Praat Scripting Workshop

Amy Hemmeter & Eric Wilbanks

North Carolina State University

Friday, September 18, 2015
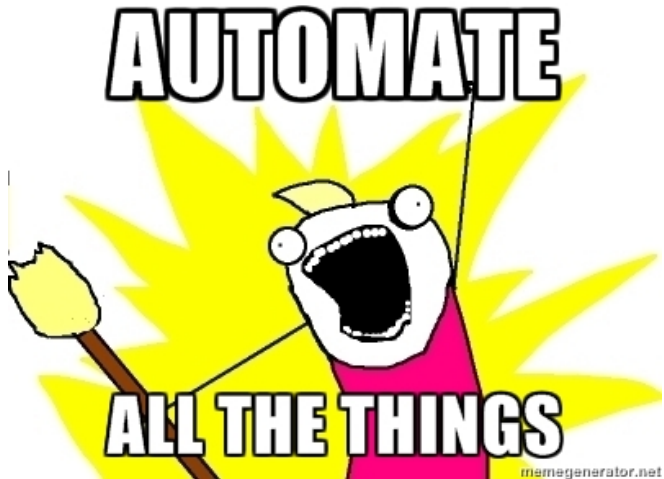
Introduction

Introduction
Definitions
Examples
Wrap-Up

Why Scripting?
What Even is Scripting?
Objectives

Why Scripting?

- ▶ Making measurements by hand is really tedious and repetitive.
- ▶ In some areas of research, **"10,000 tokens is for children!"** - Anonymous Linguistics Professor

Luckily we can use scripting to...

Introduction
Definitions
Examples
Wrap-Up

Why Scripting?
What Even is Scripting?
Objectives

Introduction
Definitions
Examples
Wrap-Up

Why Scripting?
What Even is Scripting?
Objectives

What Even is Scripting?

- ▶ Computers are stupid. We have to be VERY explicit.
- ▶ Scripts give computers instructions in a linear order.
- ▶ Acoustic/Temporal Measurements can be done automatically.
- ▶ These measurements can be saved in an output file.

Introduction
Definitions
Examples
Wrap-Up

Why Scripting?
What Even is Scripting?
Objectives

Objectives

▶ Learn what Praat Scripting is and how it's used
▶ Discover approaches to answer your own research questions

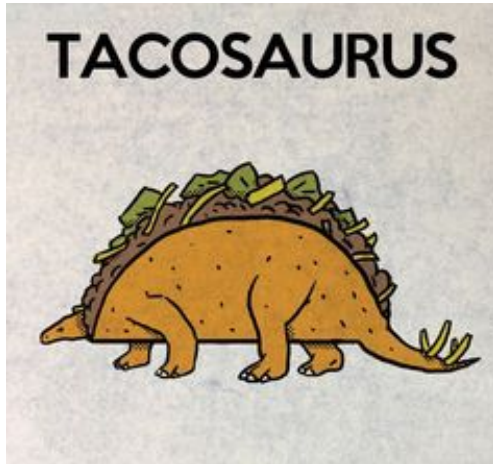# Definitions

Definitions

1. **Variable** - like in algebra, we make variables and assign them
   a value. $x = 5$ or current_word$ $= 1100$. We can refer to
   variables later and get their values.
   1.1 **Numeric** - contain numbers, you *can do math* with them
   1.2 **String** - contain numbers or letters, you *can't do math* with
       them. In praat string variables end with **'$'**
2. **Operations** - predefined functions that do a certain action.
   e.g. *printline*, *Get number of formants*, *select TextGrid* (often
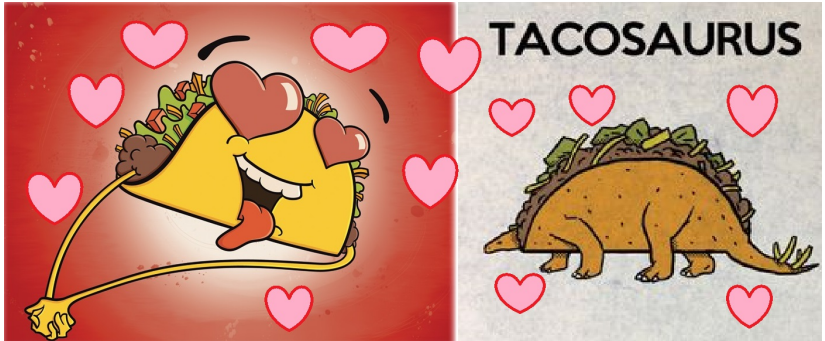   linked to buttons!)

Definitions II

4. **For Loop** - Does a specific set of operations multiple times, increasing the numeric '**iterator**' variable by one each time. (example later!)

5. **Iterate** - To go through loop one by one

6. **If/Elif/Else Statements** - Tests a condition (i.e. **if** $x > 3$) and if the condition is true, completes a certain option. If you include an **Elif** (short for "else if") or **Else** statement, it will test other options.

Tacosaurus

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

This is Tacosaurus

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Tacosaurus Loves Tacos

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Numeric Taco Variables

```
tacosaurus = 10
so_many_tacos = 55
one_taco = 1
no_tacos = 0

sad_tacosaurus = tacosaurus + no_tacos
happy_tacosaurus = tacosaurus + one_taco
so_happy_tacosaurus = tacosaurus + so_many_tacos

printline 'sad_tacosaurus'
printline 'happy_tacosaurus'
printline 'so_happy_tacosaurus'
```

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

String Taco Variables

```
tacosaurus_name$ = "Melinda"
tacosaurus_friend$ = "Joey"

printline 'tacosaurus_name$' and 'tacosaurus_friend$' both love tacos!

#Why won't this line run?
'tacosaurus_name$' + 'tacosaurus_friend$'
```

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Taco For Loop

Let's say that tacosaurus will eat up to 10 tacos but will get too full to eat 11.

```
tacos_to_eat = 10

for taco_number from 1 to 20
    leftover_tