses

Many reaction time tasks are best administered by requiring participants to make verbal responses. Consider the classic Stroop task, for example, whereby the respondent is required to identify the color of the ink in which color names are printed. Although it's possible to demonstrate the Stroop effect using key or button presses, the effect is much more evident with verbal responses. Unfortunately, analyzing the accuracy of verbal responses typically requires the tedious and time-consuming process of transcribing hundreds or even thousands of recorded vocalizations. Given the amount of labor involved, many researchers avoid verbal response tasks altogether in favor of procedures that can be completely computer automated.

Inquisit removes the tedium of transcribing verbal responses by leveraging speech recognition software. With Inquisit, spoken responses can be automatically analyzed in real time, or you can record responses and then later analyze them with the speech engine.

To analyze the content of spoken responses in real time, simply set the inputdevice attribute to *speech*. With this option, Inquisit activates the speech engine on every voice trial, listens for a response, and then attempts to identify the utterance from a list of possible responses that you specify. The identified response is recorded directly into the data file. In cases where the response could not be identified, Inquisit records a "?" instead. The advantages of this option are that a) the utterance is immediately available in the data file for analysis, and b) Inquisit can determine whether a correct or incorrect response was given for purposes of providing tracking performance and providing error feedback. The disadvantages of *speech* option are that the speech engine may occassionally misidentify or fail to recognize valid utterances. It also may impose a perceptible delay between the time an utterance is made and the time it is recognized (importantly, this delay does not affect the measurement of response latency of spoken responses).

To record responses for subsequent speech recognition analysis, set the inputdevice attribute to *voicerecord*. With this option, Inquisit listens for a response on every trial, and when it picks up incoming sound, that sound is recorded to a wav file. Separate wave files are recorded for each trial, and files are named in a way that allows you to match the file to the particular trial of the particular session for the particular subject that made the response. When you are ready to analyze the data, Inquisit provides a handy tool that "listens" to each wav file, identifies the spoken content, and saves the results to a tab delimited file.

The "Analyze Recorded Responses" Tool

To analyze the recorded responses, click Inquisit's Tools menu, and select the "Analyze Recorded Responses..." command. This will open the following window:

First, you must specify the folder containing the recorded wav files. You will find these files in a subfolder called "voicerecord" located in the folder containing your script file.

Next, you can optionally specify the complete list of valid utterances so that the engine knows what words to listen for. If your task has a fixed set of valid responses, specifying them here will *greatly* improve the recognition accuracy of the engine. If you do not specify valid responses, the engine treats the entire lexicon as a potentially valid response, and recognition accuracy suffers accordingly.

To start the analysis, click the Analyze button. Once all the files have been analyzed, each wav file and its recognition result appear in the list below. If the engine could not identify the response, a "?" appears. To listen to any of the wav files, simply double-click the file in the results list and it will play (make sure audio is configured correctly, speakers are turned on, and the volume is turned up). By listening to the files, you can double-check the engine's accuracy or try to identify an utterance that the engine could not.

Finally, you can save the results to a tab-delimited file by clicking the "Save..." button. The file will contain two columns of data for the file name and recognition result respectively. The saved data can then be inserted into the main data file using the command language and macros of your stats software, or using good old fashioned Filter, Sort, Copy, and Paste with a spreadsheet program like Excel.

How to Adjust the Response Window

The temporal characteristics of the response window may be adjusted from block to block depending on a given subject's performance. The way the script specifies the response window method also determines the adjustment procedure.

The default window adjustment procedure is:

The response window is moved back 33 ms for subsequent blocks if

a. the percent of correct responses for the block <= 55%.
b. the percent of correct responses for the block <= 65% and mean latency is over 100 ms greater than the current window center.

The response window is moved forward 33 ms for subsequent blocks if

a. the percent of correct responses for the block >= 80% and mean latency is no more than 100 ms greater than the current window center.

Using the <response> element, it is possible to customize various aspects of the window adjustment procedure, including conditions for incrementing the window center (moving it back), conditions for decrementing the window center (moving it forward), the increment and decrement amounts, the minimum and maximum window center values, and whether to base the adjustment algorithm on mean or median latency.

Response Window for Blocks

The response window procedure can be specified at the block level, as in the following:

```
<block myblock>
/ responsemode = window(100, 100, windowstim)
</block>
```

In this example, adjustment of the window center for *myblock* is independent of the subject's performance on different blocks defined in the script. Each adjustment to the response window of *myblock* affects only subsequent runs of *myblock* and is unaffected by performance on blocks with other names.

Response Window for Expt

The response window procedure can be specified at the expt level, as in the following:

```
<expt>
/ responsemode = window(100, 100, windowstim)
</expt>
```

In this case, the scope of the window center is the experiment. All blocks within the experiment will share the experiment's window center, with the exception of blocks that have the response window explicitly defined for themselves (see above). Each block that uses the shared experiment window center may adjust that center based on the subject's performance, and subsequent blocks in the experiment will use the adjusted window center.

Response Window for the Response Element

The response window procedure can also be specified within a response element, as in the following:

```
<response myresponse>
```

```
/ mode = window
/ rwhitduration = 200
/ rwhitstimulus = hitstim
/ rwcenter = 400
/ rwwidth = 300
/ rwstimulus = windstim
</response>
```

In this case, the *myresponse* element has its own response window center, and all block or expt elements that specify “/response = myresponse” will share that window center. This window center may be adjusted based on performance of any block that uses *myresponse*, and the adjusted window center will be used by subsequent blocks that use *myresponse*.

How to Control Response Timing

By default, Inquisit measures response latency as the interval beginning at the onset of the last stimlus frame of the trial and ending when the subject issues a valid response. Responses made before the onset of the last stimulus frame are ignored.

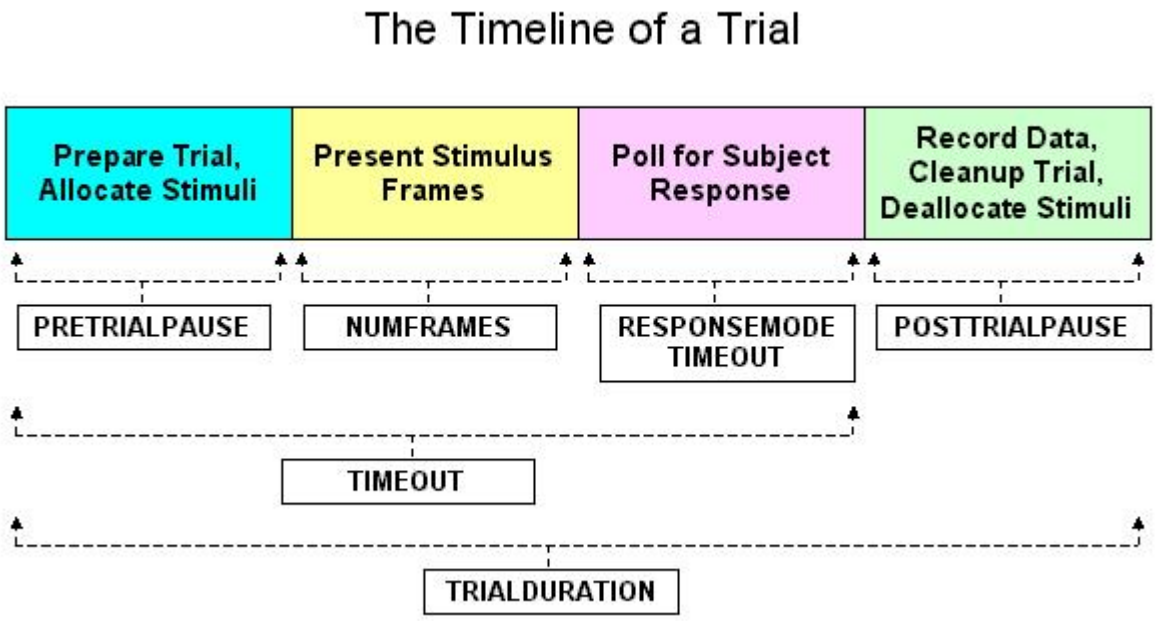
The beginning of the response interval can be customized using the beginresponsetime or beginresponseframe attributes. Beginresponsetime specifies how many milliseconds after the onset of the first frame the response interval should begin. Responseframe specifies how many frames after the first frame the response interval should begin.

For example, in the following trial, the response interval begins when the first stimulus, "prime", is presented.

```
<trial mytrial>
/ stimulusframes=[1=prime; 10=target]
/ beginresponseframe=1
</trial>
```

How to Control Trial Duration and Inter-Trial Intervals

Inquisit provides a number of commands for controlling the timing of various segments of a trial. A trial can be thought of as a sequence of four segments, illustrated in the following diagram:



Attributes

pretrialpause	Pauses for the specified duration at the begining of a trial, prior to stimulus presentation. In addition to providing a general means of controlling inter-trial intervals, the PretrialPause is useful for experiments that present large numbers of memory intensive stimuli on a given trial. Depending on the size of the stimuli and the speed of the hardware, stimulus preparation may add notable lengths of time to the beginning of the trial. Furthermore, stimulus preparation time may vary from trial to trial, in which case varying durations may be added to the beginning of the trials. However, if a PretrialPause interval is specified, Inquisit uses this time to prepare the stimulus presentation sequence. By specifying a PretrialPause duration long enough for stimulus preparation to complete, the experimenter can impose a constant and predictable duration at the beginning of each trial.
numframes	Specifies the number of stimulus presentations frames. A frame corresponds to a single vertical retrace interval of the monitor.

response	By setting this attribute to a timeout procedure (e.g., /response = timeout(1000)), it specifies the maximum duration for Inquisit to wait for the subject to respond. If no response occurs during within this duration, Inquisit finishes up the trial, waits for the postrialpause to complete, and moves onto the next.
timeout	Specifies the maximum duration of a trial, from the very beginning of the trial to the end, not including the posttrialpause.
posttrialpause	Pauses for the specified duration at the end of each trial after the subject has responded. In addition to providing a general means of controlling inter-trial intervals, the PosttrialPause is useful for experiments that present large numbers of memory intensive stimuli on a given trial. Depending on the size of the stimuli and the speed of the hardware, the process of cleaning up a stimulus presentation sequence (i.e., removing stimuli from memory) may add notable lengths of time to the end of the trial. Furthermore, stimulus cleanup time may vary from trial to trial, in which case varying durations may be added to the ends of the trials. However, if a PosttrialPause interval is specified, Inquisit uses this time to cleanup the stimulus presentation sequence. By specifying a PosttrialPause duration long enough for stimulus cleanup to complete, the experimenter can impose a constant and predictable duration at the end of each trial.
trialduration	Specifies the absolute duration of a trial, from beginning to end, including the posttrialpause. If the subject responds quickly, the posttrialpause interval is lengthened to fill out the remaining time in the duration. If the subject does not respond before the duration, the trial is terminated and the next trial begins.

How to Setup and Use Setup Speech Recognition

The speech recognition functionality also requires that you have a sound card and a microphone. Almost any sound card will work for speech recognition and text-to-speech, including Sound Blaster™, Media Vision™, ESS Technology, cards that are compatible with the Microsoft® Windows Sound System, and the audio hardware built into multimedia computers. The quality of the microphone is a large determinant of speech recognition accuracy. Use a close-talk or headset microphone that is held close to the mouth or a medium-distance microphone that rests on the computer 30 to 60 centimeters away from the speaker. A headset microphone is needed for noisy environments. Speech recognition works best with close-talk microphones.

Windows XP

Inquisit leverages the Microsoft Speech Recognition Engine to allow measurement of both latency and accuracy of spoken responses. To use Inquisit's speech recognition capabilities, you must download and install version 5.1 of the Microsoft Speech Engine.

Windows Vista, 7, and 8

The speech engine comes preinstalled on these versions of Windows.

All Versions of Windows

For optimal performance, run the Microphone Wizard to adjust microphone input to appropriate levels and the Speech Recognition Wizard to tune the engine to your voice and dialect. You can find both Wizards under the *Speech Recognition* menu within Inquisit's *Tools* menu.

Mac OSX

Inquisit leverages the native speech recognition engine that ships with Mac OSX. There are no additional installations steps required.

How to Present TTL Signals Through the Parallel Port (Windows and Mac)

Inquisit can trigger external devices such as EEG's and pidgeon feeders by sending these devices TTL (Transistor-Transistor Logic) signals through the computer's LPT (parallel) port. Inquisit allows precise control over the the duration and state of the signals, as well as syncronization of signals with visual and audio stimuli presented on a trial.

A TTL signal is a simple 8 bit value that is physically represented as the sequence of high and low voltage states in pins 2 through 9 of the parallel port at a given point in time.

In Inquisit's scripting language, parallel port signals are defined and presented much the same way as visual and audio stimuli. as the signal is represented as an 8 character sequence of 0's and 1's, with 0 corresponding to low and 1 corresponding to high. Port signals are defined within Inquisit using the port element, which can contain 1 or more items that define a specific 8-bit sequence. For example, the following port stimulus consists of a single 8 bit sequence "10101010":

```
<port mysignal>
/ port = lpt1
/ subport = data
/ items = ("10101010")
</port>
```

The port attribute specifies which of the two parallel ports to use, LPT1 or LPT2.

The subport attribute specifies whether to use the Data or Control register of the parallel port.

The items attribute specifies a sequene of 8 bits to send to the port.

This port signal can then be presented along with other trial stimuli:

```
<trial mytrial>
...
/ stimulusframes = [1 = mypicture,  mysignal]

< BR
 >  ...
</trial>
```

The standard parallel port consists of three registers or 'subports' commonly referred to as Data, Status and Control registers. The Data and Control registers are capable of sending output signals. Inquisit supports writing to either the Data and Control registers by defining the subport attribute of the port element. The Status register, on the other hand, supports input signals. Inquisit supports reading from Status register (see inputdevice for details).

TTL signals are specified as a sequence of 8 bits (i.e., a byte of information). The following charts show the mappings between each binary digit specified in the item (e.g., "01001001"), the bit, and their respective DB25 pins for signals send to the Data and Control registers, respectively:

Data Register		
Item	**Bit**	**DB25 Pin**
1	7	9

2	6	8
3	5	7
4	4	6
5	3	5
6	2	4
7	1	3
8	0	2
Control Register		
1	7	not used
2	6	not used
3	5	not used
4	4	not used
5	3	17
6	2	16 (logic reversed)
7	1	14
8	0	1

Inquisit's parallel port triggering is a generic mechanism for sending any 8-bit TTL signal to any external device capable of receiving. The duration and content of the signals sent by an experiment depends upon the specific device that is listening for those signals. Consult the documentation for your device to understand what kind of signals it expects.

Inquisit includes a parallel port monitoring tool that allows ad hoc sending of TTL signals to the Data and Control registers of either of two parallel ports (LPT1 or LPT2).

Inquisit can also read signals from the parallel port sent from other devices using the pretrialsignal and posttrialsignal commands.

Parallel Port Support for Mac

Although parallel ports have long been sole province of Windows-based PCs, Inquisit extends support to the Mac OS X operating system. A parallel port can be connected to to your Mac Pro, Macbook Pro, or iMac, using Mac's Thunderbolt connector protocal. Specifically, a ExpressCard PCIe parallel port card can be connected to a Thunderbolt to PCIe adapter (e.g. Sonnet Echo Pro ExpressCard PCIe 2.0 Thundebolt Adapter), which can then be plugged into a Mac's Thunderbolt port. Additionally, a standard PCI or PCIe parallel port card can be plugged in directly to the PCI or PCIe slot on a Mac Pro's motherboard.

Importantly, Inquisit is compatible with single function parallel port cards only. Multi-function cards such as those with multiple parallel ports or a mix of parallel and serial ports are not supported.

How to Use the Parallel Port Monitor Tool (Windows and Mac)

Inquisit can communicate with external hardware such as fMRI, EEG, and Eye Tracker measurement systems via TTL signals sent via parallel port. Inquisit supports parallel port communication on both Mac and Windows computers. Inquisit's Parallel Port Monitor provides a handy tool for testing whether parallel port signal values are properly sent and received.

The Parallel Port Monitor tool can be launched by selecting the "Parallel Port Monitor..." command from Inquisit's "Tool" menu.

The Parallel Port Monitor tool allows you to send TTL signals through the parallel port of your choice, as well as monitor incoming TTL signals send from external devices. The parallel port can be useful for testing what kinds of TTL signals are sent or recognized by external devices such as EEGs amplifiers.

Inquisit recognizes TTL input to the Status and Data registers. When the "Receive" button is pressed, the Parallel Port Monitor tool displays both the byte value of the current input TTL signal as well as the high/low status of each individual pin. A checked box indicates high; unchecked indicates low.

Inquisit can send TTL input to the Data or Control registers. To send a signal, check the box for pin that should be high, then press the "Send" button. The corresponding pins will be set high or low and will remain in that state until another signal is sent.

How to Log Parallel Port Signals

The Parallel Port monitor also supports logging of parallel port input signals over time. To achieve maximum timing resolution, the logging tool boosts it's thread and process priorities and polls the parallel port state, logging the time of any changes. Results are saved in tab-delimited format that can be loaded into Inquisit and other data analysis tools such as Excel, SPSS, etc.

To log parallel port port input, simply click the Log... button on the Parallel Port Monitor. To start recording immediately, press the Record button. You can define a parallel port pin/bit as a trigger so that recording will start when the value of the selected bit transitions to high (bit value 1). The logging tool also enables you to specify the path of the log data file and the duration of time for signals to be logged.

Parallel Port Support for Mac

h2>Parallel Port Support for Mac

Although parallel ports have long been sole province of Windows-based PCs, Inquisit extends support to the Mac OS X operating system. A parallel port can be connected to to your Mac Pro, Macbook Pro, or iMac, using Mac's Thunderbolt connector protocal. Specifically, a ExpressCard PCIe parallel port card can be connected to a Thunderbolt to PCIe adapter (e.g. Sonnet Echo Pro ExpressCard PCIe 2.0 Thundebolt Adapter), which can then be plugged into a Mac's Thunderbolt port. Additionally, a standard PCI or PCIe parallel port card can be plugged in directly to the PCI or PCIe slot on a Mac Pro's motherboard.

Importantly, Inquisit is compatible with single function parallel port cards only. Multi-function

cards such as those with multiple parallel ports or a mix of parallel and serial ports are not supported.

Using Cedrus RB Series and Lumina Response Boxes with Inquisit

Inquisit has built in support for interoperating with Cedrus RB-Series and Lumina response pads and other devices that use Cedrus' XID communication protocol. Cedrus response pads can be used with Inquisit on both Windows and Mac platforms.

RB-x30 Response Boxes (RB-430, RB-530, RB-630, and RB-830), Lumina response pads

The RB-x30 devices are the third and, as of the time this article was written, latest generation of response boxes from Cedrus. These and the Lumina response pads use a communication protocol called XID that defines a set of commands for sending and retrieving data to and from the device. Inquisit uses this protocol to automatically (i.e., no manual configuration) connect to the device, and to query the device for responses and response latencies as recorded by the device's built-in timer.

The first step in using the response device is to plug it into a USB port on your computer and install the device driver (which you can download from Cedrus' web site).

Once the device is plugged in, you can communicate with it in Inquisit by making a few simple modifications to your task script. For example, if you are modifying a script that is configured to use the keyboard for measuring responses (either inputdevice is set to keyboard or it's unspecified, in which case Inquisit defaults to the keyboard), you simply need to set inputdevice to XID, either as the default for the entire script:

```
<defaults>
/ inputdevice = XID
</defaults>
```

Or specifically for a given trial:

```
<trial target>
/ inputdevice = XID
</trial>
```

You will also need to configure your script to handle the specific numeric values returned by the buttons on the device. To discover the button values, download and run the response pad sample from our Cedrus page. This is a great sample for scripting against an XID response device, and it will display the numeric values of any button you press. Once you know the values, you can update your script to treat these values as valid or correct responses:

```
<trial target>
/ inputdevice = XID
/ validresponse = (2, 6)
/ correctresponse = (6)
</trial>
```

If you'd like to access advanced properties of the response pad such as the response time

as measured by the onboard timer or the id, port, or action of the last-pressed button, you can define an xid element as follows:

```
<xid rb>
/ product = responsepad
</xid>

<trial target>
/ inputdevice = XID
/ isvalidresponse = [xid.rb.lasteventbutton == 4 ||
xid.rb.lasteventbutton == 5;]
/ correctresponse = [xid.rb.lasteventbutton == 4 &&
xid.rb.lastlatency < 1000;]
</trial>
```

Troubleshooting

If Inquisit suddenly stops responding to button presses, try unplugging your device and then plugging it back in. We've found ourselves having to do this on occassion.

If you have been unable to get Inquisit to recognize button presses at all, verify the dipswitches on your device are configured to XID mode. The dipswitches on the back of the response box control the response mode and baudrate that the device uses to signal the serial port. When the response box is shipped, all four switches on the device are down by default, which sets the device to XID mode at a baud rate of 115,200. See below for an illustration. Although Inquisit can use any baud rates supported by the device, we'll just use with the default setting of 115,200 for the sake of simplicity. If the dipswitches are in different positions, unplug the response box, return them all to the down position, then plug it back in. Be warned, you must disconnect your response box from the computer and then reconnect it for dipswitch changes to take effect.

Inquisit RB-x20 Response Boxes (RB-420, RB-520, RB-620, and RB-820)

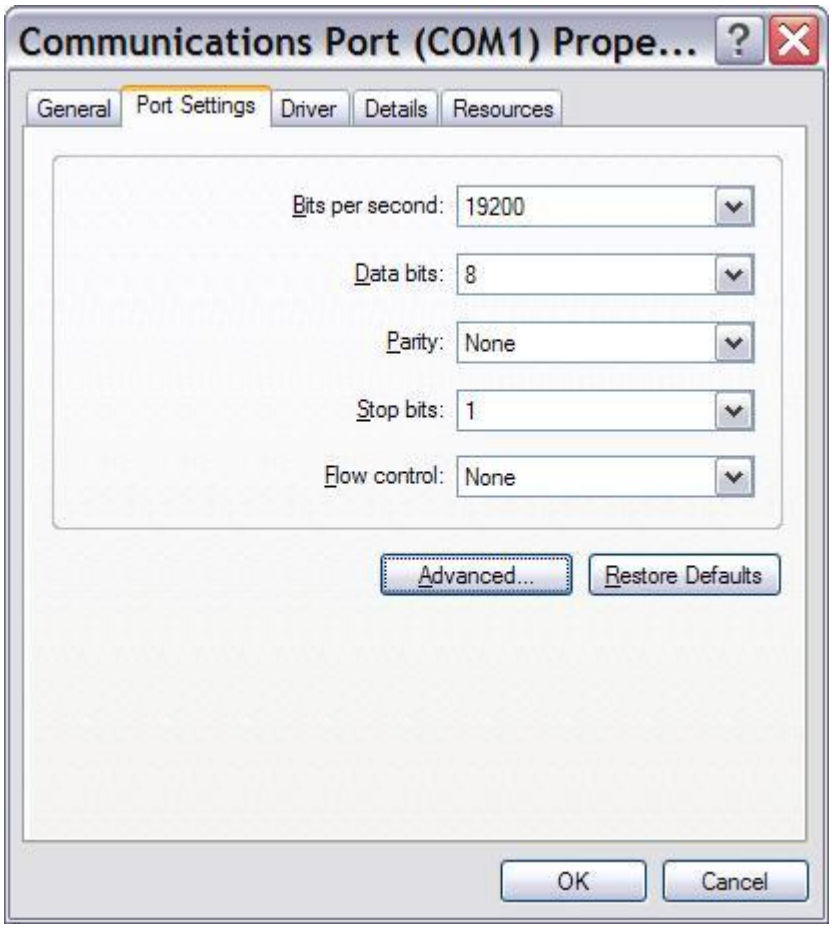
The RB-x20 devices are the second generation of response boxes from Cedrus. These response boxes support only the "RB Series" communication mode.

Setting the Dipswitches

The dipswitches on the back of the response box control, among other things, the baudrate that the device uses to signal the serial port. When the box is shipped, all four switches on the device are down by default, which corresponds to a baud rate of 19200 (see the image below). Although Inquisit supports any baud rate, we'll just use the default setting of 19200 to keep things simple. If the switches are not all in the down position, unplug your device from the computer, flip them all down, and then plug it back in.

Configuring the Serial Port

Once all four dipswitches have been set to the down position, the serial port must be configured with the compatible settings. To configure the port, use the Windows Device Manager applet (on Windows XP, open the Control Panel, then the System applet, click on the Hardware tab, and click the Device Manager button). Expand the Ports node on the tree, right click on the COM port that your response box is plugged into, and select the Properties command. This will open the window pictured below, which allows you to configure the port. For the RB-x20 devices with the dipswitches in the down position, the port should set to the following:



If you haven't already, plug your device into the serial port of you computer. If your computer has multiple serial ports (COM1, COM2, etc.), make sure that you connect the device to the same port that you configured in the previous step.

Using Cedrus StimTracker with Inquisit

Inquisit has built in support for interoperating with Cedrus StimTracker devices. The StimTracker provides an alternative to the parallel or serial port for Inquisit to communicate with external neurophysiological measurement systems and send markers of significant events during stimulus presentation. Inquisit can interoperate with a StimTracker on both Windows and Mac platforms.

The first step in using the StimTracker is to plug it into a USB port on your computer and install the device driver (which you can download from Cedrus' web site).

Once the device is plugged in, you can interface with it in Inquisit as if it were a type of stimulus. In other words, you can send signals to the device using syntax similar to that which displays pictures or text or plays a sound. By presenting the StimTracker signals at the same time as other stimuli, the StimTracker can relay the signals to an ERP of fMRI system in order to mark stimulus onsets.

To signal a StimTracker, you will need to define xid elements. The following xid element has a single item with a value of 0 (all TTL channels set to low):

```
<xid stblank>
/ product = stimtracker
/ items = (0)
</xid>
```

The following two xid elements are functionally identical, each containing 3 signals with values 1, 2, and 4. The two elements illustrate the two different ways in which signal values can be defined - as integers or as binary strings.

On each trial, the select attribute for the xid elements determines which signal is sent on a given trial. In both cases, selection is linked to the selected item in the text element named "letters". The letters text element selects randomly without replacement from items "A", "B", and "C". The xid elements select the corresponding values. Thus, when "A" is selected, xid value 1 is selected. When "B" is selected, xid value 2 is selected. When "C" is selected, xid value 4 is selected.

```
<xid stsignalint>
/ product = stimtracker
/ items = (1, 2, 4)
/ select = current(letters)
</xid>

<xid stsignalbin>
/ product = stimtracker
/ items = ("00000001", "00000010", "00000100")
/ select = current(letters)
</xid>

<text letters>
/ items = ("A", "B", "C")
/ select = noreplace
</text>
```

The following xid element defines a Lumina fMRI response pad that is also plugged into the presentation computer.

```
<xid rb>
/ product = lumina
</xid>
```

The following trial demonstrates how to present the signals and text as well as record the response from the Lumina reponse pad. The trial presents a signal that is synchronized to the onset of the text stimulus. The signal is reset to 0 after 3 vertical retrace intervals (50 milliseconds on a 60hz monitor). Note that pretrialsignal is defined so that the trial waits for a signal value of 1 from the parallel port before running. This is handy for synchronizing trials on the presentation machine with fMRI recording blocks.

```
<trial target>
/ pretrialsignal = (LPT1, 1)
/ stimulusframes = [1 = letters,stsignalint; 4=stblank]
/ inputdevice = xid(rb)
/ validresponse = (4)
</trial>
```

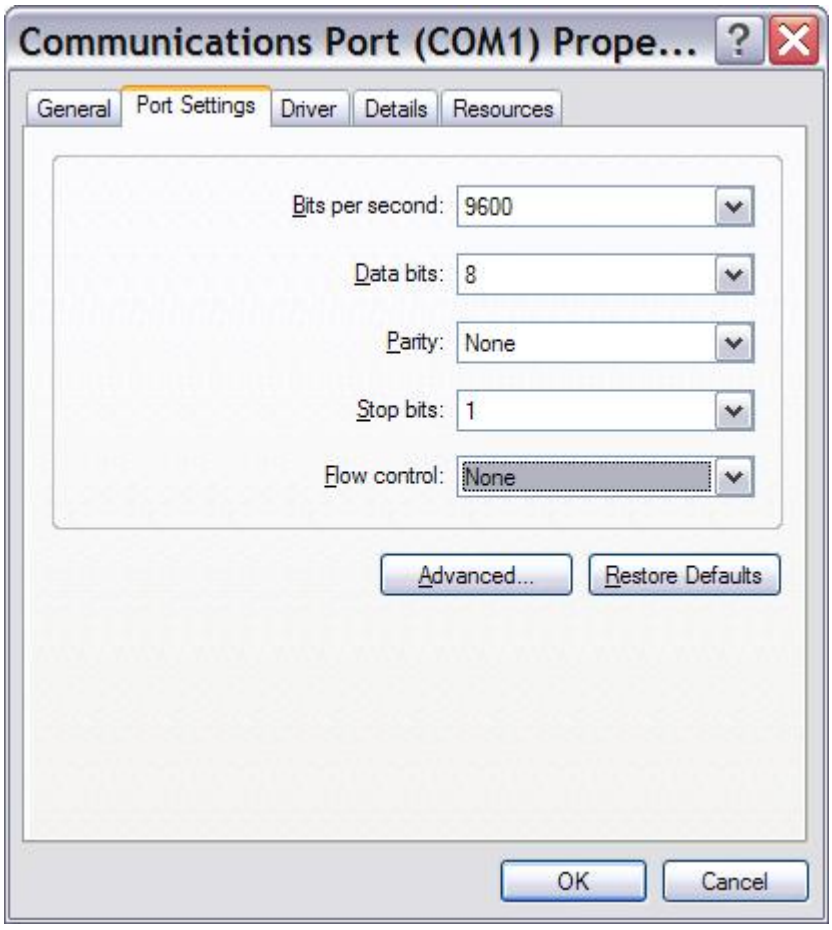
Record Responses from a Serial Response Box

Inquisit supports obtaining and measuring responses from serial port devices such as serial response boxes and voice key microphones (Inquisit also supports voice key and speech recognition using any PC microphone). Inquisit has generic serial port cababilities that can be used to interact with many devices. In addition, Inquisit also has special capabilities for interacting with Cedrus' XID response boxes, which are described in detail below.

Configuring the serial port

Most devices require the serial port to be configured with specific settings in order to function properly. Settings include the port's baud rate, the number of bits in each chunk of data, parity, and flow control. Consult the manual for your device for the appropriate COM port settings.

To configure the port, use the Windows Device Manager applet (on Windows XP, open the Control Panel, then the System applet, click on the Hardware tab, and click the Device Manager button). Expand the Ports node on the tree, right click on the COM port you wish to configure, and select the Properties command. This will open the following Window, which allows you to configure the port. If you are using an RB x30 series device, the settings should be as follows:



Note that the RB x30 series of response pads have a set of dip switches on the back that allow you to configure the device to use a 9600 or 19200 baud rate. Be sure to set the "bits per second" option in the above window to whichever of these two values the dip switches are configured to use.

Inquisit commands for serial port input

The Inquisit commands for using a serial port device are very similar to those used for other response devices such as a keyboard, mouse, or joystick. The inputdevice command should be set to "com1", "com2", "com3", ... depending upon which port number the device is plugged into on your PC. The inputdevice can both be set globally for all trials in an experiment by using the <defaults> element:

```
<defaults>
/ inputdevice = com1
</defaults>
```

The inputdevice can also be set on a trial by trial basis as follows (trial settings override the default settings):

```
<trial mytrial>
/ inputdevice = com2
/ validresponse = (128, 8)
/ correctresponse = (8)
</trial>
```

Next, define the valid and correct responses for that trial. Inquisit treats each byte of data sent by the device as a separate response whose values range from 0 to 255. Correct and valid responses must therefore be an integer within this range. The exact value sent by a particular device, or by a given button on a device, is determined by the device itself. To determine the value corresponding to a particular response on a serial port device, consult the documentation for that device, or run a series of trials with "responsemode=anyresponse". Under this mode, Inquisit will treat any response from the device as valid and will record the value for each response in the data file. You can then consult the data file to determine the value for each response.

Using Cedrus XID-compatible response boxes with Inquisit

Cedrus' new line of RB and Lumina response boxes include a built in timer that can be used to measure response latencies. The response pad measures the participant's reaction using it's own hardware and then reports a time stamped response to the computer. This capability is useful when running computationally intensive trials such as video presentation that could affect the computer's ability to provide accurate timing.

Taking advantage of an XID response box's on board timer is easy. There is no port configuration required. Just set the inputdevice command to "xid1", "xid2", "xid2", ... depending on which serial port number the device is plugged into. That's all there is to it. Inquisit will now record response latencies using the device's timer rather than that of the computer.

Using Current Design, Inc. fORP response devices with Inquisit

Inquisit is also compatible with fORP response devices by Current Design, Inc. These devices plug in through a USB port and can be configured to register as a keyboard or joystick device. Inquisit can thus interact with them as if they were a regular keyboard or joystick (i.e., by setting inputdevice equal to "keyboard" or "joystick").

How to Run an Inquisit 4 Experiment on the Web

Inquisit 4 Web allows you to launch your experiments directly from a web page. If you have purchased a web license, you have the option of launching expeirments from your own web site or from the millisecond.com web site. In either case, data are saved by default to the millisecond.com data service where you can login and download the data files.

If you haven't yet purchased a web license, you can still evaluate Inquisit 4 Web by setting up an experiment on your own web server. When evaluating Inquisit, you can launch and run scripts as normal, but the data will not be saved.

Click here for more information on registering Inquisit 4 Lab. Click here for more information on registering Inquisit 4 Web.

Publishing Inquisit scripts on millisecond.com

Hosting your scripts on millisecond.com is the easiest option for those without experience creating and administering web sites. For those with basic web development skills, this option also includes some support for customizing the launch web page and subject number assignment method. To publish a script on millisecond.com:

1. Write and test your Inquisit script using the Inquisit 4 Lab editor and tools.
2. Open your web browser and navigate to the millisecond.com web site.
3. Select "My Account" from the menu and click the "Register Inquisit Web Scripts" menu item. If you are not already logged into the site, you will be prompted for your user name and password.
4. Under the "Register Web Scripts" section, click the "Register New Script" link. This will launch the Inquisit Web Script Wizard
5. The first page of the wizard asks whether you wish to host the experiment on millisecond.com or on your own web server. Select the millisecond.com option. The click the "Browse..." button and select your script file from your local computer. Click next once you have specified the script file.
6. On the next page you can upload additional files used by the script such as pictures and video.
7. Next, select whether you wish to use Inquisit's automatically generated launch page or your own custom web page. The subsequent steps in the wizard allow you specify the title, instructions, and how subject id numbers should be generated and assigned to subjects.
8. When you are done, click the Finish button. That's it, your experiment is now online. You can browse to the launch page using the following url:

   http://research.millisecond.com/[username]/[scriptfilename].web

   where [username] is your user id and [scriptfilename] is the original filename of your script.
9. Click the "Start" link to launch your experiment.

Publishing Inquisit scripts on your own web server

Hosting experiments on your own server is an easy if you have access to a web server. To deploy an Inquisit experiment to your web server, follow these steps:

1. Write and test your Inquisit script using the Inquisit 4 Lab editor and tools, or download a script from the Inquisit Task Library .

2. Navigate to your web scripts page at http://www.millisecond.com/myaccount/webscripts.aspx.
3. If the status of your web license is "pending", start your web license by clicking the "Start Now" link.
4. Click the "Register New Script" link to launch the registration wizard and follow the steps in the wizard.
5. On the first page of the wizard, select the option to host the experiment on your own server, and enter the full url to the script file on your server.
6. Continue through the wizard specifying the options you'd like for the launch page.
7. On the final Summary page of the wizard, click the "Download Launch Page" button and save the html page to your computer. Then click the Finish button.
8. Upload your script file and the launch page created above to the location on your web server that you specified when registering the script. If you script uses picture or other media files, be sure to upload those as well.
9. Direct participants to the launch web page to start the experiment.

How to Combine Multiple Data Files into a Single File

Depending on the configuration of the data and summarydata elements in your script, and whether you are saving the data locally or to a remote server, Inquisit may record data from all participants to a single file, or it may record data from each participant to a separate file.

If the data is saved to separate files, you can easily combine them into a single file that can be loaded into SPSS, Excel, or any other stats program for analysis. To combine data from multiple data files, perform the following steps:

1. Start the Inquisit application on your PC or Mac
2. Select the Merge Data Files command from the File menu
3. Browse to the folder containing your data files
4. Hold down the Shift key and select all of the files to be merged
5. Click the Open button - you should see the data from all of the selected files combined in the data editor
6. Select the Save command from the File menu to save the merged data

The data are saved in a non-proprietary tab-delimited text format that can be loaded into your statistics program of choice. Consult the documentation of your data analysis software for instructions on importing tab-delimited text.

How to do Conditional Branching with Inquisit

Inquisit provides several attributes that enable an experimental procedure to dynamically change or adapt based on the subject's performance.

Branch Attribute

The most powerful attribute for conditional logic is the branch attribute. The branch attribute can be defined at the level of the trial (including specialized trials such as likert, openended, or block. The attribute allows you to specify which trials or blocks to run next based on performance. Branching is useful in a variety of circumstances:

- Repeating a task until the subject makes ten correct responses in a row.
- Running one of two tasks depending upon the median latency on a previous task.
- Running a minimum of 10 and a maximum of 50 trials in a block and moving onto the next block if the average response latency rises above 1000 milliseconds.

The syntax of the attribute is as follows:

```
/ branch = [if (<boolean expression>)nextevent]
```

where *<boolean expression>* is an expression that evaluates to true or false, and *nextevent* is the trial or block that should be run if the boolean expression is true. To specify that no branching should occur if a particular condition is true, "0" can be specified as the next event.

Multiple branches may be defined for a given element. If the conditions of multiple branches are true, then the first branch in the list wins.

Skip Attribute

Another useful attribute for conditional logic is the skip attribute. Like the branch attribute, skip can be defined at the level of . The attribute allows you to specify conditions under which which the trial or block should be skipped. The syntax of the attribute is as follows:

```
/ skip = [<boolean expression>]
```

where *<boolean expression>* is an expression that evaluates to true or false. Multiple skip conditions may be defined for a given element. If any of the skip conditions of are true, this event is skipped. Otherwise, it runs as normal.

Responsetrial Attribute

The responsetrial attribute provides a convenient way to chain together trials based on which response the subject made. For example:

- Following up incorrect responses with a study trial.
- Creating a questionnaire that includes follow up questions only if a particular response is given.

Note that with Inquisit 4, the branch attribute includes all of the functionality of the responsetrial, and also includes functionality not supported by responsetrial.

Stop Attribute

The stop attribute aborts the remainder of the trials in a block if the subject's peformance meets the specified condition. This is useful in a variety of situations:

- Aborting a task if the percentage of correct responses drops below a threshold.
- Aborting a task if an incorrect response is given.
- Aborting a task after a maximum number of trials has been run.

Running Sequences of Inquisit Scripts and Other Applications

A single experiment does not necessarily fit into a single Inquisit script. In many cases it may be necessary to collect data using a combination of different Inquisit scripts, or even a combination of different data collection programs. Ideally, the different scripts and programs would run as a single, seamless sequence of tasks requiring no manual intervention from the researcher. This article discusses approaches to achieve this.

Using the Inquisit Batch Element

The Inquisit language provides a simple facility for stringing together multiple scripts into a single data collection session, the batch element. The batch element allows you to specify a list of script files to run in order.

```
<batch>
/ file="snowboard.iqx"
/ file="ski.iqx"
/ file="snowshoe.iqx"
</batch>
```

The batch element must be defined in its own seperate file. To run the batch element, simply open the script containing the batch element definition in Inquisit and run it as you would run any other script.

This is a very simple approach, but it is also somewhat limited. The batch provides no way to launch other programs besides Inquisit, and it does not allow you to counterbalance the order in which the scripts are run. For that, we can rely on Windows batch files.

Using Windows Batch Files

Most researchers assume that running a sequence of data collection programs together requires the ability of the data collection software to launch other software applications. The applications can thus be daisy-chained together, with each application launching the next application in the sequence. In fact, this capability isn't really necessary at all. Everything you need to run batches of applications in sequence is built directly into the Windows operating system.

Those of you who remember the days of Microsoft DOS are probably familiar with batch files. Batch files are simple text files, usually named with the "*.bat" file extension, that contain a series of shell commands. Shell commands can move, copy, and delete files and folders. They can search for files by name or that contain a particular string of text. They can format a hard drive. Most importantly for our purposes, however, they can launch applications.

Creating a batch file

Creating a batch file is simple:

1. Click the Windows Start button in the lower left corner, and select "My Computer".
2. Navigate to the C: hard drive by double clicking its icon.
3. Open the "File" menu, select the "New" command, and then select "Text Document".
4. Now, rename the text file you created to "millisecond.bat". Click "OK" when Windows asks you to confirm that the name change.

5. Right click the millisecond.bat file and select the "Edit" command. This will open the file in the Notepad text editor.

Now we're ready to enter in some commands. For the sake of example, let's assume that our experiment consists of two Inquisit scripts called "Snowboard.iqx" and "Ski.iqx". We'd like to run the "Snowboard.iqx" script first, then have the subject play a game of Solitaire to serve as a distractor task before running the "Ski.iqx" scrip. To launch the "Snowboard.iqx" Inquisit script, we use the same syntax that we would use to launch the script from the Windows command line shell (hence, the name "shell commands"). The Inquisit.exe program accepts 3 command line parameters that specify the script to run, the subject id, and the group id. Thus, the first command in the batch file is the following:

```
"C:/Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Snowboard.iqx" -s 23 - g 1
```

The first part of the command is the full path to the Inquisit executable file (yours may be different depending on where you installed Inquisit). The second part specifies the full path of the script to run. The third part is the subject number (more on this later). Now, on the second line of the file we'll add the command for launching the Windows Solitaire application, which changes our batch file to the following:

```
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Snowboard.iqx" -s 23 -g 1
"C:\Windows\System32\sol.exe"
```

Finally, we'll add a third line to the file to run the "Ski.iqx" Inquisit script.

```
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Snowboard.iqx" -s 23 -g 1
"C:\Windows\System32\sol.exe"
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Ski.iqx" -s 23 -g 1
```

Our batch file is almost complete. We can run the file either by double clicking the file with the mouse, or by opening the Windows command line, moving to our desktop directory, and typing "millisecond.bat". The batch file first runs "Snowboard.iqx". When that script is complete, it opens the Windows Solitaire application. When Solitaire is closed, it runs the "Ski.iqx" script in Inquisit. In both cases, it sets the subject number to "23".

Wait a minute, you may be thinking, won't this batch file set assign "23" to all of my subjects? The answer is yes. Obviously, that's not very useful as we'll need the ability to specify a unique subject number for each participant. Fortunately, this isn't difficult because Windows allows you to pass command line parameters to batch files as well. In our case, we'll want to pass the subject number to the batch file, and have it apply that number to both Inquisit scripts. We can do that by modifying the batch file as follows:

```
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Snowboard.iqx" -s %1 -g 1
"C:\Windows\System32\sol.exe"
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Ski.iqx" -s %1 -g 1
```

All we've done is replaced "23" with "%1". Windows will substitute the value of the first command line parameter passed to the batch file wherever it see's a "%1". (All occurences of "%2" would be replaced by the second parameter, "%3" by the third parameter, and so forth).

We've now got a batch file that will run the three pieces of our experiment in sequence, but what if we want to counterbalance the order of our Inquisit scripts? No problem, we'll just add some additional logic to our batch file. Our batch file is going to need a second command line parameter that tells us the order to run the Inquisit's scripts and an "IF" statement to select the correct order.

```
IF "%2" == "A" (
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Snowboard.iqx" -s %1 -g 1
"C:\Windows\System32\sol.exe"
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Ski.iqx" -s %1 -g 1
)
IF "%2" == "B" (
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Ski.iqx" -s %1 -g 1
"C:\Windows\System32\sol.exe"
"C:\Program Files\Millisecond Software\Inquisit 4\Inquisit.exe"
"C:\Myscripts\Snowboard.iqx" -s %1 -g 1
)
```

Now our batch file takes two command line paramters, the first is the subject number and the second (either "A" or B") indicates which order to run. If the second parameter is neither "A" or "B", neither condition is run.

Running the batch file

Our batch file is now finished, so let's take a look at how to run it. We can no longer double click the file to run it, because the file is expecting us to supply a subject number as a first parameter. Instead, we'll launch the batch file from the Windows command line shell. To open the command shell, do the following:

1. Click the Windows Start button in the lower left corner of the screen.
2. Select the "Run..." command.
3. Enter "cmd" in the text input box, and click the "OK" button. This will open a command line console window.
4. In the console window, type "`cd c:\` " to navigate to the root folder of the C drive (if you are using a different drive, then switch the drive letter).
5. To launch your batch file, type "`millisecond.bat 99 A`". Note that 99 is the value of the the subject number and A specifies the first counterbalancing condition. To run the second counterbalancing condition, you would type "`millisecond.bat 99 B`"

We now have a batch file that allows us to run multiple Inquisit scripts in counterbalanced order, as well as running a another software application, "Solitaire". To the participant, these different pieces will seamlessly flow together. Click here for the completed batch file.

Batch files are a powerful tool that can be used to automate many different aspects of data collection, including automatically backing up data files to another location when a session is complete, preprocessing data, or even logging off of Windows after a script is complete to prevent tampering (using the Windows "logoff.exe" program).

How to Combine Multiple Scripts

Often a study will involve administering multiple measures to each participant. For example, a study might administer an IAT, a direct measure of attitude, and a demographic questionnaire, or it may require that 2 different IAT tasks be administered. Inquisit places no constraints on the number of measures that can included in a single script. However, for a number of reasons, it is often more convenient for each measure to be defined in its own script. For example, putting all of the measures in a single file may result in a large and unwieldy script. Also, in many cases each of the measures already exists as a separate script anyway.

Inquisit provides two mechanisms for combining different scripts into a single data collection session, the <batch> element and the <include> element.

The <batch> Element

The batch element provides a simple way of running a set of scripts in sequence. To use the batch element, create new empty script file that will contain only the batch element definition and no other commands:

```
<batch>
/ file = "IAT1.iqx"
/ file = "IAT2.iqx"
/ file = "IAT3.iqx"
</batch>
```

As you can see from this example, the batch element is really just a list of the script files you wish to run. In the above example, three IAT scripts are listed, IAT1.iqx, IAT2.iqx, and IAT3.iqx. As you might have guessed, the batch runs each of these scripts in the order they are listed. To run the batch, simpy open the script file that contains the batch element definition in Inquisit, and select the Run command from the Experiment menu. You will be prompted for a subject id, after which each script is run in sequence. Data from each script are saved in separate files, and the same subject id is used for each file. To use the batch element with Inquisit Web, simply register the script containing the batch element, and then upload the other scripts to the web server. With the Web, the data are also saved in different files using the same subject id.

The batch file is very easy to use, but it does have some limitations. Most notably, there is currently no built in way to randomize the order in which the scripts are run (this is true as of version 3.0.2.0, but the feature is planned for a future release). If you are using the lab version of Inquisit, you can create multiple batch files, each of which contains a different ordering, and then randomly assign participants to one of those batch files. With the Web, this technique would require you to register multiple batch scripts, each of which would require a separate license. For web experiments requiring randomized ordering, the <include> element described below is likely a better option.

The <include> Element

The include element provides a convenient way to "copy and paste" elements from one script into another script without requiring you to go through the hastle of actually copying and pasting. It therefore can serve as a useful tool for combining measures defined in separate scripts, although typically the scripts will have to be modified somewhat in order to combine properly.

As an example, let's say we wish to run two IAT measures, randomly varying the order. We could arbitrarily choose either IAT script and add the include element to it. However, in order to make it easier to reuse this solution with other scripts (containing IATs or other measures), we'll start with a new empty file and then add our include definition to it:

```
<include>
/ file = "IAT1.iqx"
/ file = "IAT2.iqx"
</include>
```

In the above example, we've included two different scripts, IAT1.iqx and IAT2.iqx. The order in which they are listed doesn't matter. Conceptually, we now have a single virtual script that contains all of the element definitions contained in IAT1.iqx and IAT2.iqx. If you try to run the script, however, you'll notice a whole bunch of errors. This is because both scripts use the same names for elements. They also both include definitions of global elements such as <data>, <defaults>, <values>, <variables>, and <expressions>, so Inquisit will report an error stating that these elements have been defined more than once.

The first step in resolving these errors is to put a single copy of the global elements in our include script, and remove these element definitions from both of the IAT scripts. The global elements to add to our include script and remove from our IAT scripts are as follows:

```
<defaults>
/ fontstyle = ("Arial", 3.5%)
/ screencolor = (0,0,0)
/ txbgcolor = (0,0,0)
/ txcolor = (255, 255, 255)
/ minimumversion = "3.0.0.0"
</defaults>

<data>
/ columns = [date, time, subject, blockcode, blocknum, trialcode, trialnum, response, correct, latency, stimulusnumber, stimulusitem, expressions.da, expressions.db, expressions.d ]
</data>

<monkey>
/ latencydistribution = normal(500, 100)
/ percentcorrect = 90
</monkey>

<values>
/ sum1a = 0
/ sum2a = 0
/ sum1b = 0
/ sum2b = 0
/ n1a = 0
/ n2a = 0
/ n1b = 0
```

```
/ n2b = 0
/ ss1a = 0
/ ss2a = 0
/ ss1b = 0
/ ss2b = 0
/ magnitude = "unknown"
</values>

<expressions>
/ m1a = values.sum1a
/ values.n1a
/ m2a = values.sum2a
/ values.n2a
/ m1b = values.sum1b
/ values.n1b
/ m2b = values.sum2b
/ values.n2b
/ sd1a = sqrt((values.ss1a - (values.n1a * (expressions.m1a * expressions.m1a))) /
(values.n1a - 1))
/ sd2a = sqrt((values.ss2a - (values.n2a * (expressions.m2a * expressions.m2a))) /
(values.n2a - 1))
/ sd1b = sqrt((values.ss1b - (values.n1b * (expressions.m1b * expressions.m1b))) /
(values.n1b - 1))
/ sd2b = sqrt((values.ss2b - (values.n2b * (expressions.m2b * expressions.m2b))) /
(values.n2b - 1))
/ sda = sqrt((((values.n1a - 1) * (expressions.sd1a * expressions.sd1a) + (values.n2a - 1) *
(expressions.sd2a * expressions.sd2a)) + ((values.n1a + values.n2a) * ((expressions.m1a -
expressions.m2a) * (expressions.m1a - expressions.m2a)) / 4) ) / (values.n1a + values.n2a -
1) )
/ sdb = sqrt((((values.n1b - 1) * (expressions.sd1b * expressions.sd1b) + (values.n2b - 1) *
(expressions.sd2b * expressions.sd2b)) + ((values.n1b + values.n2b) * ((expressions.m1b -
expressions.m2b) * (expressions.m1b - expressions.m2b)) / 4) ) / (values.n1b + values.n2b -
1) )
/ da = (m2a - m1a) / expressions.sda / db = (m2b - m1b) / expressions.sdb
/ d = (expressions.da + expressions.db) / 2
/ preferred = "unknown"
/ notpreferred = "unknown"
</expressions>
```

The next step is to rename all of the blocks, trials, stimuli, and stimulus items in both IAT scripts so that they are all unique. In our case, we'll simply add an "iat1" to beginning of all of the names in the IAT1.iqx script, and "iat2" to the beginning of all of the names in the IAT2.iqx script. Thus, the blocks named "targetcompatiblepractice" becomes "iat1targetcompatiblepractice" and "iat2targetcompatiblepractice". The text stimulus named "instructions" becomes "iat1instructions" and "iat2instructions". The trial named "iat1summary" and "iat2summary". And so forth. Note that you will need to update the parts of each script that refer to these elements as well. For example, iat1summary trial contains

the command / stimulustimes = [0=summary], which must be changed to / stimulustimes = [0=iat1summary].

The element responsible for running our IATs is the <expt>element, so we'll next need to remove these element definitions from the IAT scripts and rewrite them in our include script so that they run the blocks of each of our IATs. After we delete these elements from the IAT scripts, we'll add the following element definition to the include scripts.

<expt>
/ subjects = (1 of 4)
/ blocks = [1=iat1targetcompatiblepractice; 2=iat1attributepractice; 3=iat1compatibletest1; 4=iat1compatibletestinstructions; 5=iat1compatibletest2; 6=iat1targetincompatiblepractice; 7=iat1incompatibletest1; 8=iat1incompatibletestinstructions; 9=iat1incompatibletest2; 10=iat1summary; 11=iat2targetcompatiblepractice; 12=iat2attributepractice; 13=iat2compatibletest1; 14=iat2compatibletestinstructions; 15=iat2compatibletest2; 16=iat2targetincompatiblepractice; 17=iat2incompatibletest1; 18=iat2incompatibletestinstructions; 19=iat2incompatibletest2; 20=iat2summary]
</expt>

The above experiment runs IAT1 first and IAT2 second. In both cases, the compatible parings are applied before the incompatible parings.

The next expt element reverses the order of the IATs.

<expt>
/ subjects = (2 of 4)
/ blocks = [1=iat2targetcompatiblepractice; 2=iat2attributepractice; 3=iat2compatibletest1; 4=iat2compatibletestinstructions; 5=iat2compatibletest2; 6=iat2targetincompatiblepractice; 7=iat2incompatibletest1; 8=iat2incompatibletestinstructions; 9=iat2incompatibletest2; 10=iat2summary; 11=iat1targetcompatiblepractice; 12=iat1attributepractice; 13=iat1compatibletest1; 14=iat1compatibletestinstructions; 15=iat1compatibletest2; 16=iat1targetincompatiblepractice; 17=iat1incompatibletest1; 18=iat1incompatibletestinstructions; 19=iat1incompatibletest2; 20=iat1summary]
</expt>

The next expt element runs IAT1 first and IAT2 second, but incompatible pairings are used first, and incompatible pairings second.

<expt>
/ subjects = (3 of 4)
/ blocks = [1=iat1targetincompatiblepractice; 2=iat1attributepractice; 3=iat1incompatibletest1; 4=iat1incompatibletestinstructions; 5=iat1inccompatibletest2; 6=iat1targetcompatiblepractice; 7=iat1compatibletest1; 8=iat1compatibletestinstructions; 9=iat1compatibletest2; 10=iat1summary; 11=iat2targetincompatiblepractice; 12=iat2attributepractice; 13=iat2incompatibletest1; 14=iat2incompatibletestinstructions; 15=iat2incompatibletest2; 16=iat2targetcompatiblepractice; 17=iat2compatibletest1; 18=iat2compatibletestinstructions; 19=iat2compatibletest2; 20=iat2summary]
</expt>

Finally, the last expt element runs IAT2 first and IAT1 second, with incompatible pairings first, and incompatible pairings second.

<expt>
/ subjects = (4 of 4)
/ blocks = [1=iat2targetincompatiblepractice; 2=iat2attributepractice;

3=iat2incompatibletest1; 4=iat2incompatibletestinstructions; 5=iat2inccompatibletest2; 6=iat2targetcompatiblepractice; 7=iat2compatibletest1; 8=iat2compatibletestinstructions; 9=iat2compatibletest2; 10=iat2summary; 11=iat1targetincompatiblepractice; 12=iat1attributepractice; 13=iat1incompatibletest1; 14=iat1incompatibletestinstructions; 15=iat1incompatibletest2; 16=iat1targetcompatiblepractice; 17=iat1compatibletest1; 18=iat1compatibletestinstructions; 19=iat1compatibletest2; 20=iat1summary]
</expt>

Note the /subjects command in each <expt> element determines which conditions a participant is assigned to based on the subject number. Subjects 1, 5, 9, 13, etc are assigned to the first expt element, 2, 6, 10, 14, etc. to the second, 3, 7, 11, 15, etc. to the third, and 4, 8, 12, 16, etc. are assigned to the fourth expt element.

To run the script with Inquisit Lab, simply open the script containing the include element and select the Run command from the Experiment menu. To run it with Inquisit Web, register the script with the include element, and upoad the other two scripts to the server.

How to Interoperate Inquisit Web with Online Survey Packages

Inquisit has full-featured survey capabilities for administering questionnaires and surveys. In some cases, however, you may want to use Inquisit Web to administer a cognitive task in conjunction with surveys administered from online survey sites such as Survey Monkey, Unipark, Qualtrics, etc. This scenario is quite common among Inquisit users, and we've put some features in place to make the transition back and forth between Inquist and other packages as smooth as possible.

Integrating surveys and Inquisit tasks into a seamless and coherent user experience for participants is primarily accomplished by automatically redirecting participants back and forth between the different programs. Most survey packages allow you to forward participants to another web site after they've completed part or all of the survey. You need only specify the Inquisit launch page as your forwarding url, and your participants will be automatically redirected to the Inquisit portion of the study when the survey is complete.

Similarly, Inquisit allows you to specify a "Finish Page", where it will redirect participants after they've completed the Inquisit part of the experiment. Here you would specify the url to the survey page where you want participants to go next. Having done this, Inquisit will automatically send participants back to the survey once the reaction time task is complete.

Typically, however, you will need some way to map the survey data from each participant to their corresponding data collected with Inquisit. To accomplish this, you will need a unique subject id for each participant that is shared between Inquisit and the survey. This id must be recorded in both data sets so that responses from both packages can be mapped for each participant at data analysis time.

A simple way to accomplish this is to ask the participant to enter some identifier - for example, a preassigned number or an email address, at the beginning of the survey and the Inquisit session. When registering your Inquisit web script on millisecond.com, you can specify that subjects should provide the id in the registration wizard. Alternatively, you could add the question to the Inquisit script itself, and then specify that the response be recorded to the data file.

Another way to do this is to have your participants start in the survey web site, and use whatever method that survey offers for creating a unique identifier for each respondent. When the survey is finished, configure the survey package to forward each participant to the Inquisit launch page address, and to append the respondent's unique id to the url as query parameters. Query parameters are a standard mechanism for sharing data between different web sites, and many survey packages have this capability. Consult the support resources offered by your survey package for instructions on how to forward participants to a url with the subject id as a query parameter.

The following shows an example of a url to an Inquisit experiment with a query parameter at the end of it:

```
http://research.millisecond.com/sniffles/myexperiment.web?respo
ndentid=134
```

The url contains a single parameters named "respondentid", the values of which is "134".

Inquisit can be configured to handle any parameter name. You will have to configure your survey package to dynamically insert the appropriate id value for each participant.

To configure Inquisit to retrieve the subject id from the query parameter, simply run through the webscript registration wizard. When asked how to generate subject ids, select the "Query Parameter" option and specify the name of the parameter (in this case, the name is "respondentid"). That's it, Inquisit will now extract this subject number from the url and record it in the data file.

If you would would like to forward the participant back to the survey package at the end of the Inquisit session, simply specify the url to your survey as the Finish Page when running through the web script registration wizard. Below is an example Finish Page url that will return your subject to a survey hosted on "surveysrs".

```
http://www.surveysrus.com/coolsurvey/part2.html
```

There is no need to specify the subject id in the Finish Page url. Inquisit will automatically append the id using the same query parameter that it found when the subject arrived at the Inquisit launch page. To continue with the above examples, the actual Finish Page url would be:

```
http://www.surveysrus.com/coolsurvey/part2.html?respondentid=13
4
```

Your survey package can then retrieve the value of this query parameter to identify which subject is returning to the survey. Now the survey package can pick up where it left off with this participant.

Introducing Inquisit 4 Web

Inquisit 4 Web extends the power and flexibility of the Inquisit 4 experiment engine to the web. With Inquisit Web, your experiments can be launched directly from a web page without having to manually install Inquisit on the client machine. Data gathered from the web can be saved back to a web site, ftp site, network share, or even an email address.

What are the benefits of Inquisit 4 Web?

Unlimited client licenses. With Inquisit Web, Inquisit experiments can be run on an unlimited number of client machines. This makes Inquisit Web an ideal tool for large scale data collection in laboratories, class rooms, or over the Internet.

Easy web deployment. Inquisit Web allows you to launch your experiments directly from a web page. The Inquisit Web engine is packaged both as an ActiveX control and a Mozilla Plugin that is automatically downloaded by Internet Explorer and Mozilla browsers like Firefox and Netscape respectively. Starting an experiment with Inquisit Web is as easy as browsing to a web page.

Power, flexibility, and accurate timing. The Inquisit Web engine affords the same power, flexibility, and timing accuracy as the Inquisit Lab engine. How is that possible? Because the Inquisit Web engine *is* the Lab engine. Literally. We've just repackaged it in a way that makes it easy to deploy over the web.

Compatible with Inquisit 4 Lab. Your Inquisit 4 scripts will run interchangeably between the lab and web engines. There is no need to maintain and test multiple versions of your scripts.

How does the Inquisit 4 Web work?

When you purchase a web license, we will create an account on millisecond.com where can login and use the online tools to upload and register experiments. Once you've registered an experiment, you will have a launch page on millisecond.com where you can direct participants. On the launch page, they can click a link to start the experiment. They will have to agree to download Inquisit Web, after which the experiment will start. Inquisit Web download all materials required to run the study at the very beginning, then runs the experiment locally on the participant's computer, and uploads the data at the end. Inquisit thus only requires the network prior to and after the experiment runs, but it does not rely on the network as the experiment is running.

You can see what the experience of launching an Inquisit Web study yourself by running any of the demos in the Inquisit Task Library.

How does licensing work with Inquisit 4 Web?

Unlike Inquisit Lab, Inquisit Web is not licensed based on the number of client computers that install and run Inquisit experiments. In fact, an Inquisit Web license entitles you to run Inquisit experiments on an unlimited number of client computers.

Inquisit Web licenses determine the number of experiments that can be run at a given point in time. An Inquisit Web license entitles you to run a single web experiment (as defined by a single Inquisit script). If you wish to run one web experiment at a time, you would only need a single Inquisit Web license. If you wish to collect data for five different experiments in parallel, you would need five Inquisit Web licenses.

Inquisit Web enforces the licensing policy at run time by checking whether the experiment it has been instructed to run is listed as an active experiment for the specified user account. If the experiment is active, the experiment runs as normal. If the experiment is not active, it can optionally be run, but no data will be collected. You may change your list of active experiments as often as you'd like. However, the number of active experiment you may specify is limited to the number of Inquisit Web licenses held by your account. Importantly, this means that Inquisit Web must be able to connect to www.millisecond.com from the client computer in order to collect data. *Inquisit Web can not be used to collect data on machines that are not connected to the Internet.*

What are the machine requirements for Inquisit 4 Web?

The client must be running Windows XP or later, or Mac OSX 10.5 or later. Sorry, no support for Linux.

The client must have a working Internet connection.

The client must be running an reasonably recent version of Chrome, Firefox, Internet Explorer, or Safari.

Where can I get Inquisit 4 Web?

To use Inquisit 4 Web, you must purchase a web license. This will enable you to login to your account on millisecond.com, where you can use our online tools for uploading experiments and accessing your data.

Introducing Inquisit 4 Web

Inquisit 4 Web extends the power and flexibility of the Inquisit 4 experiment engine to the web. With Inquisit Web, your experiments can be launched directly from a web page without having to manually install Inquisit on the client machine. Data gathered from the web can be saved back to a web site, ftp site, network share, or even an email address.

What are the benefits of Inquisit 4 Web?

Unlimited client licenses. With Inquisit Web, Inquisit experiments can be run on an unlimited number of client machines. This makes Inquisit Web an ideal tool for large scale data collection in laboratories, class rooms, or over the Internet.

Easy web deployment. Inquisit Web allows you to launch your experiments directly from a web page. The Inquisit Web engine is packaged both as an ActiveX control and a Mozilla Plugin that is automatically downloaded by Internet Explorer and Mozilla browsers like Firefox and Netscape respectively. Starting an experiment with Inquisit Web is as easy as browsing to a web page.

Power, flexibility, and accurate timing. The Inquisit Web engine affords the same power, flexibility, and timing accuracy as the Inquisit Lab engine. How is that possible? Because the Inquisit Web engine *is* the Lab engine. Literally. We've just repackaged it in a way that makes it easy to deploy over the web.

Compatible with Inquisit 4 Lab. Your Inquisit 4 scripts will run interchangeably between the lab and web engines. There is no need to maintain and test multiple versions of your scripts.

How does the Inquisit 4 Web work?

When you purchase a web license, we will create an account on millisecond.com where can login and use the online tools to upload and register experiments. Once you've registered an experiment, you will have a launch page on millisecond.com where you can direct participants. On the launch page, they can click a link to start the experiment. They will have to agree to download Inquisit Web, after which the experiment will start. Inquisit Web download all materials required to run the study at the very beginning, then runs the experiment locally on the participant's computer, and uploads the data at the end. Inquisit thus only requires the network prior to and after the experiment runs, but it does not rely on the network as the experiment is running.

You can see what the experience of launching an Inquisit Web study yourself by running any of the demos in the Inquisit Task Library.

How does licensing work with Inquisit 4 Web?

Unlike Inquisit Lab, Inquisit Web is not licensed based on the number of client computers that install and run Inquisit experiments. In fact, an Inquisit Web license entitles you to run Inquisit experiments on an unlimited number of client computers.

Inquisit Web licenses determine the number of experiments that can be run at a given point in time. An Inquisit Web license entitles you to run a single web experiment (as defined by a single Inquisit script). If you wish to run one web experiment at a time, you would only need a single Inquisit Web license. If you wish to collect data for five different experiments in parallel, you would need five Inquisit Web licenses.

Inquisit Web enforces the licensing policy at run time by checking whether the experiment it has been instructed to run is listed as an active experiment for the specified user account. If the experiment is active, the experiment runs as normal. If the experiment is not active, it can optionally be run, but no data will be collected. You may change your list of active experiments as often as you'd like. However, the number of active experiment you may specify is limited to the number of Inquisit Web licenses held by your account. Importantly, this means that Inquisit Web must be able to connect to www.millisecond.com from the client computer in order to collect data. *Inquisit Web can not be used to collect data on machines that are not connected to the Internet.*

What are the machine requirements for Inquisit 4 Web?

The client must be running Windows XP or later, or Mac OSX 10.5 or later. Sorry, no support for Linux.

The client must have a working Internet connection.

The client must be running an reasonably recent version of Chrome, Firefox, Internet Explorer, or Safari.

Where can I get Inquisit 4 Web?

To use Inquisit 4 Web, you must purchase a web license. This will enable you to login to your account on millisecond.com, where you can use our online tools for uploading experiments and accessing your data.

How to Run an Inquisit 4 Experiment on the Web

Inquisit 4 Web allows you to launch your experiments directly from a web page. If you have purchased a web license, you have the option of launching expeirments from your own web site or from the millisecond.com web site. In either case, data are saved by default to the millisecond.com data service where you can login and download the data files.

If you haven't yet purchased a web license, you can still evaluate Inquisit 4 Web by setting up an experiment on your own web server. When evaluating Inquisit, you can launch and run scripts as normal, but the data will not be saved.

Click here for more information on registering Inquisit 4 Lab. Click here for more information on registering Inquisit 4 Web.

Publishing Inquisit scripts on millisecond.com

Hosting your scripts on millisecond.com is the easiest option for those without experience creating and administering web sites. For those with basic web development skills, this option also includes some support for customizing the launch web page and subject number assignment method. To publish a script on millisecond.com:

1. Write and test your Inquisit script using the Inquisit 4 Lab editor and tools.
2. Open your web browser and navigate to the millisecond.com web site.
3. Select "My Account" from the menu and click the "Register Inquisit Web Scripts" menu item. If you are not already logged into the site, you will be prompted for your user name and password.
4. Under the "Register Web Scripts" section, click the "Register New Script" link. This will launch the Inquisit Web Script Wizard
5. The first page of the wizard asks whether you wish to host the experiment on millisecond.com or on your own web server. Select the millisecond.com option. The click the "Browse..." button and select your script file from your local computer. Click next once you have specified the script file.
6. On the next page you can upload additional files used by the script such as pictures and video.
7. Next, select whether you wish to use Inquisit's automatically generated launch page or your own custom web page. The subsequent steps in the wizard allow you specify the title, instructions, and how subject id numbers should be generated and assigned to subjects.
8. When you are done, click the Finish button. That's it, your experiment is now online. You can browse to the launch page using the following url:

   http://research.millisecond.com/[username]/[scriptfilename].web

   where [username] is your user id and [scriptfilename] is the original filename of your script.
9. Click the "Start" link to launch your experiment.

Publishing Inquisit scripts on your own web server

Hosting experiments on your own server is an easy if you have access to a web server. To deploy an Inquisit experiment to your web server, follow these steps:

1. Write and test your Inquisit script using the Inquisit 4 Lab editor and tools, or download a script from the Inquisit Task Library .

2. Navigate to your web scripts page at http://www.millisecond.com/myaccount/webscripts.aspx.
3. If the status of your web license is "pending", start your web license by clicking the "Start Now" link.
4. Click the "Register New Script" link to launch the registration wizard and follow the steps in the wizard.
5. On the first page of the wizard, select the option to host the experiment on your own server, and enter the full url to the script file on your server.
6. Continue through the wizard specifying the options you'd like for the launch page.
7. On the final Summary page of the wizard, click the "Download Launch Page" button and save the html page to your computer. Then click the Finish button.
8. Upload your script file and the launch page created above to the location on your web server that you specified when registering the script. If you script uses picture or other media files, be sure to upload those as well.
9. Direct participants to the launch web page to start the experiment.

Gathering Data Over the Web

Inquisit 4 enables you send data from the desktop machine running the experiment to a remote server on the network. The ability to save data to a remote server is critical for experiments conducted over the web because the experimenter often does not have access to the participant's computer to retrieve any locally saved data files. The feature can also be used with Inquisit Lab, for example, in cases where it is more convenient to save the data to a single location rather than having to copy the data files from multiple computers in a classroom or lab.

There are several options for saving data to a remote server.

1. Save the data to the millisecond.com web server where the experimenter can login and download the files.
2. Send the data to a web server via HTTP POST
3. Send the data to an FTP server
4. Save the data to a shared network (UNC) folder

Of couse, it is also possible for both web and lab experiments to save the data to the local machine in cases where the experiment is run on lab or classroom computers.

Option 1 (saving the data to millisecond.com) is the default behavior of Inquisit Web, and it is by far the most reliable and easiest solution. To protect against snoopers and sniffers, data is encrypted and posted back to millisecond.com using Secure Sockets Layer (SSL), the same technology used by online shopping and banking web sites to protect sensitive information transmitted over the web. Each participant's data is saved to the server is a separate file. The experimenter can login and download the files from the millisecond.com web site. Again, the downloaded files are encrypted over the network using SSL.

While option 1 is appropriate for the vast majority of experimenters, in some cases it may be necessary or desirable to leverage some of the other remote data features of Inquisit. The means by which data is saved to a server is controlled by the following attributes on the data element.

```
<data>
/ encrypt = true | false
/ file = "file path"
/ password = "password"
/ userid = "userid"
</data>
```

Encrypt specifies whether Inquisit should first encrypt the data before being sending it back to the server. If the data is being saved over SSL, this command can be set to "false" since the data will be encrypted using standard web protocols. If SSL is not an option, this command should be set to "true" to obfuscate potentially sensitive data from being compromised by hackers and packet sniffers as it travels over the network. Encrypted data files are saved with the "inq" extension. Unencrypted data files have the "dat" extenstion.

The *file* attribute specifies the location to which the data is saved. This can be any of the following:

- *Http or https address* (e.g., https://www.millisecond.com/). Inquisit uses the HTTP POST protocol to send the data back to the web server. Most web development technologies (PHP, ASP, ASP.NET, JSP) have easy to use methods for extracting data that has been posted to the server.
- *Ftp address* (e.g., ftp://www.millisecond.com/mydata/). Inquisit uses the standard

FTP protocol to save files to a folder on an ftp server.

- *Unc path* (e.g., \\millisecond\mydata\). If you are running the experiment inside a LAN, you can save the data to a writeable network share.
- *Local path* (e.g., c:\inquisit\mydata\). Inquisit saves the data to the specified path on the client computer.

If you specify a folder with no file name, Inquisit will default the file name to that of the script file. Otherwise, it will use the specified file name. So as not to overwrite other data files on the server, Inquisit also appends the date and time (to the nearest millisecond) to the file name along with the "dat" or "inq" file extension depending whether encryption is turned on.

The *userid* and *password* attributes allows you to specify login credentials to use when accessing the web, ftp, or unc. It is not necessary to specify the userid or password when saving the data to millisecond.com.

When saving data to a remote server, Inquisit creates separate data files for each run of the script as opposed to appending the data to a single file as it does in the case of saving to a local folder. This is to avoid potential collisions that might occur when multiple clients attempt to save to the server at the same time. You can combine multiple data files into a single file by selecting the "Open" command on Inquisit's file menu and multi-selecting all of the files you wish to combine. Inquisit will open all of the selected files, appending them together. You can then select the "Save As" command on Inquisit's File menu to save the combined data into a single file.

Note that data collection capabilities of both Inquisit Web and Inquisit Lab are disabled unless a license has been purchased.

Assigning Subject Numbers in Web Experiments

Subject numbers play a number of important roles in experiments. In longitudinal studies, they can be used to correlate data gathered from a subject at different times. For experiments with between-subject variables, subject numbers play a critical role in assigning participants into particular conditions. By using identification numbers such as student ids or telephone numbers, the subject number can also allow researchers to identify participants in cases where the research makes that necessary.

For traditional lab research, managing subject numbers with Inquisit is straightforward. The experimenter starts the Inquisit script and either enters the subject number herself, or she instructs the participant to enter the number. With web research, participants may be located anywhere in the world, in which case there is no experimenter overseeing the data collection session who can assign the appropriate subject number. In these cases, it is necessary to devise a system in which either participants can specify the number themselves, or the number is automatically assigned by the web site. This article will discuss several strategies for assigning subject numbers to web participants.

Subject numbers for between-subject variables

One of the most common uses of subject numbers by Inquisit is to assign subjects into a particular cell of a between-subjects variable. Subject numbers are mapped to conditions within the Inquisit script itself, either by the expt or the variables element. For example, in Figure 1 below the script uses the expt element to counterbalance the order of two blocks across even and odd numbered subjects:

Figure 1.

```
<expt>
/ subjects = (1 of 2)
/ blocks = [1=conditiona; 2=conditionb]
</expt>

<expt>
/ subjects = (2 of 2)
/ blocks = [1=conditionb; 2=conditiona]
</expt>
```

In most cases, the researcher wants to ensure that subjects are randomly assigned into the even or odd numbered group, and they want equal numbers of subjects in each condition.

Subject number assignment for scripts hosted on millisecond.com

If you choose to host your script on the millisecond.com server, there are several options for generating subject numbers that you can choose from: random generation, random generation without replacement, sequential, user entered, and user entered with confirmation prompt. You simply choose which option you want when running the Script Registration Wizard. There's no need to understand the technical details of how these work.

Subject number assignment for scripts hosted on other servers

If you are hosting the script on your own server, you can select from 3 different sample pages to use as a starting point for your launch page. The sample pages are all linked to from here: http://www.millisecond.com/web/samplelaunch.aspx.

Random Assignment of Subject Numbers

The first sample page shows random generation of subject nunbers, which is the simplest way to achieve a random, approximately even distribution of subjects into different conditions. Let's take a look at how the reference page randomly assigns subject numbers. (You can see this first hand by browsing to the page and viewing the underlying source.) The first thing to note is the following section of JavaScript at the top of the page source:

In the source code for the page is a javascript method called "GetSubjectNumber" that is responsible for generating the subject number. For random generation, the method looks like this:

Figure 2.

```
function GetSubjectNumber()
{
   return (Math.floor(Math.random() * 1000000000));
}
```

The method contains a single line of code does the work of randomly generating the subject number. The function uses the javascrip method , `Math.random()`, to generate a random number from 0 to 1, then multiples that value by 1,000,000,000 and rounds it down to the nearest integer so that the final result is a random number between 1 and 1,000,000,000. Note that we are selecting numbers with replacement, so it is theoretically possible that two participants might be assigned the same subject number. However, the chances are slim indeed, and if it does happen, you can use the time of the session as logged in the "date" and "time" data columns to distinguish the subjects' data.

Prompting participants to enter a subject number

For some experiments, it may be necessary or convenient to use personal identification such as a telephone number, social security number, or student id as the subject number rather than an arbitrary, randomly generated number. To administer this kind of experiment over the web, the participant must be allowed to input their id number so that it can be recorded along with the data. The second option allow you to prompt the participant to enter an id number. The third option has the subject enter the number twice to avoid keying errors.

Let's take a look at the javascript for the third option, which is the more complicated method. In this case, the GetSubjectNumber() method contains the following javascript code, which prompts the subject to enter a 5 digit number, then prompts again to confirm the number, and provides error feedback if the number is invalid or they don't match.

Figure 3.

```
function GetSubjectNumber()
{
// This method prompts the subject for an id number and then
prompts
    again to // confirm in order avoid mistyped numbers.

var intRegExp = /(^\d{5,5}$)/;
var promptMsg = "Please enter a 5 digit id number.";
var confirmMsg = "Please confirm the number you entered.";
var invalidMsg = "The number was invalid. Please enter a valid
number.";
var matchMsg = "The numbers you entered did not match. Please
```

```
enter the number again.";

var snum = window.prompt(promptMsg, "");

while ( snum != null && intRegExp.test(snum) == false )
{
// if the input was invalid, prompt again
    window.alert(invalidMsg);
    snum = window.prompt(promptMsg, "");
}

if ( snum == null )
{
    return null;
}

var sconfirm = window.prompt(confirmMsg, "");
while ( sconfirm != null && (sconfirm != snum ||
intRegExp.test(sconfirm) == false) )
{
    // if the input was invalid, prompt again
    if ( intRegExp.test(sconfirm) == false)
    {
        window.alert(invalidMsg);
    }

    // if the numbers do not match, alert the user and bail out
so
        they can start over
    else if ( sconfirm != snum )
    {
        window.alert(matchMsg);
        return null;
    }

    sconfirm = window.prompt(confirmMsg, "");
}

return sconfirm;

}
```

The validation is done through the regular expression in the first line of code. You can change the validation by replacing the regular expression (which only verifies that the input is numeric and 5 digits long) with your own. If you don't understand regular expressions, don't worry, the web is abundant with ready made regular expressions for validating all kinds of input (integers, zip codes, telephone numbers, etc.). I found this one in seconds through Google.

Customized subject number generation

If you wish to use your own method for generating subject numbers, you can do so simply by editing the GetSubjectNumber() method in the source code. Remember, this javascript code runs on the participant's machine, not on the server, so it has no way to keep track of

which subject numbers have already been assigned. For that, you would have to program some server code that tracks subject numbers in a database, then dynamically injects the subject number into this web page, and in particular, into the GetSubjectNumber(). If you host your scripts on millisecond.com, this is how the hosting service is able to generate sequential subject numbers and random selection without replacement.

These are just a few of the strategies for assigning subject numbers on the web. They are by no means the only techniques possible. Other strategies include deriving subject numbers from the date and time, the ip address of the client computer, or the session id. For those with some familiarity with web development, the web is an flexible and open programming environment that makes any number of schemes possible.

caption element

The caption element defines a survey item consisting of just a caption and subcaption.

Syntax

```
<caption captionname>
/ caption = "text"
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ position = (x expression, y expression)
/ size = (width expression, height expression)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
</caption>
```

Properties

caption.captionname.caption
caption.captionname.fontheight
caption.captionname.height
caption.captionname.hposition
caption.captionname.name
caption.captionname.subcaption
caption.captionname.subcaptionfontheight
caption.captionname.typename
caption.captionname.vposition
caption.captionname.width

Functions

None.

Remarks

The caption element allows you to insert additional text and instructions into a survey that do not require a response from participants.

Examples

The following caption item displays a caption and subcaption.

```
<caption q1>
/ caption="Remember to tell the experimenter when you are
finished with the survey"
/ subcaption="(The experimenter is sitting in the adjacent
room.)"
</caption>
```

Send comments on this topic:

checkboxes element

The checkboxes element defines a survey item that allows respondents to check off one or more options.

Syntax

```
<checkboxes checkboxesname>
/ caption = "text"
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ options = ("label", "label", "label", ...)
/ optionvalues = ("value", "value", "value", ...)
/ order = order mode
/ orientation = layout
/ other = "caption" or textbox
/ position = (x expression, y expression)
/ range = (minimum, maximum)
/ required = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ size = (width expression, height expression)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ txcolor = (red expression, green expression, blue expression)
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</checkboxes>
```

Properties

checkboxes.checkboxesname.caption
checkboxes.checkboxesname.fontheight
checkboxes.checkboxesname.height
checkboxes.checkboxesname.hposition
checkboxes.checkboxesname.maxvalue
checkboxes.checkboxesname.minvalue
checkboxes.checkboxesname.name
checkboxes.checkboxesname.required
checkboxes.checkboxesname.response
checkboxes.checkboxesname.responsefontheight

checkboxes.checkboxesname.selected
checkboxes.checkboxesname.selectedcount
checkboxes.checkboxesname.subcaption
checkboxes.checkboxesname.subcaptionfontheight
checkboxes.checkboxesname.typename
checkboxes.checkboxesname.vposition
checkboxes.checkboxesname.width
checkboxes.checkboxesname.width

Functions

None.

Remarks

Checkboxes are useful for questions in which the respondent may choose more than one option.

Examples

The following checkbox item requires the respondent to select at least one option.

```
<checkboxes q1>
/ caption="Pick one or more of the following numbers:"
/ required = true
/ options=("one", "eight", "seventy-two")
</checkboxes>
```

Send comments on this topic:

dropdown element

The dropdown element defines a survey item in which respondents select an option from a dropdown list.

Syntax

```
<dropdown dropdownname>
/ caption = "text"
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ listsize = (width, height)
/ options = ("label", "label", "label", ...)
/ optionvalues = ("value", "value", "value", ...)
/ order = order mode
/ orientation = layout
/ position = (x expression, y expression)
/ required = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ size = (width expression, height expression)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ txcolor = (red expression, green expression, blue expression)
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</dropdown>
```

Properties

dropdown.dropdownname.caption
dropdown.dropdownname.fontheight
dropdown.dropdownname.height
dropdown.dropdownname.hposition
dropdown.dropdownname.listheight
dropdown.dropdownname.listwidth
dropdown.dropdownname.name
dropdown.dropdownname.option
dropdown.dropdownname.optionvalue
dropdown.dropdownname.required
dropdown.dropdownname.response

dropdown.dropdownname.responsefontheight
dropdown.dropdownname.selected
dropdown.dropdownname.selectedcaption
dropdown.dropdownname.selectedcount
dropdown.dropdownname.selectedvalue
dropdown.dropdownname.subcaption
dropdown.dropdownname.subcaptionfontheight
dropdown.dropdownname.typename
dropdown.dropdownname.vposition
dropdown.dropdownname.width
dropdown.dropdownname.width

Functions

None.

Remarks

Dropdowns provide a space efficient user interface for selecting from mutually exclusive options.

Examples

The following dropdown item requires the respondent to select at least one option.

```
<dropdown q1>
/ caption="Who was the first president of the United States:"
/ options=("George Washington", "Abraham Lincoln", "Thomas
Jefferson")
/ required=true
</dropdown>
```

Send comments on this topic:

image element

The image element defines a survey item that presents a captioned image.

Syntax

```
<image imagename>
/ caption = "text"
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ imagesize = (width, height)
/ items = itemname or ("item", "item", "item",... )
/ position = (x expression, y expression)
/ size = (width expression, height expression)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
</image>
```

Properties

image.imagename.caption
image.imagename.fontheight
image.imagename.height
image.imagename.hposition
image.imagename.imageheight
image.imagename.imagewidth
image.imagename.name
image.imagename.subcaption
image.imagename.subcaptionfontheight
image.imagename.typename
image.imagename.vposition
image.imagename.width

Functions

None.

Remarks

The image element allows you to insert an image into a survey that does not require a response from participants.

Examples

The following image item displays a picture of a logo and a caption.

```
<image q1>
/ caption="Logo for Brand X"
```

```
/ items=("logox.jpg")
</image>
```

Send comments on this topic:

listbox element

The listbox element defines a survey item in which respondents select an option from a list.

Syntax

```
<listbox listboxname>
/ caption = "text"
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ listsize = (width, height)
/ options = ("label", "label", "label", ...)
/ optionvalues = ("value", "value", "value", ...)
/ order = order mode
/ orientation = layout
/ position = (x expression, y expression)
/ required = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ size = (width expression, height expression)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ txcolor = (red expression, green expression, blue expression)
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</listbox>
```

Properties

listbox.listboxname.caption
listbox.listboxname.fontheight
listbox.listboxname.height
listbox.listboxname.hposition
listbox.listboxname.listheight
listbox.listboxname.listwidth
listbox.listboxname.name
listbox.listboxname.option
listbox.listboxname.optionvalue
listbox.listboxname.required
listbox.listboxname.response
listbox.listboxname.responsefontheight

listbox.listboxname.selected
listbox.listboxname.selectedcaption
listbox.listboxname.selectedcount
listbox.listboxname.selectedvalue
listbox.listboxname.subcaption
listbox.listboxname.subcaptionfontheight
listbox.listboxname.typename
listbox.listboxname.vposition
listbox.listboxname.width
listbox.listboxname.width

Functions

None.

Remarks

Examples

The following listbox item requires the respondent to select at least one option.

```
<listbox q1>
/ caption="Who was the first president of the United States:"
/ options=("George Washington", "Abraham Lincoln", "Thomas
Jefferson")
/ required=true
</listbox>
```

Send comments on this topic:

radiobuttons element

The radiobuttons element defines a survey item in which respondents select from a list of mutually exclusive options.

Syntax

```
<radiobuttons radiobuttonsname>
/ caption = "text"
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ options = ("label", "label", "label", ...)
/ optionvalues = ("value", "value", "value", ...)
/ order = order mode
/ orientation = layout
/ other = "caption" or textbox
/ position = (x expression, y expression)
/ required = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ size = (width expression, height expression)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ txcolor = (red expression, green expression, blue expression)
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</radiobuttons>
```

Properties

radiobuttons.radiobuttonsname.selectedcaption
radiobuttons.radiobuttonsname.selectedcount
radiobuttons.radiobuttonsname.selectedvalue
radiobuttons.radiobuttonsname.subcaption
radiobuttons.radiobuttonsname.subcaptionfontheight
radiobuttons.radiobuttonsname.typename
radiobuttons.radiobuttonsname.vposition
radiobuttons.radiobuttonsname.width
radiobuttons.radiobuttonsname.width

Functions

None.

Remarks

Examples

The following radiobuttons item requires the respondent to select at least one option.

```
<radiobuttons q1>
/ caption="Who was the first president of the United States:"
/ options=("George Washington", "Abraham Lincoln", "Thomas
Jefferson")
/ required=true
</radiobuttons>
```

Send comments on this topic:

slider element

The slider element defines a survey item in which responses are made by sliding a thumb control along a continuous line.

Syntax

```
<slider slidername>
/ caption = "text"
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ increment = integer
/ labels = ("label", "label", "label", ...)
/ orientation = layout
/ position = (x expression, y expression)
/ range = (minimum, maximum)
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ showticks = boolean
/ showtooltips = boolean
/ size = (width expression, height expression)
/ slidersize = (width, height)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ txcolor = (red expression, green expression, blue expression)
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</slider>
```

Properties

slider.slidername.caption
slider.slidername.fontheight
slider.slidername.height
slider.slidername.hposition
slider.slidername.name
slider.slidername.response
slider.slidername.responsefontheight
slider.slidername.sliderheight
slider.slidername.sliderwidth
slider.slidername.subcaption

slider.slidername.subcaptionfontheight
slider.slidername.typename
slider.slidername.vposition
slider.slidername.width

Functions

None.

Remarks

Examples

The following slider item asks the respondent to rate their feelings from cold to hot.

```
<slider q1>
/ caption="How do you feel about bananas?"
/ labels=("Cold", "Hot")
/ range = (0, 100)
/ increment = 1
</slider>
```

survey element

The survey element defines a sequence of one or more pages containing question and response items.

Syntax

```
<survey surveyname>
/ backbuttonposition = (x expression, y expression)
/ backlabel = "label"
/ branch = [if expression then event]
/ file = "location"
/ encrypt = true("password") or false
/ finishlabel = "label"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ itemfontstyle = ("face name", height, bold, italic, underline
, strikeout, quality)
/ itemspacing = height or expression
/ navigationbuttonfontstyle = ("face name", height, bold,
italic, underline, strikeout, quality, character set)
/ navigationbuttonsize = (width, height)
/ nextbuttonposition = (x expression, y expression)
/ nextlabel = "label"
/ nextlabel = "label"
/ onblockbegin = [expression; expression; expression; ...]
/ onblockend = [expression; expression; expression; ...]
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ orientation = layout
/ pages = [pagenumber, pagenumber = pagename; pagenumber-
pagenumber = selectmode(pagename, pagename,...); pagenumber,
pagenumber-pagenumber = pagename]
/ password = "string"
/ recorddata = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ screencolor = (red expression, green expression, blue
expression)
/ showbackbutton = boolean
/ showpagenumbers = boolean
/ showquestionnumbers = boolean
/ skip = [expression; expression; expression; ...]
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ timeout = integer expression
/ txcolor = (red expression, green expression, blue expression)
/ userid = "string"
```

```
</survey>
```

Properties

survey.surveyname.backlabel
survey.surveyname.correct
survey.surveyname.correct
survey.surveyname.correctcount
survey.surveyname.correctcount
survey.surveyname.correctstreak
survey.surveyname.correctstreak
survey.surveyname.count
survey.surveyname.count
survey.surveyname.currentblocknumber
survey.surveyname.currentpagenumber
survey.surveyname.currentquestionnumber
survey.surveyname.currenttrialnumber
survey.surveyname.elapsedtime
survey.surveyname.error
survey.surveyname.errorcount
survey.surveyname.errorstreak
survey.surveyname.finishlabel
survey.surveyname.fontheight
survey.surveyname.inwindow
survey.surveyname.inwindow
survey.surveyname.itemfontheight
survey.surveyname.itemspacing
survey.surveyname.latency
survey.surveyname.latency
survey.surveyname.leftmargin
survey.surveyname.maxlatency
survey.surveyname.maxlatency
survey.surveyname.meanlatency
survey.surveyname.meanlatency
survey.surveyname.medianlatency
survey.surveyname.medianlatency
survey.surveyname.minlatency
survey.surveyname.minlatency
survey.surveyname.name
survey.surveyname.name
survey.surveyname.navigationbuttonheight
survey.surveyname.navigationbuttonwidth
survey.surveyname.next
survey.surveyname.next
survey.surveyname.nextlabel
survey.surveyname.numinwindow
survey.surveyname.numinwindow
survey.surveyname.pagefontheight
survey.surveyname.percentcorrect
survey.surveyname.percentcorrect
survey.surveyname.percentinwindow
survey.surveyname.percentinwindow
survey.surveyname.recorddata

survey.surveyname.response
survey.surveyname.responsefontheight
survey.surveyname.rightmargin
survey.surveyname.screencolorblue
survey.surveyname.screencolorblue
survey.surveyname.screencolorgreen
survey.surveyname.screencolorgreen
survey.surveyname.screencolorred
survey.surveyname.screencolorred
survey.surveyname.sdlatency
survey.surveyname.showbackbutton
survey.surveyname.showpagenumbers
survey.surveyname.showquestionnumbers
survey.surveyname.subcaptionfontheight
survey.surveyname.sumlatency
survey.surveyname.topmargin
survey.surveyname.totalcorrectcount
survey.surveyname.totalcount
survey.surveyname.totalerrorcount
survey.surveyname.totalmaxlatency
survey.surveyname.totalmeanlatency
survey.surveyname.totalmedianlatency
survey.surveyname.totalminlatency
survey.surveyname.totalnuminwindow
survey.surveyname.totalpercentcorrect
survey.surveyname.totalpercentinwindow
survey.surveyname.totalsdlatency
survey.surveyname.totalsumlatency
survey.surveyname.totaltrialcount
survey.surveyname.totalvarlatency
survey.surveyname.trialcount
survey.surveyname.trialscount
survey.surveyname.trialscount
survey.surveyname.typename
survey.surveyname.typename
survey.surveyname.varlatency

Functions

None.

Remarks

Examples

The following survey contains 3 pages and allows forward navigation only.

```
<survey customersat>
/ pages=[1=page1; 2=page2; 3=page3]
/ showbackbutton=false
/ finishlabel = "Thank you!"
/ screencolor = white
</survey>
```

Send comments on this topic:

surveypage element

The surveypage element presents a page of survey questions.

Syntax

```
<surveypage surveypagename>
/ backbuttonposition = (x expression, y expression)
/ backlabel = "label"
/ branch = [if expression then event]
/ caption = "text"
/ finishlabel = "label"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ inputmask = "bit mask"
/ iscorrectresponse = [expression; expression; expression; ...]
/ isvalidresponse = [expression; expression; expression; ...]
/ itemfontstyle = ("face name", height, bold, italic, underline
, strikeout, quality)
/ itemspacing = height or expression
/ navigationbuttonfontstyle = ("face name", height, bold,
italic, underline, strikeout, quality, character set)
/ navigationbuttonsize = (width, height)
/ nextbuttonposition = (x expression, y expression)
/ nextlabel = "label"
/ numframes = integer
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ orientation = layout
/ posttrialpause = integer expression
/ posttrialsignal = (modality, signal)
/ pretrialpause = integer expression
/ pretrialsignal = (modality, signal)
/ questions = [questionnumber, questionnumber = questionname;
questionnumber-questionnumber = selectmode(questionname,
questionname,...); questionnumber, questionnumber-
questionnumber = questionname]
/ recorddata = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ showbackbutton = boolean
/ showpagenumbers = boolean
/ showquestionnumbers = boolean
/ stimulusframes = [framenumber = stimulusname, stimulusname,
...; framenumber = stimulusname, ...] or [framenumber =
list.name] or [framenumber = selectionmode(stimulusname,
stimulusname, stimulusname, ...)]
/ stimulustimes = [time = stimulusname, stimulusname, ...; time
```

```
= stimulusname, ...] or [time = list.name] or [time =
selectionmode(stimulusname, stimulusname, stimulusname, ...)]
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ timeout = integer expression
/ trialcode = "string"
/ txcolor = (red expression, green expression, blue expression)
</surveypage>
```

Properties

surveypage.surveypagename.backlabel
surveypage.surveypagename.caption
surveypage.surveypagename.correct
surveypage.surveypagename.correctcount
surveypage.surveypagename.correctstreak
surveypage.surveypagename.count
surveypage.surveypagename.currentquestionnumber
surveypage.surveypagename.error
surveypage.surveypagename.errorcount
surveypage.surveypagename.errorstreak
surveypage.surveypagename.finishlabel
surveypage.surveypagename.fontheight
surveypage.surveypagename.inputmask
surveypage.surveypagename.inwindow
surveypage.surveypagename.itemfontheight
surveypage.surveypagename.itemspacing
surveypage.surveypagename.latency
surveypage.surveypagename.leftmargin
surveypage.surveypagename.maxlatency
surveypage.surveypagename.meanlatency
surveypage.surveypagename.medianlatency
surveypage.surveypagename.minlatency
surveypage.surveypagename.name
surveypage.surveypagename.navigationbuttonheight
surveypage.surveypagename.navigationbuttonwidth
surveypage.surveypagename.nextlabel
surveypage.surveypagename.numinwindow
surveypage.surveypagename.percentcorrect
surveypage.surveypagename.percentinwindow
surveypage.surveypagename.posttrialpause
surveypage.surveypagename.pretrialpause
surveypage.surveypagename.response
surveypage.surveypagename.responsefontheight
surveypage.surveypagename.rightmargin
surveypage.surveypagename.sdlatency
surveypage.surveypagename.showbackbutton
surveypage.surveypagename.showpagenumbers
surveypage.surveypagename.showquestionnumbers
surveypage.surveypagename.subcaption
surveypage.surveypagename.subcaptionfontheight

surveypage.surveypagename.sumlatency
surveypage.surveypagename.topmargin
surveypage.surveypagename.totalcorrectcount
surveypage.surveypagename.totalcount
surveypage.surveypagename.totalerrorcount
surveypage.surveypagename.totalmaxlatency
surveypage.surveypagename.totalmeanlatency
surveypage.surveypagename.totalmedianlatency
surveypage.surveypagename.totalminlatency
surveypage.surveypagename.totalnuminwindow
surveypage.surveypagename.totalpercentcorrect
surveypage.surveypagename.totalpercentinwindow
surveypage.surveypagename.totalsdlatency
surveypage.surveypagename.totalsumlatency
surveypage.surveypagename.totaltrialcount
surveypage.surveypagename.totalvarlatency
surveypage.surveypagename.trialcode
surveypage.surveypagename.trialcount
surveypage.surveypagename.trialduration
surveypage.surveypagename.typename
surveypage.surveypagename.varlatency

Functions

surveypage.surveypagename.clearstimulusframes
surveypage.surveypagename.getstimulusframe
surveypage.surveypagename.getstimulustime
surveypage.surveypagename.insertstimulusframe
surveypage.surveypagename.insertstimulustime
surveypage.surveypagename.removestimulusframe
surveypage.surveypagename.removestimulustime
surveypage.surveypagename.resetstimulusframes
surveypage.surveypagename.setstimulusframe
surveypage.surveypagename.setstimulustime

Remarks

The surveypage element is a specialized type of trial that presents one or more survey questions. A survey page may be presented as part of a sequence of pages in a survey element, or it can be presented like as a trial trials in a block element. Survey pages can present multiple choice, free text, and slider questions, as well as plain text, images, and even rapid sequences of stimuli (pictures, video, text, sound, port signals) just like regular trials.

Examples

The following surveypage displays three questions:

```
<surveypage mypage>
/caption = "Please answer the following items to the best of
your ability"
/ questions=[1=q1; 2=q2; 3=q3]
</surveypage>
```

The following surveypage displays three questions, no back button, a custom label on the next button. At the end of the page, it sets a custom value based on the response to the first question.

```
<surveypage mypage>
/caption = "Please answer the following items to the best of
your ability"
/ questions=[1=q1; 2=q2; 3=q3]
/ showbackbutton=false
/ nextlabel="Forward"
/ ontrialend = [if (radiobuttons.q1.response == 1) values.sex =
"female"]
</surveypage>
```

Send comments on this topic:

textbox element

The textbox element defines a survey item in which respondents enter free text.

Syntax

```
<textbox textboxname>
/ caption = "text"
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ defaultresponse = "text"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ mask = constraint or regular expression
/ maxchars = integer
/ minchars = integer
/ multiline = boolean
/ orientation = layout
/ position = (x expression, y expression)
/ range = (minimum, maximum)
/ required = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ size = (width expression, height expression)
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ textboxsize = (width, height)
/ txcolor = (red expression, green expression, blue expression)
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</textbox>
```

Properties

textbox.textboxname.caption
textbox.textboxname.fontheight
textbox.textboxname.height
textbox.textboxname.hposition
textbox.textboxname.maxchars
textbox.textboxname.maxvalue
textbox.textboxname.minchars
textbox.textboxname.minvalue
textbox.textboxname.name
textbox.textboxname.required

textbox.textboxname.response
textbox.textboxname.responsefontheight
textbox.textboxname.subcaption
textbox.textboxname.subcaptionfontheight
textbox.textboxname.textboxheight
textbox.textboxname.textboxwidth
textbox.textboxname.typename
textbox.textboxname.vposition
textbox.textboxname.width

Functions

None.

Remarks

The textbox element has a powerful set of features for validating and constraining the range of permissible input. See the mask attribute for details.

Examples

The following textbox item asks the respondent to enter their age, constraining the response to be a positive integer between 18 and 120.

```
<textbox q1>
/ caption="Please enter your age."
/ mask=positiveinteger
/ range = (18, 120)
</textbox>
```

Send comments on this topic:

item element

The item element defines a set of stimulus items.

Syntax

```
<item itemname>
/ 1 = "item text"
/ 2 = "item text"
/ 3 = "item text"
/ 4 = "item text"
/ items = (trialname, trialname, trialname)
</item>
```

Properties

item.itemname.itemcount
item.itemname.items
item.itemname.name
item.itemname.typename

Functions

item.itemname.clearitems
item.itemname.insertitem
item.itemname.item
item.itemname.removeitem
item.itemname.reset
item.itemname.setitem

Remarks

Stimulus items can be defined using the item element or the items attribute. If multiple stimuli have the same set of items, the item element allows you to specify the items in a single place and reuse them with the different stimuli rather than repeating them inline within each stimulus.

The content of the items depends on the type of stimulus that is using the items. For text stimuli, the items represent the text to display on the screen. Picture, sound, and video interpret each item as a path to a picture, sound, or video file. If relative file paths are specified, the path is interpretted relative to the folder containing the script file.

For port stimuli, the items must be an 8 character string of zeroes and ones representing an 8-bit signal to send through the port (e.g., "00001111", "11111111", ...).

For dynamically defined item sets, the items attribute specifies which trial generates the items. Each time the specified trial is run, the subject's response on that trial is added to the item set until the set is full.

Stimulus items may also contain embedded peformance variables. The current value of a given measure for a given trial or block can be inserted anywhere within the text of a

stimulus itemby specifying the type of element, element's name, and the name of the measure as follows:

```
<% type.name.property %>
```

Examples

The following item set consists of 5 statically defined items for use by a text element.

```
<item shoppinglist>
/ 1="bread"
/ 2="beer"
/ 3="eggs"
/ 4="butter"
/ 5="milk"
</item>
```

The following item set consists of 5 statically defined items containing variables for use by a text element.

```
<item shoppinglist>
/ 1="mean latency = <% trial.critical.meanlatency %>"
/ 2="percent correct = <% trial.critical.percentcorrect %>"
</item>
```

The following item set consists of 4 statically defined images for use by a picture element. The image files are in the same folder as the script.

```
<item monuments>
/ 1="mountrushmore.jpg"
/ 2="washington.gif"
/ 3="lincoln.bmp"
/ 4="statueofliberty.jpg"
</item>
```

The following item set consists of 10 dynamically defined items, each of which is a response to an openended trial called "personalinfoquestions".

```
<item personalinfo>
/ items=personalinfoquestions
/ numitems=10
</item>
```

clock element

The clock element presents a timer, stopwatch, or clock on the screen.

Syntax

```
<clock clockname>
/ format = clockformat
/ mode = clockmode
/ erase = true(red expression, green expression, blue
expression) or false
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ halign = alignment
/ height = integer expression
/ hposition = x expression
/ onprepare = [expression; expression; expression; ...]
/ position = (x expression, y expression)
/ resetrate = rate
/ size = (width expression, height expression)
/ timeout = integer expression
/ txbgcolor = (red expression, green expression, blue
expression) or (transparent)
/ txcolor = (red expression, green expression, blue expression)
/ valign = alignment
/ vposition = y expression
/ width = integer expression
</clock>
```

Properties

clock.clockname.currenttime
clock.clockname.elapsedtime
clock.clockname.erase
clock.clockname.erasecolor
clock.clockname.erasecolorblue
clock.clockname.erasecolorgreen
clock.clockname.erasecolorred
clock.clockname.fontheight
clock.clockname.height
clock.clockname.hposition
clock.clockname.name
clock.clockname.remainingtime
clock.clockname.skip
clock.clockname.stimulusonset
clock.clockname.textbgcolor
clock.clockname.textbgcolorblue
clock.clockname.textbgcolorgreen
clock.clockname.textbgcolorred

clock.clockname.textcolor
clock.clockname.textcolorblue
clock.clockname.textcolorgreen
clock.clockname.textcolorred
clock.clockname.timeout
clock.clockname.typename
clock.clockname.vposition
clock.clockname.width

Functions

clock.clockname.pause
clock.clockname.resettime
clock.clockname.start

Remarks

The clock element is used to display a timer, stopwatch, or clock on the screen. The clock is a convenient way to show participants how much time is left to complete the task.

Examples

The following presents a 5-minute timer spanning a block of trials with yellow letters against a black background:

```
<clock timer>
/ mode = timer
/ resetrate = block
/ erase = false
/ txcolor = yellow
/ txbgcolor = black
/ timeout = 300000
/ position = (50%, 10%)
/ format = "mm:ss"
</clock>
```

The following presents white stopwatch with black letters that spans a single trial:

```
<clock stopwatch>
/ mode = stopwatch
/ txcolor = black
/ txbgcolor = white
/ format = "hh:mm:ss"
/ position = (50%, 90%)
</clock>
```

Send comments on this topic:

picture element

The picture element defines a set of pictures items and controls how they are displayed.

Syntax

```
<picture picturename>
/ erase = true(red expression, green expression, blue
expression) or false
/ halign = alignment
/ height = integer expression
/ hposition = x expression
/ items = itemname or ("item", "item", "item",... )
/ onprepare = [expression; expression; expression; ...]
/ position = (x expression, y expression)
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
/ size = (width expression, height expression)
/ transparentcolor = (red expression, green expression, blue
expression)
/ valign = alignment
/ vposition = y expression
/ width = integer expression
</picture>
```

Properties

picture.picturename.currentindex
picture.picturename.currentitem
picture.picturename.currentitemnumber
picture.picturename.currentvalue
picture.picturename.erase
picture.picturename.erasecolorblue
picture.picturename.erasecolorgreen
picture.picturename.erasecolorred
picture.picturename.height
picture.picturename.hposition
picture.picturename.itemcount
picture.picturename.items
picture.picturename.name
picture.picturename.nextindex
picture.picturename.nextvalue
picture.picturename.playthrough
picture.picturename.resetinterval
picture.picturename.selectedcount
picture.picturename.skip
picture.picturename.stimulusonset

picture.picturename.typename
picture.picturename.unselectedcount
picture.picturename.vposition
picture.picturename.width

Functions

picture.picturename.appenditem
picture.picturename.clearitems
picture.picturename.insertitem
picture.picturename.item
picture.picturename.removeitem
picture.picturename.resetselection
picture.picturename.setitem

Remarks

The picture element determines how picture items are selected (e.g., randomly, in sequence, etc.) along with the location on the screen at which they are presented.

Examples

The following defines a set of picture items presented on the right side of the screen:

```
<picture moutains>
/ items = ("rainier.bmp", "baker.jpg", "sainthelens.gif")
/ position = (75, 50)
</picture>
```

Send comments on this topic:

port element

The port element defines a set of 8-bit signals to be sent through a serial or parallel port.

Syntax

```
<port portname>
/ erase = boolean("bits") or boolean(integer)
/ items = itemname or ("binary", "binary", "binary",... ) or (
integer, integer, integer,... )
/ onprepare = [expression; expression; expression; ...]
/ port = port name
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
/ subport = porttype
</port>
```

Properties

port.portname.currentindex
port.portname.currentitem
port.portname.currentitemnumber
port.portname.currentvalue
port.portname.erase
port.portname.erasesignal
port.portname.itemcount
port.portname.items
port.portname.name
port.portname.nextindex
port.portname.nextvalue
port.portname.playthrough
port.portname.portnumber
port.portname.resetinterval
port.portname.selectedcount
port.portname.skip
port.portname.stimulusonset
port.portname.typename
port.portname.unselectedcount

Functions

port.portname.appenditem
port.portname.clearitems
port.portname.insertitem
port.portname.item
port.portname.removeitem
port.portname.resetselection
port.portname.setitem

Remarks

The port element determines which port the signal is sent through along with how individual signals are selected on each trial (e.g. randomly, in sequence, etc.).

Inquisit supports sending values to a serial (RS 232) port on Windws only. Inquisit supports parallel port signalling on both Windows and Mac. You'll need to first install a PCI Express parallel port card into an open PCI Express slot on your computer, or to the Mac Thunderbolt port via an adapter. See documentation for the parallel port monitor for details on connecting a parallel port to a Mac.

Examples

The following presents signals through the data register of the parallel port (LPT2). Items are selected based on the currently selected item of a another stimuli called "sometext".

```
<port somesignal>
/ port = LPT2
/ subport = data
/ items = ("00000001", "00000010", "00000100", "00001000")
/ erase = ("00000000")
/ select = current(sometext)
</port>
```

Send comments on this topic:

shape element

The shape element defints a single shape stimulus and specifies how the shape is presented.

Syntax

```
<shape shapename>
/ color = (red expression, green expression, blue expression)
/ erase = true(red expression, green expression, blue
expression) or false
/ halign = alignment
/ height = integer expression
/ hposition = x expression
/ onprepare = [expression; expression; expression; ...]
/ position = (x expression, y expression)
/ shape = shapename
/ size = (width expression, height expression)
/ valign = alignment
/ vposition = y expression
/ width = integer expression
</shape>
```

Properties

shape.shapename.color
shape.shapename.colorblue
shape.shapename.colorgreen
shape.shapename.colorred
shape.shapename.currentindex
shape.shapename.currentvalue
shape.shapename.erase
shape.shapename.erasecolorblue
shape.shapename.erasecolorgreen
shape.shapename.erasecolorred
shape.shapename.height
shape.shapename.hposition
shape.shapename.itemcount
shape.shapename.items
shape.shapename.name
shape.shapename.nextindex
shape.shapename.nextvalue
shape.shapename.playthrough
shape.shapename.resetinterval
shape.shapename.skip
shape.shapename.stimulusonset
shape.shapename.typename
shape.shapename.vposition
shape.shapename.width

Functions

None.

Remarks

Shape stimuli provide a convenient means of overwriting previously presented stimuli during a presentation sequence, or for drawing background to be presented behind other stimuli.

Examples

The following defines a blue circle that appears on the right side of the screen:

```
<shape bluecircle>
/ shape = circle
/ color = (0, 0, 200)
/ position = (80%, 50%)
</shape>
```

sound element

The sound element defines a set of sound stimuli.

Syntax

```
<sound soundname>
/ erase = true(red expression, green expression, blue
expression) or false
/ items = itemname or ("item", "item", "item",... )
/ onprepare = [expression; expression; expression; ...]
/ pan = integer
/ playthrough = boolean
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
/ volume = integer
</sound>
```

Properties

sound.soundname.currentindex
sound.soundname.currentitem
sound.soundname.currentitemnumber
sound.soundname.currentvalue
sound.soundname.erase
sound.soundname.itemcount
sound.soundname.items
sound.soundname.name
sound.soundname.nextindex
sound.soundname.nextvalue
sound.soundname.pan
sound.soundname.playthrough
sound.soundname.resetinterval
sound.soundname.selectedcount
sound.soundname.skip
sound.soundname.stimulusonset
sound.soundname.typename
sound.soundname.unselectedcount
sound.soundname.volume

Functions

sound.soundname.appenditem
sound.soundname.clearitems
sound.soundname.insertitem
sound.soundname.item
sound.soundname.removeitem
sound.soundname.resetselection

sound.soundname.setitem

Remarks

The sound element determines how individual items are selected on each trial (e.g. serially through item list, random selection without replacement, linked to the selection of items from another stimulus element) and how those items should be presented (e.g., left/right pan and volume).

Examples

The following defines a set of sounds to be presented to the left speaker:

```
<sound rock>
/ items = ("beatles.wav", "stones.wav", "thewho.wav")
/ pan = -10000
</sound>
```

systembeep element

Syntax

```
<systembeep>
This element has no attributes
</systembeep>
```

Properties

systembeep.currentindex
systembeep.currentvalue
systembeep.duration
systembeep.erase
systembeep.frequency
systembeep.itemcount
systembeep.items
systembeep.name
systembeep.nextindex
systembeep.nextvalue
systembeep.playthrough
systembeep.stimulusonset
systembeep.typename

Functions

None.

Remarks

The systembeep element is built-in, there is no need to explicitly declare it in the script. It is a type of stimulus, so it can be used wherever a stimulus element is valid. The systembeep is useful for providing audio feedback (e.g., to indicate an incorrect response). The advantage of using systembeep rather than the sound element is that it does not require a sound card. By default, the duration of the beep is 250 ms and the frequency is 750 hz.

Examples

The following trial presents a beep.

```
<trial beeptrial>
/ stimulustimes = [1=systembeep]
/ validresponse = (anyresponse)
</trial>
```

text element

The text element defines a set of text stimuli and determines how items are selected and displayed on the screen.

Syntax

```
<text textname>
/ erase = true(red expression, green expression, blue
expression) or false
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ halign = alignment
/ height = integer expression
/ hjustify = justification
/ hposition = x expression
/ items = itemname or ("item", "item", "item",... )
/ onprepare = [expression; expression; expression; ...]
/ position = (x expression, y expression)
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
/ size = (width expression, height expression)
/ txbgcolor = (red expression, green expression, blue
expression) or (transparent)
/ txcolor = (red expression, green expression, blue expression)
/ valign = alignment
/ vjustify = justification
/ vposition = y expression
/ width = integer expression
</text>
```

Properties

text.textname.currentindex
text.textname.currentitem
text.textname.currentitemnumber
text.textname.currentvalue
text.textname.erase
text.textname.erasecolor
text.textname.erasecolorblue
text.textname.erasecolorgreen
text.textname.erasecolorred
text.textname.fontheight
text.textname.height
text.textname.hposition
text.textname.itemcount
text.textname.items

text.textname.name
text.textname.nextindex
text.textname.nextvalue
text.textname.playthrough
text.textname.resetinterval
text.textname.selectedcount
text.textname.skip
text.textname.stimulusonset
text.textname.textbgcolor
text.textname.textbgcolorblue
text.textname.textbgcolorgreen
text.textname.textbgcolorred
text.textname.textcolor
text.textname.textcolorblue
text.textname.textcolorgreen
text.textname.textcolorred
text.textname.typename
text.textname.unselectedcount
text.textname.vposition
text.textname.width

Functions

text.textname.appenditem
text.textname.clearitems
text.textname.insertitem
text.textname.item
text.textname.removeitem
text.textname.resetselection
text.textname.setitem

Remarks

The text element is used to display text stimuli on the screen. Typically, a single text element consists of a set of text items, and it specifies the method by which a given item is selected for presentation on a trial (e.g., randomly, in sequential order, linked to a different stimulus element, etc.). The text element also controls the appearance of the text on the screen, including font, size, color, justification, and location.

Examples

The following presents white text on a blue background:

```
<text sometext>
/ items = ("inquisit rocks")
/ txcolor = (0, 0, 255)
/ txbgcolor = (255, 255, 255)
</text>
```

The following defines a set of text items to be selected in sequential order:

```
<text presidents>
/ items = ("George Washington", "John Adams", "Thomas
```

```
Jefferson")
/ select = sequence
</text>
```

Send comments on this topic:

video element

The video element defines a set of video items and controls how they are displayed.

Syntax

```
<video videoname>
/ erase = true(red expression, green expression, blue
expression) or false
/ halign = alignment
/ height = integer expression
/ hposition = x expression
/ items = itemname or ("item", "item", "item",... )
/ onprepare = [expression; expression; expression; ...]
/ playthrough = boolean
/ position = (x expression, y expression)
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
/ size = (width expression, height expression)
/ valign = alignment
/ vposition = y expression
/ width = integer expression
</video>
```

Properties

video.videoname.typename
video.videoname.unselectedcount
video.videoname.vposition
video.videoname.width

Functions

video.videoname.appenditem
video.videoname.clearitems
video.videoname.insertitem
video.videoname.item
video.videoname.removeitem
video.videoname.resetselection
video.videoname.setitem

Remarks

The video element determines how video files are selected on each trial (e.g. randomly, in sequence, etc.) and how those items should be presented. Inquisit can display a variety of different streaming formats, including asf, vod, mpeg-1, mpeg-2, mpeg-3, mpeg-4, avi, midi, mov, wav, snd, au, and aiff, animated gifs, and Adobe Flash animations. Note that not all video file containers and codecs are supported on all platforms. To present videos that will work on both Mac and Windows, use the mpg (with mp2 codec) format, or use conditional include elements to select *.wmv versions of your videos on Windows and *.mov versions for Mac.

Examples

The following randomly selects from 3 video files and displays the video on the upper left quadrant of the screen. Responding is not permitted until the video clip is finished.

```
<video tvshows>
/ items = ("desparatehousewives.mpg", "thedailyshow.avi",
"southpark.wmv")
/ playthrough = true
/ position = (25, 25)
</video>
```

Send comments on this topic:

xid element

The xid element enables interacting with XID-compatible devices such as Lumina fMRI Response Pads, RB-series Response Pads, and StimTracker from Cedrus.

Syntax

```
<xid xidname>
/ erase = boolean("bits") or boolean(integer)
/ items = itemname or ("binary", "binary", "binary",... ) or (
integer, integer, integer,... )
/ onprepare = [expression; expression; expression; ...]
/ product = product
/ pulseduration = positive integer or -1 to indicate a
persistent signal
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
</xid>
```

Properties

xid.xidname.currentindex
xid.xidname.currentitem
xid.xidname.currentitemnumber
xid.xidname.currentvalue
xid.xidname.erase
xid.xidname.erasesignal
xid.xidname.itemcount
xid.xidname.items
xid.xidname.lastevent
xid.xidname.lasteventaction
xid.xidname.lasteventbutton
xid.xidname.lasteventport
xid.xidname.lastlatency
xid.xidname.name
xid.xidname.nextindex
xid.xidname.nextvalue
xid.xidname.product
xid.xidname.resetinterval
xid.xidname.selectedcount
xid.xidname.skip
xid.xidname.stimulusonset
xid.xidname.typename
xid.xidname.unselectedcount

Functions

xid.xidname.appenditem

xid.xidname.clearitems
xid.xidname.insertitem
xid.xidname.item
xid.xidname.removeitem
xid.xidname.resetselection
xid.xidname.setitem

Remarks

The xid element can be used as a stimulus to send signals to a Cedrus StimTracker. To use the xid element in this mode, simply plug the StimTracker into the computer and ensure that product attribute is set to stimtracker. You can then define the signals as 8-bit values expressed as binary strings or as an object for setting and retrieving properties from a Cedrus RB-Series or Lumina response pad.

The xid element can also be used to get more detailed properties from Cedrus RB-Series or Lumina response pad. The element is not required in order to use a response pad but provides a way to access some of its advanced features. If you do not require access to the advanced properties of the device, you need only set the inputdevice attribute to "XID" and the validresponse and/or correctresponse attributes to the values of the buttons used for the task.

For more information on using Inquisit with Cedrus RB Series and Lumina response pads, see the following topic.

For more information on using Inquisit with a Cedrus StimTracker, see the following topic.

Examples

The following configures a StimTracker as a stimulus and presents the binary values of 1, 2, or 3 in sequential order.

```
<xid stimtracker>
/ product = stimtracker
/ items = ("000000001", "000000010", "00000011")
/ pulseduration = 100
/ selectionmode = sequence
</xid>
```

The following creates an element for an RB Series response box so that properties (e.g., xid.responsepad.lastevent) can be retrieved in the script.

```
<xid responsepad>
/ product = responsepad
</xid>
```

The following sets the default input device for responding to the XID response device that is plugged into the computer (i.e., RB-Series or Lumina response pad).

```
<defaults>
/ inputdevice = XID
</defaults>
```

Send comments on this topic:

trial element

The trial element controls the timing and the content of stimulus presentation.

Syntax

```
<trial trialname>
/ beginresponseframe = integer
/ beginresponsetime = integer
/ branch = [if expression then event]
/ correctmessage = false or true(stimulusname, duration)
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ draw = stimulusname or true(stimulusname) or false
/ errormessage = false or true(stimulusname, duration)
/ inputdevice = modality
/ inputmask = "bit mask"
/ iscorrectresponse = [expression; expression; expression; ...]
/ isvalidresponse = [expression; expression; expression; ...]
/ monkeyresponse = ("string", "string",...) or (scancode,
scancode, ...) or (property, property, ...) or [expression;
expression; expression;...]
/ numframes = integer
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ posttrialpause = integer expression
/ posttrialsignal = (modality, signal)
/ pretrialpause = integer expression
/ pretrialsignal = (modality, signal)
/ recorddata = boolean
/ response = responsename or timeout(milliseconds) or window(
center, width, stimulusname) or responsemode
/ responseinterrupt = mode
/ responsemessage = (responsevalue, stimulusname, duration)
/ responsetrial = (response, trialname)
/ screencapture = boolean
/ showmousecursor = boolean
/ stimulusframes = [framenumber = stimulusname, stimulusname,
...; framenumber = stimulusname, ...] or [framenumber =
list.name] or [framenumber = selectionmode(stimulusname,
stimulusname, stimulusname, ...)]
/ stimulustimes = [time = stimulusname, stimulusname, ...; time
= stimulusname, ...] or [time = list.name] or [time =
selectionmode(stimulusname, stimulusname, stimulusname, ...)]
/ timeout = integer expression
/ trialcode = "string"
```

```
/ trialduration = integer expression
/ undodraw = [expression; expression; expression; ...]
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</trial>
```

Properties

trial.trialname.beginresponseframe
trial.trialname.beginresponsetime
trial.trialname.correct
trial.trialname.correctcount
trial.trialname.correctstreak
trial.trialname.count
trial.trialname.error
trial.trialname.errorcount
trial.trialname.errorstreak
trial.trialname.inputmask
trial.trialname.inwindow
trial.trialname.latency
trial.trialname.maxlatency
trial.trialname.meanlatency
trial.trialname.medianlatency
trial.trialname.minlatency
trial.trialname.name
trial.trialname.numinwindow
trial.trialname.percentcorrect
trial.trialname.percentinwindow
trial.trialname.posttrialpause
trial.trialname.pretrialpause
trial.trialname.response
trial.trialname.responsex
trial.trialname.responsey
trial.trialname.screencapture
trial.trialname.sdlatency
trial.trialname.showmousecursor
trial.trialname.sumlatency
trial.trialname.totalcorrectcount
trial.trialname.totalcount
trial.trialname.totalerrorcount
trial.trialname.totalmaxlatency
trial.trialname.totalmeanlatency
trial.trialname.totalmedianlatency
trial.trialname.totalminlatency
trial.trialname.totalnuminwindow
trial.trialname.totalpercentcorrect
trial.trialname.totalpercentinwindow
trial.trialname.totalsdlatency
trial.trialname.totalsumlatency
trial.trialname.totaltrialcount

trial.trialname.totalvarlatency
trial.trialname.trialcode
trial.trialname.trialcount
trial.trialname.trialduration
trial.trialname.typename
trial.trialname.varlatency

Functions

trial.trialname.clearstimulusframes
trial.trialname.getstimulusframe
trial.trialname.getstimulustime
trial.trialname.insertstimulusframe
trial.trialname.insertstimulustime
trial.trialname.removestimulusframe
trial.trialname.removestimulustime
trial.trialname.resetstimulusframes
trial.trialname.setstimulusframe
trial.trialname.setstimulustime

Remarks

The trial element is the primary tool for controlling the flow of an experimental task. Trials allow customization of stimulus presentation, response procedure, time constraints, and response feedback. Each time a trial is executed, a line of data is written to the data file. Inquisit supports a number of specialized kinds of trials that provide a simple way to configure specific, commonly used types of tasks. Specialized trials include openended, likert, and surveypage.

Examples

The following trial runs *happytrial* if the response is "a" and *sadtrial* if the response is "b":

```
<trial mytrial>
/ stimulusframes = [0=sometext]
/ validresponse = ("a", "b")
/ responsetrial = ("a", happytrial)
/ responsetrial = ("b", sadtrial)
</trial>
```

The following trial presents a rapid series of 5 pictures at 10 millisecond intervals. The subject may respond by clicking the left or right mouse button. If the left button is clicked, an error message appears. If the right button is clicked, a correct message appears.

```
<trial mytrial>
/ stimulustimes = [0=pic1; 10=pic2; 20=pic3; 30=pic4; 40=pic5]
/ inputdevice = mousekey
/ validresponse = (lbuttondown, rbuttondown)
/ errormessage = (redx, 500)
/ correctmessage = (greenstar, 500)
</trial>
```

Send comments on this topic:

likert element

The likert element is a specialized trial element for collecting likert ratings.

Syntax

```
<likert likertname>
/ anchors = [point = "label"; point = "label"; point = "label"]
/ anchorwidth = width
/ beginresponseframe = integer
/ beginresponsetime = integer
/ branch = [if expression then event]
/ buttonvalues = [point="value", point="value", point="value"]
/ correctmessage = false or true(stimulusname, duration)
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ errormessage = false or true(stimulusname, duration)
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ iscorrectresponse = [expression; expression; expression; ...]
/ isvalidresponse = [expression; expression; expression; ...]
/ position = (x, y)
/ mouse = boolean
/ numframes = integer
/ numpoints = integer
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ posttrialpause = integer expression
/ posttrialsignal = (modality, signal)
/ pretrialpause = integer expression
/ pretrialsignal = (modality, signal)
/ response = responsename or timeout(milliseconds) or window(
center, width, stimulusname) or responsemode
/ responseinterrupt = mode
/ responsemessage = (responsevalue, stimulusname, duration)
/ responsetrial = (response, trialname)
/ stimulusframes = [framenumber = stimulusname, stimulusname,
...; framenumber = stimulusname, ...] or [framenumber =
list.name] or [framenumber = selectionmode(stimulusname,
stimulusname, stimulusname, ...)]
/ stimulustimes = [time = stimulusname, stimulusname, ...; time
= stimulusname, ...] or [time = list.name] or [time =
selectionmode(stimulusname, stimulusname, stimulusname, ...)]
/ timeout = integer expression
/ trialcode = "string"
/ trialduration = integer expression
```

```
</likert>
```

Properties

likert.likertname.anchorwidth
likert.likertname.beginresponseframe
likert.likertname.beginresponsetime
likert.likertname.correct
likert.likertname.correctcount
likert.likertname.correctstreak
likert.likertname.count
likert.likertname.error
likert.likertname.errorcount
likert.likertname.errorstreak
likert.likertname.fontheight
likert.likertname.hposition
likert.likertname.inputmask
likert.likertname.inwindow
likert.likertname.latency
likert.likertname.maxlatency
likert.likertname.meanlatency
likert.likertname.medianlatency
likert.likertname.minlatency
likert.likertname.name
likert.likertname.numinwindow
likert.likertname.numpoints
likert.likertname.percentcorrect
likert.likertname.percentinwindow
likert.likertname.posttrialpause
likert.likertname.pretrialpause
likert.likertname.response
likert.likertname.responsex
likert.likertname.responsey
likert.likertname.scalewidth
likert.likertname.sdlatency
likert.likertname.sumlatency
likert.likertname.totalcorrectcount
likert.likertname.totalcount
likert.likertname.totalerrorcount
likert.likertname.totalmaxlatency
likert.likertname.totalmeanlatency
likert.likertname.totalmedianlatency
likert.likertname.totalminlatency
likert.likertname.totalnuminwindow
likert.likertname.totalpercentcorrect
likert.likertname.totalpercentinwindow
likert.likertname.totalsdlatency
likert.likertname.totalsumlatency
likert.likertname.totaltrialcount
likert.likertname.totalvarlatency
likert.likertname.trialcode
likert.likertname.trialcount
likert.likertname.trialduration

likert.likertname.typename
likert.likertname.varlatency
likert.likertname.vposition

Functions

likert.likertname.clearstimulusframes
likert.likertname.getstimulusframe
likert.likertname.getstimulustime
likert.likertname.insertstimulusframe
likert.likertname.insertstimulustime
likert.likertname.removestimulusframe
likert.likertname.removestimulustime
likert.likertname.resetstimulusframes
likert.likertname.setstimulusframe
likert.likertname.setstimulustime

Remarks

The likert element controls the timing and the content of stimulus presentation as well as the appearance and behavior of the likert scale used to obtain ratings. Every time a likert element is executed, a line of data is written to the data file. Likert supports responding by keyboard (number and arrow keys to select a response, and ENTER key to submit it) or mouse (click the response button to submit a response). The default is mouse input.

Examples

The following shows a five point likert scale at the bottom of the screen with evaluative labels:

```
<likert ratingquestion>
/ stimulusframes=[1=sometext]
/ anchors=[1="excellent"; 2="good"; 3="satisfactory"; 4="bad";
5="aweful"]
/ position=(50, 90)
</likert>
```

Send comments on this topic:

openended element

The openended element is a specialized trial element for gathering free recall, openended responses.

Syntax

```
<openended openendedname>
/ beginresponseframe = integer
/ beginresponsetime = integer
/ branch = [if expression then event]
/ buttonlabel = "string"
/ charlimit = integer
/ correctmessage = false or true(stimulusname, duration)
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ errormessage = false or true(stimulusname, duration)
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ iscorrectresponse = [expression; expression; expression; ...]
/ isvalidresponse = [expression; expression; expression; ...]
/ linelength = integer
/ mask = constraint or regular expression
/ mouse = boolean
/ multiline = boolean
/ numframes = integer
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ position = (x expression, y expression)
/ posttrialpause = integer expression
/ posttrialsignal = (modality, signal)
/ pretrialpause = integer expression
/ pretrialsignal = (modality, signal)
/ range = (minimum, maximum)
/ required = boolean
/ response = responsename or timeout(milliseconds) or window(
center, width, stimulusname) or responsemode
/ responseinterrupt = mode
/ responsemessage = (responsevalue, stimulusname, duration)
/ responsetrial = (response, trialname)
/ size = (width expression, height expression)
/ stimulusframes = [framenumber = stimulusname, stimulusname,
...; framenumber = stimulusname, ...] or [framenumber =
list.name] or [framenumber = selectionmode(stimulusname,
stimulusname, stimulusname, ...)]
/ stimulustimes = [time = stimulusname, stimulusname, ...; time
```

```
= stimulusname, ...] or [time = list.name] or [time =
selectionmode(stimulusname, stimulusname, stimulusname, ...)]
/ timeout = integer expression
/ trialcode = "string"
/ trialduration = integer expression
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
</openended>
```

Properties

openended.openendedname.beginresponseframe
openended.openendedname.beginresponsetime
openended.openendedname.buttonlabel
openended.openendedname.charlimit
openended.openendedname.correct
openended.openendedname.correctcount
openended.openendedname.correctstreak
openended.openendedname.count
openended.openendedname.error
openended.openendedname.errorcount
openended.openendedname.errorstreak
openended.openendedname.fontheight
openended.openendedname.height
openended.openendedname.hposition
openended.openendedname.inputmask
openended.openendedname.inwindow
openended.openendedname.latency
openended.openendedname.maxlatency
openended.openendedname.maxvalue
openended.openendedname.meanlatency
openended.openendedname.medianlatency
openended.openendedname.minlatency
openended.openendedname.minvalue
openended.openendedname.multiline
openended.openendedname.name
openended.openendedname.numinwindow
openended.openendedname.percentcorrect
openended.openendedname.percentinwindow
openended.openendedname.posttrialpause
openended.openendedname.pretrialpause
openended.openendedname.required
openended.openendedname.response
openended.openendedname.responsex
openended.openendedname.responsey
openended.openendedname.sdlatency
openended.openendedname.sumlatency
openended.openendedname.totalcorrectcount
openended.openendedname.totalcount
openended.openendedname.totalerrorcount

openended.openendedname.totalmaxlatency
openended.openendedname.totalmeanlatency
openended.openendedname.totalmedianlatency
openended.openendedname.totalminlatency
openended.openendedname.totalnuminwindow
openended.openendedname.totalpercentcorrect
openended.openendedname.totalpercentinwindow
openended.openendedname.totalsdlatency
openended.openendedname.totalsumlatency
openended.openendedname.totaltrialcount
openended.openendedname.totalvarlatency
openended.openendedname.trialcode
openended.openendedname.trialcount
openended.openendedname.trialduration
openended.openendedname.typename
openended.openendedname.varlatency
openended.openendedname.vposition
openended.openendedname.width

Functions

openended.openendedname.clearstimulusframes
openended.openendedname.getstimulusframe
openended.openendedname.getstimulustime
openended.openendedname.insertstimulusframe
openended.openendedname.insertstimulustime
openended.openendedname.removestimulusframe
openended.openendedname.removestimulustime
openended.openendedname.resetstimulusframes
openended.openendedname.setstimulusframe
openended.openendedname.setstimulustime

Remarks

The openended element controls the timing and the content of stimulus presentation as well as how open-ended responses are obtained. Every time a openended element is executed, a line of data is written to the data file.

The respondent can advance past this trial by hitting ENTER if openended is single line expecting keyboard input, and Ctrl+ENTER if it's multiline or set to mouse input. The default input for openended is mouse input, which enables the respondent to advance by clicking the openended element's button.

Examples

The following displays a text entry box at the bottom of the screen, sets the line length to 40 characters, and the total number of lines in the box to 3:

```
<openended question>
/ stimulusframes=[1=sometext]
/ position = (50, 90)
/ linelength = 40
/ numlines = 3
```

```
</openended>
```

Send comments on this topic:

surveypage element

The surveypage element presents a page of survey questions.

Syntax

```
<surveypage surveypagename>
/ backbuttonposition = (x expression, y expression)
/ backlabel = "label"
/ branch = [if expression then event]
/ caption = "text"
/ finishlabel = "label"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ inputmask = "bit mask"
/ iscorrectresponse = [expression; expression; expression; ...]
/ isvalidresponse = [expression; expression; expression; ...]
/ itemfontstyle = ("face name", height, bold, italic, underline
, strikeout, quality)
/ itemspacing = height or expression
/ navigationbuttonfontstyle = ("face name", height, bold,
italic, underline, strikeout, quality, character set)
/ navigationbuttonsize = (width, height)
/ nextbuttonposition = (x expression, y expression)
/ nextlabel = "label"
/ numframes = integer
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ orientation = layout
/ posttrialpause = integer expression
/ posttrialsignal = (modality, signal)
/ pretrialpause = integer expression
/ pretrialsignal = (modality, signal)
/ questions = [questionnumber, questionnumber = questionname;
questionnumber-questionnumber = selectmode(questionname,
questionname,...); questionnumber, questionnumber-
questionnumber = questionname]
/ recorddata = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ showbackbutton = boolean
/ showpagenumbers = boolean
/ showquestionnumbers = boolean
/ stimulusframes = [framenumber = stimulusname, stimulusname,
...; framenumber = stimulusname, ...] or [framenumber =
list.name] or [framenumber = selectionmode(stimulusname,
stimulusname, stimulusname, ...)]
/ stimulustimes = [time = stimulusname, stimulusname, ...; time
```

```
= stimulusname, ...] or [time = list.name] or [time =
selectionmode(stimulusname, stimulusname, stimulusname, ...)]
/ subcaption = "text"
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ timeout = integer expression
/ trialcode = "string"
/ txcolor = (red expression, green expression, blue expression)
</surveypage>
```

Properties

surveypage.surveypagename.backlabel
surveypage.surveypagename.caption
surveypage.surveypagename.correct
surveypage.surveypagename.correctcount
surveypage.surveypagename.correctstreak
surveypage.surveypagename.count
surveypage.surveypagename.currentquestionnumber
surveypage.surveypagename.error
surveypage.surveypagename.errorcount
surveypage.surveypagename.errorstreak
surveypage.surveypagename.finishlabel
surveypage.surveypagename.fontheight
surveypage.surveypagename.inputmask
surveypage.surveypagename.inwindow
surveypage.surveypagename.itemfontheight
surveypage.surveypagename.itemspacing
surveypage.surveypagename.latency
surveypage.surveypagename.leftmargin
surveypage.surveypagename.maxlatency
surveypage.surveypagename.meanlatency
surveypage.surveypagename.medianlatency
surveypage.surveypagename.minlatency
surveypage.surveypagename.name
surveypage.surveypagename.navigationbuttonheight
surveypage.surveypagename.navigationbuttonwidth
surveypage.surveypagename.nextlabel
surveypage.surveypagename.numinwindow
surveypage.surveypagename.percentcorrect
surveypage.surveypagename.percentinwindow
surveypage.surveypagename.posttrialpause
surveypage.surveypagename.pretrialpause
surveypage.surveypagename.response
surveypage.surveypagename.responsefontheight
surveypage.surveypagename.rightmargin
surveypage.surveypagename.sdlatency
surveypage.surveypagename.showbackbutton
surveypage.surveypagename.showpagenumbers
surveypage.surveypagename.showquestionnumbers
surveypage.surveypagename.subcaption
surveypage.surveypagename.subcaptionfontheight

surveypage.surveypagename.sumlatency
surveypage.surveypagename.topmargin
surveypage.surveypagename.totalcorrectcount
surveypage.surveypagename.totalcount
surveypage.surveypagename.totalerrorcount
surveypage.surveypagename.totalmaxlatency
surveypage.surveypagename.totalmeanlatency
surveypage.surveypagename.totalmedianlatency
surveypage.surveypagename.totalminlatency
surveypage.surveypagename.totalnuminwindow
surveypage.surveypagename.totalpercentcorrect
surveypage.surveypagename.totalpercentinwindow
surveypage.surveypagename.totalsdlatency
surveypage.surveypagename.totalsumlatency
surveypage.surveypagename.totaltrialcount
surveypage.surveypagename.totalvarlatency
surveypage.surveypagename.trialcode
surveypage.surveypagename.trialcount
surveypage.surveypagename.trialduration
surveypage.surveypagename.typename
surveypage.surveypagename.varlatency

Functions

surveypage.surveypagename.clearstimulusframes
surveypage.surveypagename.getstimulusframe
surveypage.surveypagename.getstimulustime
surveypage.surveypagename.insertstimulusframe
surveypage.surveypagename.insertstimulustime
surveypage.surveypagename.removestimulusframe
surveypage.surveypagename.removestimulustime
surveypage.surveypagename.resetstimulusframes
surveypage.surveypagename.setstimulusframe
surveypage.surveypagename.setstimulustime

Remarks

The surveypage element is a specialized type of trial that presents one or more survey questions. A survey page may be presented as part of a sequence of pages in a survey element, or it can be presented like as a trial trials in a block element. Survey pages can present multiple choice, free text, and slider questions, as well as plain text, images, and even rapid sequences of stimuli (pictures, video, text, sound, port signals) just like regular trials.

Examples

The following surveypage displays three questions:

```
<surveypage mypage>
/caption = "Please answer the following items to the best of
your ability"
/ questions=[1=q1; 2=q2; 3=q3]
</surveypage>
```

The following surveypage displays three questions, no back button, a custom label on the next button. At the end of the page, it sets a custom value based on the response to the first question.

```
<surveypage mypage>
/caption = "Please answer the following items to the best of
your ability"
/ questions=[1=q1; 2=q2; 3=q3]
/ showbackbutton=false
/ nextlabel="Forward"
/ ontrialend = [if (radiobuttons.q1.response == 1) values.sex =
"female"]
</surveypage>
```

Send comments on this topic:

instruct element

The instruct element specifies how instruction pages are presented in the script.

Syntax

```
<instruct>
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ inputdevice = modality
/ lastlabel = "label"
/ nextkey = ("character") or (scancode) or (signal)
/ nextlabel = "label"
/ prevkey = ("character") or (scancode) or (signal)
/ prevlabel = "label"
/ screencolor = (red expression, green expression, blue
expression)
/ timeout = integer expression
/ txcolor = (red expression, green expression, blue expression)
/ wait = integer
/ windowsize = (width expression, height expression)
</instruct>
```

Properties

instruct.backlabel
instruct.finishlabel
instruct.fontheight
instruct.height
instruct.name
instruct.nextlabel
instruct.screencolor
instruct.screencolorblue
instruct.screencolorgreen
instruct.screencolorred
instruct.textcolor
instruct.textcolorblue
instruct.textcolorgreen
instruct.textcolorred
instruct.timeout
instruct.typename
instruct.wait
instruct.width

Functions

None.

Remarks

The instruct element allows customization of how instruction pages are displayed on the screen and the means by which subjects can navigate backwards and forwards through the pages. Only one instruct element may be defined in a script.

Examples

The following sets the font and size of the instruction pages and indicates that the page must be displayed for at least one second before the participant can advance.

```
<instruct>
/ fontstyle = ("Verdana", 12pt, true)
/ windowsize = (800px, 600px)
/ wait = 1000
</instruct>
```

Send comments on this topic:

page element

The page element defines a page of instruction or feedback text.

Syntax

```
<page pagename>
This element has no attributes
</page>
```

Properties

page.pagename.content
page.pagename.expression
page.pagename.name
page.pagename.typename

Functions

None.

Remarks

preinstructions or postinstructions attribute. Tab and space characters occuring within the page definition will also appear in the instruction page as displayed. Line breaks, however, are stripped out prior to display. To force a line break, use the special character "^".

Inquisit provides built-in support for reporting accuracy, latency and response window measures at the end of a block of trials using the blockfeedback attribute. The page element also supports customized reporting of a wide variety of performance statistics factored by trial or block type and aggregated over the course of a single block or the entire experiment. The current value of a given measure for a given trial or block can be inserted anywhere within the text of an instruction page by specifying the type of element, element's name, and the name of the measure as follows:

```
<% type.name.property %>
```

Examples

The following page reports various latency measures for a "nonword" trial:

```
<page report>
^^ Your average response time on nonword trials was <%
trial.nonword.meanlatency %> milliseconds.
^^ Your fastest response on nonword trials was <%
trial.nonword.minlatency %> milliseconds.
^^ Your slowest response on nonword trials was <%
trial.nonword.maxlatency %> milliseconds.
</page>
```

htmlpage element

The htmlpage element defines an HTML formatted instruction page.

Syntax

```
<htmlpage htmlpagename>
/ file = "path"
</htmlpage>
```

Properties

htmlpage.htmlpagename.file
htmlpage.htmlpagename.name
htmlpage.htmlpagename.typename

Functions

None.

Remarks

The htmlpage element is used to define pages of text to be displayed as instructions using the preinstructions or postinstructions attribute. The htmlpage element is useful when complete control over formatting and content of instruction pages is required, otherwise the page element provides an easier way to display text with basic formatting. The actual content of the page is contained in a separate HTML file located on the local machine or the web.

Inquisit provides built-in support for reporting accuracy, latency and response window measures at the end of a block of trials using the blockfeedback attribute. The htmlpage element also supports customized reporting of a wide variety of performance statistics factored by trial or block type and aggregated over the course of a single block or the entire experiment. The current value of a given measure for a given trial or block can be inserted anywhere within the text of an instruction page by specifying the type of element, element's name, and the name of the measure as follows:

```
<% type.name.property%>
```

Examples

The following htmlpage consists of content in an html file located on millisecond.com.

```
<htmlpage intro>
/ file="http://www.millisecond.com/pages/intro.htm"
</htmlpage>
```

Send comments on this topic:

block element

The block element defines a sequence of trials and instruction pages to be run.

Syntax

```
<block blockname>
/ bgstim = (stimulusname, stimulusname, stimulusname)
/ blockfeedback = (metric, metric, metric, ...)
/ branch = [if expression then event]
/ correctmessage = false or true(stimulusname, duration)
/ correcttarget = (property, target, maxblocks)
/ errormessage = false or true(stimulusname, duration)
/ latencytarget = (property, target, maxblocks)
/ onblockbegin = [expression; expression; expression; ...]
/ onblockend = [expression; expression; expression; ...]
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ postinstructions = (pagename, pagename, pagename, ...)
/ preinstructions = (pagename, pagename, pagename, ...)
/ recorddata = boolean
/ response = responsename or timeout(milliseconds) or window(
center, width, stimulusname) or responsemode
/ screencapture = boolean
/ screencolor = (red expression, green expression, blue
expression)
/ showmousecursor = boolean
/ skip = [expression; expression; expression; ...]
/ stop = [expression; expression; expression; ...]
/ timeout = integer expression
/ trials = [trialnumber, trialnumber = trialname; trialnumber-
trialnumber = selectmode(trialname, trialname,...); trialnumber
, trialnumber-trialnumber = trialname] or [trialnumber-
trialnumber = list.name]
</block>
```

Properties

block.blockname.correct
block.blockname.correctcount
block.blockname.correctstreak
block.blockname.count
block.blockname.currentblocknumber
block.blockname.currenttrialnumber
block.blockname.elapsedtime
block.blockname.error
block.blockname.errorcount
block.blockname.errorstreak
block.blockname.inwindow

block.blockname.latency
block.blockname.maxlatency
block.blockname.meanlatency
block.blockname.medianlatency
block.blockname.minlatency
block.blockname.name
block.blockname.next
block.blockname.numinwindow
block.blockname.percentcorrect
block.blockname.percentinwindow
block.blockname.recorddata
block.blockname.response
block.blockname.responsex
block.blockname.responsey
block.blockname.screencapture
block.blockname.screencolor
block.blockname.screencolorblue
block.blockname.screencolorgreen
block.blockname.screencolorred
block.blockname.sdlatency
block.blockname.showmousecursor
block.blockname.sumlatency
block.blockname.totalcorrectcount
block.blockname.totalcount
block.blockname.totalerrorcount
block.blockname.totalmaxlatency
block.blockname.totalmeanlatency
block.blockname.totalmedianlatency
block.blockname.totalminlatency
block.blockname.totalnuminwindow
block.blockname.totalpercentcorrect
block.blockname.totalpercentinwindow
block.blockname.totalsdlatency
block.blockname.totalsumlatency
block.blockname.totaltrialcount
block.blockname.totalvarlatency
block.blockname.trialcount
block.blockname.trialscount
block.blockname.typename
block.blockname.varlatency

Functions

None.

Remarks

The primary function of the block element is to define a randomly selected or sequentially ordered set of trials to run. The block element also controls whether instructions are provided at the beginning and end of the block, and whether summary performance feedback (average latency, percent correct) is given at the block's conclusion.

By default, all random selection pools for trials and stimulus items are reset at the end of a

block. For example, if any stimulus items are selected without replacement (the default selection algorithm), all of the stimuli are replaced into the selection pool after each block is finished. To preserve selection pools across multiple blocks, use the resetinterval attribute.

Examples

The following block runs ten trials, randomly selecting trial1 and trial2 for five trials each. The block also presents two background stimuli.

```
<block myblock>
/ trials=[1-10=noreplace(trial1, trial2)]
/ bgstim=(remindertext, instructiontext)
</block>
```

The following block runs ten trials, selecting trial1 for the first five and trial2 for the second five. Three instruction pages are displayed before and after the trials are run.

```
<block myblock>
/ trials=[1-5=trial1; 6-10=trial2]
/ preinstructions=(page1, page2, page3)
/ postinstructions=(page4, page5, page6)
</block>
```

survey element

The survey element defines a sequence of one or more pages containing question and response items.

Syntax

```
<survey surveyname>
/ backbuttonposition = (x expression, y expression)
/ backlabel = "label"
/ branch = [if expression then event]
/ file = "location"
/ encrypt = true("password") or false
/ finishlabel = "label"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ itemfontstyle = ("face name", height, bold, italic, underline
, strikeout, quality)
/ itemspacing = height or expression
/ navigationbuttonfontstyle = ("face name", height, bold,
italic, underline, strikeout, quality, character set)
/ navigationbuttonsize = (width, height)
/ nextbuttonposition = (x expression, y expression)
/ nextlabel = "label"
/ nextlabel = "label"
/ onblockbegin = [expression; expression; expression; ...]
/ onblockend = [expression; expression; expression; ...]
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ orientation = layout
/ pages = [pagenumber, pagenumber = pagename; pagenumber-
pagenumber = selectmode(pagename, pagename,...); pagenumber,
pagenumber-pagenumber = pagename]
/ password = "string"
/ recorddata = boolean
/ responsefontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ screencolor = (red expression, green expression, blue
expression)
/ showbackbutton = boolean
/ showpagenumbers = boolean
/ showquestionnumbers = boolean
/ skip = [expression; expression; expression; ...]
/ subcaptionfontstyle = ("face name", height, bold, italic,
underline, strikeout, quality)
/ timeout = integer expression
/ txcolor = (red expression, green expression, blue expression)
/ userid = "string"
```

```
</survey>
```

Properties

survey.surveyname.backlabel
survey.surveyname.correct
survey.surveyname.correct
survey.surveyname.correctcount
survey.surveyname.correctcount
survey.surveyname.correctstreak
survey.surveyname.correctstreak
survey.surveyname.count
survey.surveyname.count
survey.surveyname.currentblocknumber
survey.surveyname.currentpagenumber
survey.surveyname.currentquestionnumber
survey.surveyname.currenttrialnumber
survey.surveyname.elapsedtime
survey.surveyname.error
survey.surveyname.errorcount
survey.surveyname.errorstreak
survey.surveyname.finishlabel
survey.surveyname.fontheight
survey.surveyname.inwindow
survey.surveyname.inwindow
survey.surveyname.itemfontheight
survey.surveyname.itemspacing
survey.surveyname.latency
survey.surveyname.latency
survey.surveyname.leftmargin
survey.surveyname.maxlatency
survey.surveyname.maxlatency
survey.surveyname.meanlatency
survey.surveyname.meanlatency
survey.surveyname.medianlatency
survey.surveyname.medianlatency
survey.surveyname.minlatency
survey.surveyname.minlatency
survey.surveyname.name
survey.surveyname.name
survey.surveyname.navigationbuttonheight
survey.surveyname.navigationbuttonwidth
survey.surveyname.next
survey.surveyname.next
survey.surveyname.nextlabel
survey.surveyname.numinwindow
survey.surveyname.numinwindow
survey.surveyname.pagefontheight
survey.surveyname.percentcorrect
survey.surveyname.percentcorrect
survey.surveyname.percentinwindow
survey.surveyname.percentinwindow
survey.surveyname.recorddata

survey.surveyname.response
survey.surveyname.responsefontheight
survey.surveyname.rightmargin
survey.surveyname.screencolorblue
survey.surveyname.screencolorblue
survey.surveyname.screencolorgreen
survey.surveyname.screencolorgreen
survey.surveyname.screencolorred
survey.surveyname.screencolorred
survey.surveyname.sdlatency
survey.surveyname.showbackbutton
survey.surveyname.showpagenumbers
survey.surveyname.showquestionnumbers
survey.surveyname.subcaptionfontheight
survey.surveyname.sumlatency
survey.surveyname.topmargin
survey.surveyname.totalcorrectcount
survey.surveyname.totalcount
survey.surveyname.totalerrorcount
survey.surveyname.totalmaxlatency
survey.surveyname.totalmeanlatency
survey.surveyname.totalmedianlatency
survey.surveyname.totalminlatency
survey.surveyname.totalnuminwindow
survey.surveyname.totalpercentcorrect
survey.surveyname.totalpercentinwindow
survey.surveyname.totalsdlatency
survey.surveyname.totalsumlatency
survey.surveyname.totaltrialcount
survey.surveyname.totalvarlatency
survey.surveyname.trialcount
survey.surveyname.trialscount
survey.surveyname.trialscount
survey.surveyname.typename
survey.surveyname.typename
survey.surveyname.varlatency

Functions

None.

Remarks

Examples

The following survey contains 3 pages and allows forward navigation only.

```
<survey customersat>
/ pages=[1=page1; 2=page2; 3=page3]
/ showbackbutton=false
/ finishlabel = "Thank you!"
/ screencolor = white
</survey>
```

Send comments on this topic:

eyetracker element

The eyetracker element enables Inquisit to receive and record real-time gaze data from an eyetracker.

Syntax

```
<eyetracker>
/ plugin = "plugin name"
</eyetracker>
```

Properties

eyetracker.lastex
eyetracker.lastey
eyetracker.lastleftpupilheight
eyetracker.lastleftpupilwidth
eyetracker.lastleftvalidity
eyetracker.lastleftx
eyetracker.lastlefty
eyetracker.lastmarker
eyetracker.lastpupilheight
eyetracker.lastpupilwidth
eyetracker.lastrightpupilheight
eyetracker.lastrightpupilwidth
eyetracker.lastrightvalidity
eyetracker.lastrightx
eyetracker.lastrighty
eyetracker.lasttimestamp
eyetracker.lastx
eyetracker.lasty
eyetracker.maxleftpupilheight
eyetracker.maxleftpupilwidth
eyetracker.maxpupilheight
eyetracker.maxpupilwidth
eyetracker.maxrightpupilheight
eyetracker.maxrightpupilwidth
eyetracker.meanpupilheight
eyetracker.meanpupilwidth
eyetracker.minleftpupilheight
eyetracker.minleftpupilwidth
eyetracker.minpupilheight
eyetracker.minpupilwidth
eyetracker.minrightpupilheight
eyetracker.minrightpupilwidth
eyetracker.plugin

Functions

None.

Remarks

The eyetracker requires a custom plugin for a given make of eyetracker that can be purchased separately from Inquisit Lab. To date, we have released a plugin for Tobii eyetrackers, although plugins for other eyetrackers may be released in the future. (Note - Inquisit can send markers to any eye tracker that accepts parallel or serial port input without the use of this element and associated plugin.)

To initialize the plugin and enable access to gaze point data, simply specify the eye tracker element and set the plugin attribute to the name of the plugin (e.g., "tobii"). Each plugin may optionally support additional proprietary attributes specific to the eyetracker (see plugin-specific documentation). The eyetracker element supports a set of properties common to all plugins. These properties report gaze point and pupil size along with basic statistics on those data. The properties can be stored in the data file or used to dynamically determine experimental flow.

Currently available eye tracker plugins:
* Inquisit 4 Tobii Plugin

Examples

The following defines an eyetracker element that communicates with a Tobii eyetracker. The eyetracker element has properties that enable programmatic access to gaze data for use in gaze-contingent tasks.

```
<eyetracker>
/ plugin = "tobii"
</eyetracker>
```

eyetracker element

The following extensions to the eyetracker element are supported by the Tobii plugin.

Syntax

```
<eyetracker>
/ calibrationmode = value
/ framerate = value
/ hostname = value
/ illuminationmode = value
/ ipaddress = value
/ lowblinkmode = value
/ unitname = value
</eyetracker>
```

Properties

eyetracker.ipaddress
eyetracker.version

Functions

None.

Remarks

The attributes and properties here are specific to the Tobii Eyetracker plugin, providing additional Tobii-specific functionality beyond what is provided in the generic eyetracker element. To use these extensions, the plugin attribute must be set to "tobii".

To use Inquisit with Tobii eye trackers, perform the following steps:
â€¢ Set up the eyetracker according to Tobii's instructions. Make sure it is plugged into your local network.
â€¢ Open an Inquisit script that defines the eyetracker element with plugin attribute set to "tobii" (sample scripts are available from our library)
â€¢ Run the script. You will be asked to register the Inquisit 4 Tobii Plugin if you haven't already.

Examples

The following defines an eyetracker element that connects to a Tobii eyetracker at the given network ip address.

```
<eyetracker>
/ plugin = "tobii"
/ ipaddress = "168.192.0.22"
</eyetracker>
```

The following defines a text element that displays the current width of the right pupil:

```
<text rightpupil>
/ items = ("Right Pupil Width: <%
eyetracker.lastrightpupilwidth %>")
</text>
```

Send comments on this topic:

batch element

The batch element allows a group of Inquisit scripts to be run in sequence.

Syntax

```
<batch>
/ directory = "location"
/ file = "path"
/ groupassignment = assignment
/ subjects = (integer, integer, integer, ... of modulus)
</batch>
```

Properties

batch.currentgroupnumber
batch.groupcount
batch.name
batch.typename

Functions

None.

Remarks

The batch element should be defined in a separate script file. The batch element may not include own script file in its list of files.

Examples

The following batch runs three scripts files in sequence. The files are located in the same directory as the batch file.

```
<batch>
/ file="script1.iqx"
/ file="script2.iqx"
/ file="script3.iqx"
</batch>
```

The following batch runs three scripts files in sequence subjects with odd numbered group ids. The files are located in the same directory as the batch file.

```
<batch>
/ subjects=(1 of 2)
/ groupassignment = group
/ file="script1.iqx"
/ file="script2.iqx"
/ file="script3.iqx"
</batch>
```

The following batch runs three scripts files in the reverse order of the previous example for subjects with even numbered group ids. The files are located in the same directory as the batch file.

```
<batch>
/ subjects=(2 of 2)
/ groupassignment = group
/ file="script3.iqx"
/ file="script2.iqx"
/ file="script1.iqx"
</batch>
```

Send comments on this topic:

computer element

The computer element is a built-in element that exposes a number of properties of the current computer.

Syntax

```
<computer>
This element has no attributes
</computer>
```

Properties

computer.availablememory
computer.cpuspeed
computer.ipaddress
computer.language
computer.languagecode
computer.languageid
computer.macaddress
computer.memory
computer.os
computer.osmajorversion
computer.osminorversion
computer.platform
computer.timerresolution

Functions

None.

Remarks

The computer element is a built-in object and can not be explicitly declared in a script. It exposes a number of useful properties, however, that can be referenced in expressions throughout the script.

Examples

list element

The list element is a general purpose class for storing and selecting any type of item.

Syntax

```
<list listname>
/ itemprobabilities = (value, value, value, ...] or [expression
; expression; expression; ...] or distribution
/ items = (item item item item item item ...) or [expression;
expression; expression;...]
/ maxrunsize = integer expression
/ not = [expression; expression; expression]
/ poolsize = integer expression
/ replace = boolean
/ resetinterval = integer
/ selectionmode = selectionmode or expression
/ selectionrate = rate
</list>
```

Properties

list.listname.currentindex
list.listname.currentvalue
list.listname.itemcount
list.listname.itemprobabilities
list.listname.items
list.listname.maxrunsize
list.listname.name
list.listname.nextindex
list.listname.nextvalue
list.listname.poolitems
list.listname.poolsize
list.listname.replace
list.listname.selectedcount
list.listname.selectionmode
list.listname.selectionrate
list.listname.typename
list.listname.unselectedcount

Functions

list.listname.appenditem
list.listname.clearitems
list.listname.insertitem
list.listname.item
list.listname.removeitem
list.listname.reset
list.listname.resetselection
list.listname.setitem

Remarks

The list element is a data structure for storing ordered sets of items, whether they are strings, values, properties, expressions, or compbinations thereof. It also provides simple and powerful methods for retrieving items from the list. Retrieval can be filtered through built-in algorithms for sequential access and random selection with or without replacement according to uniform or normal distributions. Items can also be retreived according to custom expressions. Items can also be directly accessed by index through properties or functions.

List can be created statically using the items attribute, or dynamically using the appenditem, insertitem, removeitem, and clearitems functions. An ordered list of integers can be quickly be created by setting the poolsize property. The values in the list will be null, but the currentindex and nextindex could be used for random selection of integers ranging from 1 to the poolsize.

A list can be used drive stimulus item selection by setting /select = list.listName.nextvalue or /select = list.listName.nextindex on the stimulus.

The list element provides a simpler and more predictable implementation of the functionality provided by the counter element and also introduced new functionality. Although the counter element will continue to function as it has, where possible script developers should the list element instead.

Examples

The following list stores a reverse sequence of numbers, selecting them in sequential order:

```
<list backwards>
/ items = (5, 4, 3, 2, 1)
/ selectionmode = sequence
</list>
```

The following randomly selects the name of a president without replacement:

```
<list presidents>
/ items = ("George Washington", "John Adams", "Thomas
Jefferson")
</list>
```

The following selects a countdown of numbers:

```
<list countdown>
/ selectionmode = sequence
/ items = (3 2 1)
</list>
```

The following selects a value of 2 for odd numbered trials and 1 for even numbered trials:

```
<list evenodd>
/ selectionmode = sequence
/ items = [if ( floor(mod(block.test.currenttrialnumber, 2)) ==
0 ) 1 else 2]
</list>
```

The following creates a list of 200 null values and randomly selects without replacement. All items are replaced after 10 blocks or after all of them have been selected.

```
<list stimulusTracker>
/ poolsize = 200
/ resetinterval = 10
</list>

<picture targetPics>
/ items = targetItems
/ select = list.stimulusTracker.nextindex
</picture>
```

Send comments on this topic:

counter element

The counter element defines a sequential or randomly selected set of values used to vary experimental conditions.

Syntax

```
<counter countername>
/ allowrepeats = boolean
/ items = (value, value, value,... )
/ not = (stimulusname1, stimulusname2, stimulusname3) or (
countername1, countername2, countername3)
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
/ selectionrate = rate
</counter>
```

Properties

counter.countername.currentitem
counter.countername.currentitemnumber
counter.countername.itemcount
counter.countername.items
counter.countername.name
counter.countername.selectedcount
counter.countername.selectedindex
counter.countername.selectedvalue
counter.countername.selectionmode
counter.countername.selectionrate
counter.countername.typename
counter.countername.unselectedcount

Functions

None.

Remarks

The counter element can be used to determine which stimulus items are selected from trial to trial, providing more control over item selection than is given by the stimulus element itself. Counters can also be used to specify the values from trial to trial of variable attributes (for example, the horizontal and vertical screen position of stimuli).

Examples

The following counter returns a sequence of numbers counting backwards from 5.

```
<counter backwards>
```

```
/ select = sequence(5, 4, 3, 2, 1)
</counter>
```

The following counter randomly selects values from 1 to 200 without replacement. All items are replaced after 10 blocks or after all of them have been selected.

```
<counter mycounter>
/ select = noreplace(1-200)
/ resetinterval = 10
</counter>
```

Send comments on this topic:

data element

The data element specifies how data is recorded in the data file.

Syntax

```
<data>
/ columns = [columnname, columnname, columnname, "string",
property, property, property]
/ file = "location"
/ encrypt = true("password") or false
/ format = dataformat
/ labels = boolean
/ password = "string"
/ separatefiles = boolean
/ userid = "string"
</data>
```

Properties

data.encrypt
data.encryptionkey
data.file
data.name
data.password
data.recorddata
data.typename
data.userid

Functions

None.

Remarks

The data element allows customization of data recording, including specifying which data is recorded, the format of the data file, and the location where the data are saved. If no data element is defined, Inquisit uses a default data recording scheme.

Examples

The following records 10 columns to an encrypted data file on an ftp server.

```
<data>
/ columns=[subject, blockcode, trialcode, trialnum, latency,
response, stimulusitem, stimulusnumber, stimulusitem,
stimulusnumber]
/ file="ftp://ftp.millisecond.com/mydata/"
/ userid="sean"
/ password="open sesame"
```

```
/ encrypt=true("password")
</data>
```

Send comments on this topic:

defaults element

The defaults element specifies global default values for attributes in the script.

Syntax

```
<defaults>
/ bidirectional = boolean
/ blockfeedback = (metric, metric, metric, ...)
/ canvasaspectratio = (width, height)
/ canvasposition = (x expression, y expression)
/ canvassize = (width expression, height expression)
/ combaudrates = (port = baudrate, port = baudrate, port =
baudrate, ...)
/ correctresponse = ("character", "character",...) or (scancode
, scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ displaymode = (width, height, refreshrate, bitsperpixel)
/ finishpage = "url"
/ fontstyle = ("face name", height, bold, italic, underline,
strikeout, quality, character set)
/ halign = alignment
/ inputdevice = modality
/ joystickthreshold = integer
/ lptaddresses = (port = address, port = address, port =
address, ...)
/ minimumversion = "version"
/ position = (x expression, y expression)
/ posttrialpause = integer expression
/ pretrialpause = integer expression
/ quitcommand = (command key + scancode)
/ screencolor = (red expression, green expression, blue
expression)
/ txbgcolor = (red expression, green expression, blue
expression) or (transparent)
/ txcolor = (red expression, green expression, blue expression)
/ validresponse = ("character", "character",...) or (scancode,
scancode, ...) or (stimulusname, stimulusname, ...) or (
mouseevent, mouseevent, ...) or (joystickevent, joystickevent,
...) or ("word, word, ...") or (keyword)
/ valign = alignment
/ voicekeythreshold = integer
/ windowsize = (width expression, height expression)
</defaults>
```

Properties

defaults.finishpage
defaults.fontheight
defaults.hposition
defaults.name
defaults.posttrialpause
defaults.pretrialpause
defaults.typename
defaults.vposition
defaults.windowcenter
defaults.windowdecunit
defaults.windowhitduration
defaults.windowincunit
defaults.windowmaxcenter
defaults.windowmincenter
defaults.windowoffset
defaults.windowonset
defaults.windowwidth

Functions

None.

Remarks

The default element provides a convenient way to specify global settings that apply throughout the entire script. For example, if a script contains multiple text elements that use a 12 point Arial font, the font can be specified in the defaults element and each text element will automatically use that font. This is much more convenient than specifying the font repeatedly for each text element. If the local element redefines a default attribute, the local setting takes precedent over the default setting.

Examples

The following sets the default screen color to blue, font to Arial, and input device to mouse.

```
<default>
/ screencolor = (0,0,255)
/ fontstyle = ("Arial", 14pt, true)
/ inputdevice = mouse
</default>
```

Send comments on this topic:

display element

The display element is a built-in element that exposes properties of the display system.

Syntax

```
<display>
This element has no attributes
</display>
```

Properties

display.canvasheight
display.canvaswidth
display.colordepth
display.height
display.refreshinterval
display.refreshrate
display.width

Functions

None.

Remarks

The display element is a built-in object and can not be explicitly declared in a script. It exposes a number of useful properties, however, that can be referenced in expressions throughout the script.

Examples

expressions element

The expressions element contains custom expressions that can be used throughout the script.

Syntax

```
<expressions>
/ expressionname1
/ expressionname2
/ expressionname3
</expressions>
```

Properties

expressions.expressionname1
expressions.expressionname2
expressions.expressionname3
expressions.name
expressions.typename

Functions

None.

Remarks

Sometimes a script may use long and complicated expressions, or reuse a given expression in a number of places. The expression element allows you to define such expressions and assign them a name. You can then conveniently refer to the expression by its name wherever it is used in the script. Expressions are dynamically evaluated each time they are used so that they always reflect up to date values. Expressions may include other expressions defined, although you should avoid circular references.

Examples

The following defines an expression that reflects the total score across three different conditions.

```
<expressions>
/ totalscore = values.congruentscore + values.incongruentscore
+ values.neutralscore
</expressions>
```

The following defines an expression the returns whether the current trial is even or odd.

```
<expressions>
/ isoddnumberedtrial = (mod(script.trialcount) > 0)
</expressions>
```

expt element

The expt element defines a sequence of blocks and instruction pages to be run.

Syntax

```
<expt exptname>
/ blocks = [blocknumber, blocknumber = blockname;blocknumber =
list.name; blocknumber-blocknumber = selectmode(blockname,
blockname,...); blocknumber, blocknumber-blocknumber =
blockname]
/ correctmessage = false or true(stimulusname, duration)
/ errormessage = false or true(stimulusname, duration)
/ groupassignment = assignment
/ onblockbegin = [expression; expression; expression; ...]
/ onblockend = [expression; expression; expression; ...]
/ onexptbegin = [expression; expression; expression; ...]
/ onexptend = [expression; expression; expression; ...]
/ ontrialbegin = [expression; expression; expression; ...]
/ ontrialend = [expression; expression; expression; ...]
/ postinstructions = (pagename, pagename, pagename, ...)
/ preinstructions = (pagename, pagename, pagename, ...)
/ recorddata = boolean
/ response = responsename or timeout(milliseconds) or window(
center, width, stimulusname) or responsemode
/ screencapture = boolean
/ showmousecursor = boolean
/ skip = [expression; expression; expression; ...]
/ subjects = (integer, integer, integer, ... of modulus)
/ timeout = integer expression
</expt>
```

Properties

expt.exptname.blockscount
expt.exptname.correct
expt.exptname.correctcount
expt.exptname.correctstreak
expt.exptname.count
expt.exptname.currentblocknumber
expt.exptname.currentgroupnumber
expt.exptname.currenttrialnumber
expt.exptname.elapsedtime
expt.exptname.error
expt.exptname.errorcount
expt.exptname.errorstreak
expt.exptname.groupcount
expt.exptname.inwindow
expt.exptname.latency

Functions

None.

Remarks

The primary function of the expt element is to define a randomly selected or sequentially ordered set of blocks to run. The expt element also controls whether instructions are provided at the beginning and end of the script.

Examples

The following expt runs one practice block followed by ten test blocks. An "intro" instruction page is displayed at the beginning of the script, and an "end" instruction page is displayed at the end.

```
<expt>
/ blocks=[1=practice; 2-11=test]
```

```
/ preinstructions = (intro)
/ postinstructions = (end)
</expt>
```

Send comments on this topic:

include element

The include element lists other script files containing elements to be used in the current script.

Syntax

```
<include>
/ file = "path"
/ file = "path"
/ file = "path"
/ precondition = [expression; expression; expression; ...]
</include>
```

Properties

include.file
include.name
include.typename

Functions

None.

Remarks

The include element provides a convenient way to reuse elements such as stimuli or instruction pages in multiple scripts. Rather than copying the elements into every script, the elements can be defined in a separate file and referenced via the include element. All files listed in the include element are effectively pasted into the current script file when Inquisit parses the script.

Examples

The following example conditionally includes a script with an item element containing .wmv video files for Windows and .mov files for Mac.

```
<include>
/ precondition=[computer.platform == "windows"]
/ file="wmv_videos.iqx"
</include>

<include>
/ precondition=[computer.platform == "mac"]
/ file="mov_videos.iqx"
</include>
```

The following includes stimuli and instruction pages defined in separate script files.

```
<include>
```

```
/ file = "c:\shared elements\stimuli.iqx"
/ file = "c:\shared elements\instructions.iqx"
</include>
```

Send comments on this topic:

inquisit element

The inquisit element is a built-in element that exposes a number of properties about the Inquisit application running a given script.

Syntax

```
<inquisit>
This element has no attributes
</inquisit>
```

Properties

inquisit.applicationmode
inquisit.releasedate
inquisit.version

Functions

None.

Remarks

The inquisit element is a built-in object and can not be explicitly declared in a script. It exposes a number of useful properties, however, that can be referenced in expressions throughout the script.

Examples

joystick element

The joystick element is a built-in element that exposes a number of properties reflecting the current state of the joystick.

Syntax

```
<joystick>
This element has no attributes
</joystick>
```

Properties

joystick.button
joystick.pov
joystick.rx
joystick.ry
joystick.rz
joystick.slider
joystick.x
joystick.y
joystick.z

Functions

```
None.
```

Remarks

The joystick element is a built-in object and can not be explicitly declared in a script. It exposes a number of useful properties, however, that can be referenced in expressions throughout the script.

Examples

monkey element

The monkey element enables you to customize the performance of the Inquisit test monkey.

Syntax

```
<monkey>
/ latencydistribution = constant(mean) or normal(mean, sd) or
uniform(min, max)
/ percentcorrect = integer
</monkey>
```

Properties

monkey.maxlatency
monkey.meanlatency
monkey.minlatency
monkey.monkeymode
monkey.percentcorrect
monkey.sdlatency

Functions

None.

Remarks

For help on using the monkey, see How to Test an Experiment. Please treat the monkey kindly.

Examples

The following specifies that the monkey's latencies are randomly selected from a normal distibution, with a mean of 200 and standard deviation of 10. Each response is 95% likely to be correct.

```
<monkey>
/ latencydistribution = normal(200, 10)
/ percentcorrect = 95
</monkey>
```

The following specifies that the monkey's latencies are randomly selected from a uniform distribution ranging from 100 to 500 milliseconds. Each response is 50% likely to be correct.

```
<monkey>
/ latencydistribution = uniform(100, 500)
/ percentcorrect = 50
</monkey>
```

The following specifies that the monkey's latencies are always 250 milliseconds. Each

response is 75% likely to be correct.

```
<monkey>
/ latencydistribution = constant(250)
/ percentcorrect = 75
</monkey>
```

Send comments on this topic:

mouse element

The mouse element is a built-in element that exposes a number of properties reflecting the current state of the mouse.

Syntax

```
<mouse>
This element has no attributes
</mouse>
```

Properties

mouse.x
mouse.y

Functions

None.

Remarks

The mouse element is a built-in object and can not be explicitly declared in a script. It exposes a number of useful properties, however, that can be referenced in expressions throughout the script.

Examples

response element

The response element specifies the procedure for obtaining and measuring responses.

Syntax

```
<response responsename>
/ mode = responsemode
/ rwcenter = integer
/ rwdeccondition = [(percentcorrect, latency), (percentcorrect,
latency), ...]
/ rwdecunit = integer
/ rwhitduration = integer
/ rwhitstimulus = stimulusname
/ rwinccondition = [(percentcorrect, latency), (percentcorrect,
latency), ...]
/ rwincunit = integer
/ rwlatencymetric = metric
/ rwmaxcenter = integer
/ rwmincenter = integer
/ rwmissstimulus = stimulusname
/ rwstimulus = stimulusname
/ rwwidth = integer
/ srsignal = voicesignal
/ srthreshold = srthreshold = integer
/ timeout = integer expression
</response>
```

Properties

response.responsename.name
response.responsename.timeout
response.responsename.typename
response.responsename.windowcenter
response.responsename.windowdecthreshold
response.responsename.windowdecunit
response.responsename.windowhitduration
response.responsename.windowincthreshold
response.responsename.windowincunit
response.responsename.windowmaxcenter
response.responsename.windowmincenter
response.responsename.windowoffset
response.responsename.windowonset
response.responsename.windowwidth

Functions

None.

Remarks

Once a response element has been defined, it can be assigned to the response attribute of expt, block, or trial element in order to define the response procedure. Trial settings taking precedence over block settings, and block settings take precedence over expt settings.

Examples

The following response defines a response window with an initial center of 500 ms and width of 150 ms. A black exclamation point appears on the screen during the window. If the response is in the window, it turns green and remains on teh screen for 300 ms. Otherwise it turns red. The window is incremented by 75 ms if the mean latency for the block is greater than the current center + 50 ms and the percent correct is less than 60%. The window is decremented if the mean latency for the block is 50 ms earlier than the window center and the percent correct is greater than or equal to 80%. The maximum window center 1000 ms and the minimum is 200 ms:

```
<response windowprocedure>
/ mode = window
/ rwcenter = 500
/ rwwidth = 150
/ rwinccondition = [(60, 50)]
/ rwdeccondition = [(80, -50)]
/ rwincunit = 75
/ rwdecunit = 75
/ rwmincenter = 200
/ rwmaxcenter = 1000
/ rwlatencymetric = mean
/ rwstimulus = blackexclamationpoint
/ rwhitstimulus = greenexclamationpoint
/ rwmissstimulus = redexclamationpoint
/ rwhitduration = 300
</response>
```

The following response specifies that trial advances when either a correct response is given or a two second timeout elapses.

```
<response myresponse>
/ mode = correct
/ timeout = 2000
</response>
```

Send comments on this topic:

script element

The script element is a built-in element that exposes a number of script level properties .

Syntax

```
<script>
This element has no attributes
</script>
```

Properties

script.currentblock
script.currentblocknumber
script.currentexpt
script.currenttime
script.currenttrial
script.currenttrialnumber
script.elapsedtime
script.filename
script.fullpath
script.groupassignmentcode
script.groupid
script.startdate
script.starttime
script.subjectid
script.trialcount

Functions

script.abort
script.debugbreak

Remarks

The script element is a built-in object and can not be explicitly declared in a script. It exposes a number of useful properties, however, that can be referenced in expressions throughout the script.

Examples

values element

The values element contains custom variables that can be retrieved and updated throughout the course of a script.

Syntax

```
<values>
/ valuename1
/ valuename2
/ valuename3
</values>
```

Properties

values.name
values.typename
values.valuename1
values.valuename2
values.valuename3

Functions

None.

Remarks

The values element allows you to store and update values for purposes of tracking, scoring, and displaying information in an experiment. For example, values can be used to count the occurence of a particular event, tally scores, and keep trial by trial statistics.

Examples

The following defines and initializes 3 variables for tracking the total score under different conditions.

```
<values>
/ congruentscore=0
/ incongruentscore=0
/ neutralscore=0
</values>
```

The following defines a variable that tracks the sum of squares of response latencies.

```
<values>
/ latencysumofsquares=0</values>
```

xid element

The xid element enables interacting with XID-compatible devices such as Lumina fMRI Response Pads, RB-series Response Pads, and StimTracker from Cedrus.

Syntax

```
<xid xidname>
/ erase = boolean("bits") or boolean(integer)
/ items = itemname or ("binary", "binary", "binary",... ) or (
integer, integer, integer,... )
/ onprepare = [expression; expression; expression; ...]
/ product = product
/ pulseduration = positive integer or -1 to indicate a
persistent signal
/ resetinterval = integer
/ select = integer or selectionmode or selectionmode(pool) or
dependency(stimulusname) or dependency(countername) or
countername
</xid>
```

Properties

xid.xidname.currentindex
xid.xidname.currentitem
xid.xidname.currentitemnumber
xid.xidname.currentvalue
xid.xidname.erase
xid.xidname.erasesignal
xid.xidname.itemcount
xid.xidname.items
xid.xidname.lastevent
xid.xidname.lasteventaction
xid.xidname.lasteventbutton
xid.xidname.lasteventport
xid.xidname.lastlatency
xid.xidname.name
xid.xidname.nextindex
xid.xidname.nextvalue
xid.xidname.product
xid.xidname.resetinterval
xid.xidname.selectedcount
xid.xidname.skip
xid.xidname.stimulusonset
xid.xidname.typename
xid.xidname.unselectedcount

Functions

xid.xidname.appenditem

xid.xidname.clearitems
xid.xidname.insertitem
xid.xidname.item
xid.xidname.removeitem
xid.xidname.resetselection
xid.xidname.setitem

Remarks

The xid element can be used as a stimulus to send signals to a Cedrus StimTracker. To use the xid element in this mode, simply plug the StimTracker into the computer and ensure that product attribute is set to stimtracker. You can then define the signals as 8-bit values expressed as binary strings or as an object for setting and retrieving properties from a Cedrus RB-Series or Lumina response pad.

The xid element can also be used to get more detailed properties from Cedrus RB-Series or Lumina response pad. The element is not required in order to use a response pad but provides a way to access some of its advanced features. If you do not require access to the advanced properties of the device, you need only set the inputdevice attribute to "XID" and the validresponse and/or correctresponse attributes to the values of the buttons used for the task.

For more information on using Inquisit with Cedrus RB Series and Lumina response pads, see the following topic.

For more information on using Inquisit with a Cedrus StimTracker, see the following topic.

Examples

The following configures a StimTracker as a stimulus and presents the binary values of 1, 2, or 3 in sequential order.

```
<xid stimtracker>
/ product = stimtracker
/ items = ("000000001", "000000010", "00000011")
/ pulseduration = 100
/ selectionmode = sequence
</xid>
```

The following creates an element for an RB Series response box so that properties (e.g., xid.responsepad.lastevent) can be retrieved in the script.

```
<xid responsepad>
/ product = responsepad
</xid>
```

The following sets the default input device for responding to the XID response device that is plugged into the computer (i.e., RB-Series or Lumina response pad).

```
<defaults>
/ inputdevice = XID
</defaults>
```

Send comments on this topic:

Expressions

Inquisit supports a variety logical and arithmetic expressions. Expressions are a powerful feature that enable you to create sophisticated and flexible scripts that dynamically adapt based on a wide range of inputs such as the participant's responses, elapsed time, the computer's capabilities, and more. Best of all, expressions allow you to express adaptive scripts in a natural, intuitive way, making it much easier than before to program adaptive tasks.

If you are familiar with imperative programming languages like JavaScript, Java, C#, PHP, or C, Inquisit's expression language syntax will be immediately recognizable to you. For the most part, Inquisit's expression syntax is just a subset of these other languages. See the following topics for more details on the expression syntax.

Operator reference. This topic covers the syntax for mathematical operations such as addition, subtraction, multiplication, equality. It also covers logical operations such as tests for equality, inequality, greater than, less than, logical AND, logical OR, and so on.

Function Reference. Inquisit contains numerous built in functions that can be used by expressions. Examples include fuctions for returning the maximum of two values, rounding real numbers to integers, computing the natural logarithm of a value, and more.

Incorporating expressions into a script

There are a number of different Inquisit elements and attributes that make use of expressions. The following provides an overview of how expressions can be used in a script. The reference topics elements and attributes provide more detailed information on where expressions are valid.

Simple Attributes

Simple attributes are just regular old attributes that can be set to a single numeric value, or possibly a set of numeric values. For example, the timeout attribute consists of a single numeric value, for example /timeout = 1000. The size attribute consists of two numeric attributes, for example /size = (200, 300). Inquisit allows you to set these attribute values to either a constant number such as "5" or a numeric expression such as "sqrt(5) + 22 - text.target.currentitemnumber".

As an example, imagine you are running a task in which subjects try to answer as many questions as possible in 5 minutes. When their time is up, the current trial is interrupted and no more trials are run. One way to achieve this is to set the timeout of each trial as a function of the time elapsed since the task started. This might look like the following:

```
<trial timedtaska>
/ stimulustimes = [1=question]
/ validresponse = ("a", "b")
/ correctresponse = ("a")
/ timeout = 18000000 - block.timedtask.elapsedtime
</trial>
```

The above example computes the number of milliseconds remaining in the 5 minute period by subtracting the number of milliseconds that have elapsed since the start of the block from 18000000, which is the number of millisecond in a 5 minute interval.

There is a problem with this expression however, namely that it might return a negative number, which is not a valid timeout value, or it might return 0, which Inquisit interprets to mean no timeout at all. We can fix this by uses Inquisit's "max" function, which returns the maximum value of two expressions. The following ensures that the timeout is never set to a value less than 1 millisecond.

```
<trial timedtaska>
/ stimulustimes = [1=question]
/ validresponse = ("a", "b")
/ correctresponse = ("a")
/ timeout = max(18000000 - block.timedtask.elapsedtime, 1)
</trial>
```

Event Attributes

Inquisit 4 introduces a set of event attributes that allow you to execute logic at a particular time in the experiment, such as at the beginning or end of a certain type of trial or block. These attributes allow you to configure aspects of the script based on prior performance or tally up custom scores and metrics. Event attributes include ontrialbegin, ontrialend, onblockbegin, onblockend, onexptbegin, and onexptend.

As an example, imagine a decision making task in which you award points based on correct decisions. There are two types of decisions, a relative easy type worth 2 points and a harder type worth 5 points. Using the ontrialend attribute, this is easily accomplished.

First, we'll define a custom value called "score" used to store respondent's running score.

```
<values>
/ score = 0
</values>
```

Next, we'll define the ontrialend attribute on our easy trial to add 2 points to the score with each correct response.

```
<trial easydecision>
/ stimulusframes = [1 = easydecisions]
/ validresponse = ("a", "b")
/ ontrialend=[values.score = values.score + 2 *
trial.easydecision.correct]
</trial>
```

Note that the trial.easydecision.correct property is set to 1 for a correct response and 0 for an incorrect response, so we can simply multiply this property by 2 and add the result to the score. Another way to accomplish the same thing would be to use conditional logic as follows.

```
<trial easydecision>
/ stimulusframes = [1 = easydecisions]
/ validresponse = ("a", "b")
/ ontrialend=[if (trial.easydecision.correct == 1) values.score
= values.score + 2]
```

Here, we check if the response was correct, and if so, we add two 2 points.

The last step is to define the ontrialend attribute on our difficult trial, which adds 5 points for

each correct response.

```
<trial harddecision>
/ stimulusframes = [1 = harddecisions]
/ validresponse = ("a", "b")
/ ontrialend=[values.score = values.score + 5 *
trial.harddecision.correct]
</trial>
```

Task Flow Attributes

Task flow attributes allow you to conditionally determine the flow of a procedure based on prior performance. For example, a script might repeat a practice block of trials until the percent of correct responses meets some criteria before moving on to the critical blocks. Another script may skip a certain type of trial based on the response to a previous question. Flow attributes include branch, skip, repeat, and stop.

As an example, imagine you wish to provide adaptive feedback to participants based on how well they perform a task. Specifically, if they make 5 correct responses in a row, they are shown a message of encouragement. If they make 3 incorrect responses in a row, they are shown a message warning them to slow down and concentrate on the task.

First, we'll define the two trials used to display the encouragement and warning feedback. Note that since these are just feedback trials, we use the recorddata command to prevent the data from these trials from being added to the data file.

```
<trial encouragement>
/ stimulusframes = [1 = encouragingwords]
/ validresponse = (" ")
/ recorddata = false

<trial warning>
/ stimulusframes = [1 = warningwords]
/ validresponse = (" ")
/ recorddata = false
```

Next, we'll define the trial that runs the main task. This trial includes two branch commands, the first of which runs the encouraging feedback trial and the second that runs the warning.

```
<trial maintask>
/ stimulusframes = [1 = taskstimulus]
/ validresponse = ("a", "b")
/ branch=[if (mod(trial.maintask.correctstreak, 5) == 0 &&
trial.maintask.correctstreak != 0) trial.encouragement]
/ branch=[if (mod(trial.maintask.errorstreak, 3) == 0 &&
trial.maintask.errorstreak 1 != 0) trial.warning]
</trial>
```

The first branch uses the mod function, which returns the remainder when the first argument, trial.maintask.correctstreak, is divided by the second argument, 5. If the correctstreak is a multiple of 5 (e.g., 5, 10, 15, ...), the remainder is 0 and the first statement in the condition is true. However, the mod function also returns 0 if the correctstreak is 0, in which case we don't want to show the encouragement trial. So, a second statement checking whether the correctstreak is 0 has been added. Now the encouragement trial is run after ever streak of 5 correct responses.

The second branch is similar, except that it shows a warning trial for every streak of 3 incorrect responses.

Stimulus Items

Expressions can also be incorporated into stimulus items in order to be displayed on the screen. For example, a text stimulus might include expressions representing their performance, a score, or the amount of time remaining in a task. In order to distinguish regular text from text that should be evaluated as an expression, expressions must appear between <% and %>. Anything appearing between these delimiters will be evaluated as an expression. Otherwise, the text is displayed as is.

The following example shows a text item that displays a participant's total score on a judgment and decision making task by adding subscores from phase 1 and 2:

```
<text score>
/ items = ("Total score: <% values.phase1score +
values.phase2score %>")
/ position = (50%, 5%)
</text>
```

The following text shows the number of minutes that have passed since the start of the session. Since the script.elapsedtime property returns the duration in millisecond, the value is divided by 60000 and rounded to the nearest integer to convert it to minutes:

```
<text elapsedminutes>
/ items = ("Total minutes: <% round(script.elapsetime / 60000)
%>")
/ position = (50%, 5%)
</text>
```

Instruction Pages

Just like stimulus items, expressions can also be inserted into instruction pages. Again, anything appearing between expressions must appear between <% and %> is evaluated as an expression. Otherwise the text or html is displaed as it is.

The following instruction page shows the mean latency on a block rounded to the nearest integer.

```
<page feedback>
Your average response time was <% round(block.test.meanlatency)
%>
</page>
```

Operators

Inquisit expressions supports all of the basic operators for doing arithmetic, comparing values, and creating logical statements. The complete list of operators and their syntax is listed below.

Arithmetic Operators

Arithmetic operators are used to perform additional, subtraction, multiplication, and division.

Operator	Description	Examples
+	Adds numeric operands or concatenates two or more strings.	trial.condition1.correctcount + trial.condition2.correctcount values.firstscore + values.secondscore response.rw.windowcenter + 500
-	Subtracts numeric operands.	100 - trial.mytrial.percentcorrect block.incompat.meanlatency - block.compat.meanlatency
*	Multiplies numeric operands.	trial.test.correctcount * 5 trial.test.trialcount * trial.test.meanlatency
/	Divides numeric operands.	trial.mytrial.percentcorrect / 100 block.myblock.sumlatency / block.myblock.trialcount
+=	Adds the value of an expression to the value of a variable and assigns the result to the variable.	values.trialcount += 1 values.totalfalsealarms += values.falsealarmcount
-=	Subtracts the value of an expression to the value of a variable and assigns the result to the variable.	values.remainingtrialcount -= 1 values.totalpoints -= values.errorcount

Comparison Operators

Comparison operators compare the values of the right and left operands and return a Boolean value of true or false.

Operator	Description	Examples

==	True if the right and left values are equal. Otherwise false.	trial.iat.trialcount == 100 block.compat.percentcorrect == 0 trial.foo.correct == 1
!=	True if the left and right values are not equal. Otherwise false.	trial.iat.trialcount != 1 block.compat.percentcorrect != 100 response.rw.windowcenter != 0
<	True if the left value is less than the right. Otherwise false.	trial.iat.trialcount < 25 block.compat.percentcorrect < 100 trial.test.latency < 500
<=	True if the left value is less than or equal to the right. Otherwise false.	trial.iat.trialcount <= 25 block.compat.percentcorrect <= 100 trial.test.latency <= 500
>	True if the left value is greater than the right. Otherwise false.	trial.iat.currenttrialnumber > 25 block.compat.percentcorrect > 50 trial.test.latency > 500
>=	True if the left value is greater than or equal to the right. Otherwise false.	trial.iat.currenttrialnumber >= 25 block.compat.percentcorrect >= 50 trial.test.latency >= 500

Assignment Operator

The assigment operator assigns a value to a property. Note that the operand on the left must be a writable property. Many properties (computer.cpuspeed, for example) are read-only values that can not be changed. An expression that attempts to assign a value to a read-only property will fail.

Operator	Description	Examples
=	Sets the value of the left operand to that of the right.	items.targets.item.1 = trial.gettargets.response response.rw.windowcenter = response.rw.windowcenter - 100 values.score = trial.game.correctcount * 5

Logical Operators

Logical operators return true or false depending on whether the operands are true or false. These operators are especially useful in conditional if-else statements that involve multiple conditions.

Operator	Description	Examples

&&	Logical AND. True if both the left AND right operators are true. False if either operand is false.	if (block.test1.percentcorrect == 100 && block.test2.percentcorrect == 100) values.perfectscore = true
		
		if (block.test.percentcorrect < 70 && block.test.medianlatency > 500) response.rw.windowcenter = 600

||	Logical OR. True if either the left OR right operand is true. False if both operands are false.	if (block.test1.percentcorrect < 100 || block.test2.percentcorrect < 100) values.perfectscore = false
		
		if (trial.test.latency < 100 || trial.test.latency > 1000) values.discard = true

!	Logical NOT. True if the operand is NOT true. False if the operand is NOT false.	values.imperfect = !values.perfect

Conditional Statements

Conditional statements consist of two parts, a condition that evaluates to true or false, and a statement that is evaluated if the condition part is true. Conditional statements are often referred to as "if-else" statements. These are useful for event logic that conditionally updates values. They are also used by the branch attribute to determine whether any branching should occur.

Statement	Description	Examples

if ... else ...	If the condition is true, then evaluate the first statement, otherwise evaluate the second statement.	if (block.test1.percentcorrect == 100 && block.test2.percentcorrect == 100) values.perfectscore = true
		
		if (block.test.percentcorrect < 70 && block.test.medianlatency > 500) response.rw.windowcenter = 600
		
		if (block.test1.percentcorrect < 100 || block.test2.percentcorrect < 100) values.perfectscore =

		false else values.perfectscore = true

Precedence and Grouping

You can use parentheses to set the order in which operations are applied, or to make your statements easier to read.

Delimiter	Description	Examples
()	Contains a set of statements that should be evaluated as a unit.	values.imperfect = (trial.test2.sumlatency + trial.test1.sumlatency) / (trial.test2.trialcount + trial.test1.trialcount)

Multiple Statements

Multiple statements can be expressed in event logic by separating each statement with a semi-colon.

Delimiter	Description	Examples
;	Delimiter for multiple statements	values.imperfect = !values.perfect; items.targets.item.1 = trial.gettargets.response; values.score = trial.game.correctcount * 5

Functions

The Inquisit expression language includes a number of commonly used mathematical functions that perform various calculations, from rounding decimal numbers to the nearest integer to computing a number's arctangent.

Function	Description	Examples	Result
abs	Returns the absolute value of the argument	abs(-1)	1
mod	Returns the floating point remainder when the first argument is divided by the second	mod(1.33, 1) mod(9, 4)	0.33 1.0
ipart	Returns the integer portion of a floating point argument	ipart(3.14)	3
fpart	Returns the fractional portion of a floating point argument	fpart(3.14)	0.14
min	Returns the minimum value of the arguments	min(0, 1, 2, 3) min(-100, -1000)	0 -1000
max	Returns the maximum value of arguments	max(0, 1, 2, 3) max(-100, -1000)	3 -100
pow	Returns the first argument to the power of the second argument	pow(3, 3) pow(10, 2)	27 100
sqrt	Returns the square root of the argument	sqrt(4)	2

sin	Returns the sine of the argument	sin(1.570796)	1
sinh	Returns the hyperbolic sine of the argument	sinh(1.570796)	2.301299
asin	Returns the arcsine of the argument		
cos	Returns the cosine of the argument	cos(1.570796)	0
cosh	Returns the hyperbolic cosine of the argument	cosh(1.570796)	2.509178
acos	Returns the arccosine of the argument		
tan	Returns the tangent of the argument	tan(0.785398)	1
tanh	Returns the hyperbolic tangent of the argument	tanh(1.000000)	0.761594
atan	Returns the arctangent of the argument	atan(5.0)	1.373401
atan2	Returns the arctangent of the first argument divided by the second argument	atan2(5.0 / 5.0)	0.99669
log	Returns the base 10 logarithm of the argument	log(9000.00)	9.104980
ln	Returns the natural logarithm of the argument	ln(9000.00)	3.954243
exp	Returns the exponential	exp(2.302585)	10.0

	values of the argument		
log	Returns the logarithm of the first argument using the second argument as the base		
round	Rounds the argument to the nearest integer	round(1.49) round(1.50)	1 2
ceil	Rounds the argument up to the nearest integer	ceil(1.49) ceil(1.50)	2 2
floor	Rounds the argument down to the nearest integer	floor(1.49) floor(1.50)	1 1
deg	Converts an argument from radians to degrees		
rad	Converts an argument from degrees to radians		
rand	Generates a random number within a given range	rand(0, 1) rand(0, 100)	0.55678 97.12314

Examples

The following block rounds the mean latency down to an integer and saves it to a value:

```
<block myblock>
/ trials=[1-5=practicetrial; 6-10=testtrial)]
/ onblockend=[values.simplemean =
round(block.myblock.meanlatency)]
</block>
```

The following block finds the best performance from 3 different trial types and saves the result to a value.

```
<block myblock>
/ trials=[1-300=noreplace(t1, t2, t3)]
/ onblockend=[values.bestscore = max(trial.t1.percentcorrect,
trial.t2.percentcorrect, trial.t3.percentcorrect)]
```

```
</block>
```

Selection Functions

The following table lists functions for selecting randomly or otherwise from a pool of values.

Function	Description	Examples
noreplace	Randomly selects without replacement from a set of values	noreplace(1, 2, 3, 4, 5, 6, 7, 8, 9, 10) noreplace(0, 2.5, 5, 7.5, 10)
noreplacecorrect	Randomly selects without replacement if a correct response is given and with replacement if an incorrect response is given	noreplacecorrrect(1, 2, 3, 4, 5, 6, 7, 8, 9, 10) noreplacecorrect(0, 2.5, 5, 7.5, 10)
noreplaceerror	Randomly selects without replacement if an incorrect response is given and with replacement if a correct response is given	noreplaceerror(1, 2, 3, 4, 5, 6, 7, 8, 9, 10) noreplaceerror(0, 2.5, 5, 7.5, 10)
noreplacenorepeat	Randomly selects without replacement or consecutive selection fo a value	noreplacenorepeat(10, 20, 30, 40, 50, 60, 70, 80, 90, 100) noreplacenorepeat(0, .3333333, .6666667, 1)
replace	Randomly selects with replacement from a set of values	replace(10, 20, 30, 40, 50, 60, 70, 80, 90, 100) replace(0, .3333333, .6666667, 1)
replacenorepeat	Randomly selects with replacement if an incorrect response is given and with replacement if a correct response is given	replacenorepeat(10, 20, 30, 40, 50, 60, 70, 80, 90, 100) replacenorepeat(0, .3333333, .6666667, 1)
sequence	Selects the items in the specified order	sequence(10, 9, 8, 7, 6, 5, 4, 3, 2, 1) sequence(2, 4, 6, 8, 10)
getitem	Returns the item at the specified index.	getitem(counter.deck, 1) getitem(text.presenteditems, text.presenteditems.itemcount) getitem(item.useritems, item.useritems.itemcount - 1)
setitem	Sets the item at the specified index to the	setitem(counter.deck, values.currentcard, 10) setitem(text.presenteditems, text.targets.currentitem,

	specified value.	text.presenteditems.itemcount) setitem(item.useritems, values.firstresponse, 1)
insert	Inserts an item of the specified value into the specified index.	insert(counter.deck, values.currentcard, 2) insert(text.presenteditems, text.targets.currentitem, 1) insert(item.useritems, values.firstresponse, 1)
remove	Removes item at the specified index.	remove(counter.deck, 10) remove(text.presenteditems, text.presenteditems.itemcount) remove(item.useritems, item.useritems.itemcount - 1)
clear	Removes all items from a stimulus or counter.	clear(counter.deck) clear(text.response) clear(item.useritems)
reset	Resets a counter. If the counter selects without replacement, all items are returned to the selection pool. If selection is sequential, the first item in the pool is selected next.	reset(counter.odds) reset(picture.faces)

Examples

The following stimulus will be presented in a randomly selected position on the screen:

```
<picture mypic>
/ items = ("foo.jpg")
/ hposition = replace(0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%,
80%, 90%, 100%)
/ vposition = replace(0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%,
80%, 90%, 100%)
</picture>
```

The following trial has a response timeout that gets 50 milliseconds shorter each time the trial is run.

```
<trial mytrial>
/ stimulustimes = [1=target]
/ timeout = sequence(1000, 950, 900, 850, 800, 750, 700, 650,
600, 550, 500)
/ response = ("a", "b")
</block>
```

String Functions

The following table lists functions for analyzing and manipulating strings of text.

Funct	Description	Examples	Result

ion			
tolower	Converts all alphabetic characters in the string to lower case.	tolower("TURNIPS") tolower("Sales@Server.Com")	turnips sales@server.com
toupper	Converts all alphabetic characters in the string to upper case.	toupper("turnips")	TURNIPS
capitalize	Converts the first letter of each word in the string to upper case. This is useful for presenting proper nouns entered by the participant.	capitalize("john") capitalize("bill gates") capitalize(tolower("dIET cOKE"))	John Bill Gates Diet Coke
concat	Contenates two strings together.	concat("basket", "ball") concat(concat("United", " "), "States")	basketball United States
search	Searches the first string for any occurence of the second string. If the string is found, it returns the zero based index of the first occurence. If the string is not found, it returns -1.	search("benjamin", "ben") search("benjamin", "benji") search("benjamin", "jamin")	0 -1 3
replaceall	Searches the first string for all occurrences of the second string and replaces them with the third stringFinds all occurences of the Randomly	replaceall("Hello %name%", "%name%", "Julia") replaceall("old old old", "old", "new")	Hello Julia new new new

	selects with replacement from a set of values		
contains	Returns true if the first string contains the second string, otherwise false.	contains("sales@server.com", "@") containst("http://www.millisecond.com", "@")	true false
startswith	Returns true if the first string starts with the second string.	startswith("http://www.millisecond.com", "http://") startswith("Four score and seven years ago", " ")	true false
endswith	Returns true if the first string ends with the second string.	endswith("All's well that ends well.", ".") endswith("Why did the chicken cross the road", "?")	true false
substring	Returns a portion of the string starting at the specified start index and of the specified length	substring("www.millisecond.com", 4, 11)	millisecond
trim	Trims the characters in the second string from the beginning and end of the first string	trim(" hello ", " ")	hello
trimright	Trims the characters in the second string from the right side of the first string	trimright("Get into the chopper!", "!?.")	Get into the chopper
trimleft	Trims the characters in the second string from the left side of the first string	trimleft("$1.00", "$"))	1.00
length	Returns the length of the string	length("123") length("54321")	3 5
form	An advanced funtion that	format("You have %i points", 16) format("%.2f", 3.14159265)	You have 16 points 3.14

at	allows string substitutions and formatting of decimals using format strings as used by the C function printf.		
evaluate	An funtion that evaluates a string as an expression and returns the result.	evaluate("(1 + 6) * 5") evaluate(text.mathproblems.currentitem) - evaluate(text.mathproblems.currentitem)	35 0

Examples

The following stimulus will be presented in a randomly selected position on the screen:

```
<surveypage mypage>
/ caption = format
/ questions = [1=firsname; 2=lastname]
/ ontrialend = [text.firstname.item =
capitalize(lower(textbox.firstname.response))]
</surveypage>
```

The following trial has a response timeout that gets 50 milliseconds shorter each time the trial is run.

```
<block myblock>
/ trials = [1-100=test]
/ branch = [if( contains(textbox.college.response, "Cornell")
== true ) block.next]
</block>
```

Performance Metric Functions

The following table lists functions that calculate performance metrics and statistics. Many elements contain properties corresponding to these functions. The benefit of the functions is that they can compute performance metrics for combinations of elements, whereas the property returns the metric for its element only.

Consider, for example, a task involving two types of trials, a target trial and distractor trial. Using the totalpercentcorrect property, we can get the percent of correct responses on either trial element. Specifically, the expression "trial.target.totalpercentcorrect" returns the percentage for target trials, and "trial.distractor.totalpercentcorrect" returns percentage for distractor trials. What if we want the percent correct for both types of trials. For this, we can use the totalpercentcorrect function. Specifically, the expression "totalpercentcorrect(trial.target, trial.distractor)" will return the percentage for the combined set of trials. These functions can be used to compute metrics for any arbitrary combination of elements.

Fu	Description	Examples

nction		
correctcount	number of correct responses in the current block	correctcount(trial.targeta, trial.targetb, trial.targetc)
count	number of times the item was run within the current block	count(trial.foo, trial.bar, trial.foobar)
errorcount	number of incorrect responses in the current block	errorcount(trial.red, trial.green, trial.blue)
inwindowcount	number of responses occurring within the response window in the current block	inwindowcount(trial.category1, trial.category2)
maxlatency	maximum response latency in the current block	maxlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
meanlatency	mean response latency in the current block	meanlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
minlatency	minimum response latency in the current block	minlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
notinwindowcount	number of responses occurring outside the response window in the current block	notinwindowcount(trial.category1, trial.category2)
percentcorrect	percent of correct responses in the current block	percentcorrect(trial.stroopredred, trial.stroopgreengreen, trial.stroopyellowyellow, trial.stroopblueblue)
sdlatency	standard deviation of response latencies in the current block	sdlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
sumlaten	sum of response latencies in the current block	sumlatency(trial.leftlow, trial.lefthigh, trial.leftmid)

cy		
selectedcount	number of selected items	selectedcount(item.targets, item.distractors)
totalcorrectcount	total number of correct responses	totalcorrectcount(trial.critical, trial.test)
totalcount	total number of times the item was run so far	totalcount(trial.soa100, trial.soa300, trial.soa500)
totalerrorcount	total number of incorrect responses	totalerrorcount(trial.critical, trial.test)
totalinwindowcount	total number of responses occurring within the response window	totalinwindowcount(trial.congruent, trial.incongruent, trial.neutral)
totalmaxlatency	maximum response latency	totalmaxlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
totalmeanlatency	mean response latency	totalmeanlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
totalminlatency	minimum response latency	totalminlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
totalnotinwindowcount	total number of responses outside the response window	totalnotinwindowcount(trial.congruent, trial.incongruent, trial.neutral)

totalpercentcorrect	percent of correct responses	totalpercentcorrect(trial.bigtargeta, trial.bigtargetb, trialbigtargetc)
totalpercentinwindow	percent of responses within the response window	totalpercentinwindow(trial.congruent, trial.incongruent, trial.neutral)
totalsdlatency	standard deviation of response latencies	totalsdlatency(block.critical1, block.critical2)
totalsumlatency	total sum of response latencies	totalsumlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
totaltrialcount	total number of trials run	totaltrialcount(block.training1, block.training2)
totalvarlatency	variance of response latencies	totalvarlatency(trial.leftlow, trial.lefthigh, trial.leftmid)
trialcount	number of trials run within the current block	trialcount(trial.congruent, trial.incongruent)
unselectedcount	number of unselected items	unselectedcount(picture.target1, picture.target2, picture.target3)
varlatency	variance of response latencies within the current block	varatency(trial.leftlow, trial.lefthigh, trial.leftmid)

Constants

Inquisit includes a number of built-in constants that provide a convenient way to represent commonly used mathematical values in expressions.

Name	Description	Value	Examples
m_e	e	2.71828182845904523536	trial.condition1.correctcount + trial.condition2.correctcount values.firstscore + values.secondscore response.rw.windowcenter + 500
m_log2e	log2(e)	1.44269504088896340736	100 - trial.mytrial.percentcorrect block.incompat.meanlatency - block.compat.meanlatency
m_log10e	log10(e)	0.434294481903251827651	trial.test.correctcount * 5 trial.test.trialcount * trial.test.meanlatency
m_ln2	ln(2)	0.693147180559945309417	trial.mytrial.percentcorrect / 100 block.myblock.sumlatency / block.myblock.trialcount
m_ln10	ln(10)	2.30258509299404568402	
m_pi	pi	3.14159265358979323846	
m_pi_2	pi/2	1.57079632679489661923	
m_pi_4	pi/4	0.785398163397448309616	
m_1_pi	1/pi	0.318309886183790671538	
m_2_pi	2/pi	0.636619772367581343076	

m_2_sqrtpi	sqrt(2)	1.12837916709551257390	
true	true	1	if (values.showfeedback == true) { trial.feedbacktrial }
false	false	0	if (values.showfeedback == false) { trial.nexttrial }

Conditional Statements

Inquisit supports conditional logic in the form of if-then and if-then-else statements. If-then statements evaluate an expression if and only if the specified condition expression evaluates to true (or a nonzero value in the case of numberic expressions). If-then-else extend if-then statements with an expression that should evaluated when the condition expression is false (or zero).

Conditional statements are useful in a variety of commands, including branch, skip, ontrialbegin, ontrialend, and others.

Syntax	Examples

if (expression1) expression2
 	
if (expression1) expression2 else expression3
	if (block.test1.percentcorrect == 100 && block.test2.percentcorrect == 100)
	values.perfectscore = true
	
	if (block.test.percentcorrect < 70 && block.test.medianlatency > 500)
	response.rw.windowcenter = 600
	
	if (block.test1.percentcorrect < 100 || block.test2.percentcorrect < 100)
	values.perfectscore = false
	else
	values.perfectscore = true
	
	if (trial.recall.correct)
	{
	values.correctcount = values.correctcount + 1;
	remove(text.targets, text.targets.currentitemnumber);
	}

Note that the condition expression that immediately follows the "if" keyword must be enclosed in parentheses.

Beware. A common mistake with conditional expressions is using the "=" operator when you actually mean to use the "==" operator. The "=" operator assigns the value on the right side to the variable on the left, and it returns that value. The "==" operator compares the values on left and right, return true if they are equal and false if not.

For example, the following expression sets the value of values.score and returns 25:

values.score = 25

The following compares values.score with 25, and returns true if they are equal and false otherwise.

values.score == 25

Special characters

When you are creating text items or instruction pages, some characters require special treatment. For example, imagine that you are creating a text stimulus that contains quotes. Quotes play a special role in Inquisit syntax of marking the beginning and the end of a stimulus item, so Inquisit needs away to distinguish quotes that are part of the item from those that indicate the beginning and end. If a quote is preceded by the escape character '~', this tells Inquisit that the quote is not a delimiter, but should be included in the item.

For example, the following text stimulus:

```
<text mytext>
/ items = ("The man said ~"hello~".")
/ size = (300, 200)
</text>
```

appears on the screen as

The main said "hello".

The following text stimulus, however, will result in a warning that there is extra text at the end of the item definition because the quotes are treated as markers of the beginning and end of the item:

```
<text mytext>
/ items = ("The man said "hello".")
/ size = (300, 200)
</text>
```

Other special characters that are expressed using the escape character '~' include tabs, newlines, and carriage returns. The list of special characters is below.

Character	Escape sequence	Appearance on the screen
double quote	~"	literal quote
tab	~t	tab space
carriage return	~r	line break (applies to instruction pages and text stimuli with the size attribute specified)
new line	~n	line break (applies to instruction pages and text stimuli with the size attribute specified)

Comments

Comments are text snippets in the script that the author intends to be ignored by Inquisit's script parser. Typically, comments are notes the author writes in the script describing the purpose of the script, how it works, or other useful information. Comments can make a script easier to understand for others, and they can serve as reminders about easily forgotten details.

Inquisit's rules for comments are as follows:

1. Comments may appear anywhere outside of an element definition. In other words, they may not appear between <*element* and </*element*>, where element is any Inquisit script element (e.g., <trial>, <block>, <picture>, <defaults>, etc.)
2. Comment can include any text *except* the beginning of an element definition. That is, comments may not include "<*element*", where *element* is any Inquisit script element (e.g., <trial>, <block>, <picture>, <defaults>, etc.)

Data Recording

Data are written in a non-proprietary UTF-8 tab-delimited text format to the file specified in the message window that appears at the bottom of the script editor. If the data file already contains data, the new data are appended to existing data. A separate line of data is written for each trial in the experiment.

The default order of variables values on each line of data is as follows:

1. Current date (mmddyy)
2. Experiment starting time (hh:mm)
3. Group id
4. Subject id
5. Block number
6. Trial number
7. Trial code
8. Pretrialpause (ms)
9. Posttrialpause (ms)
10. Scan code of the key with which the subject responded
11. Whether or not the given response was the correct response
12. Response latency (ms following the end of the last display frame).
13. Response window center (milliseconds following the end of the last display frame; 0 if no response window is used).
14. The next N variables are the item numbers of the stimuli shown on each trial recorded in the order in which those stimuli were presented. N is equal to the greatest number of stimuli presented on any single trial defined in the script. For trials on which less than N stimuli were presented, a value of 0 is recorded in the extra columns.

To customize the way data is written to file, define a data element and set its attributes according to preference.

Keyboard Scan Codes

Inquisit records the Scan Code of the subject's response in the response column of the data file. Each key on the keyboard has a single, unique scan code, given in the table below.

Scancode	Keyboard Key
1	ESC
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	0
12	-
13	=
14	bs
15	Tab
16	Q
17	W
18	E
19	R
20	T
21	Y
22	U
23	I
24	O
25	P
26	[
27	]
28	Enter
29	CTRL
30	A
31	S
32	D
33	F
34	G
35	H

36	J
37	K
38	L
39	;
40	'
41	`
42	LShift
43	\
44	Z
45	X
46	C
47	V
48	B
49	N
50	M
51	,
52	.
53	/
54	RShift
55	PrtSc
56	Alt
57	Space
58	Caps
59	F1
60	F2
61	F3
62	F4
63	F5
64	F6
65	F7
66	F8
67	F9
68	F10
69	Num
70	Scroll
71	Home (7)
72	Up (8)
73	PgUp (9)
74	-
75	Left (4)

76	Center (5)
77	Right (6)
78	+
79	End (1)
80	Down (2)
81	PgDn (3)
82	Ins
83	Del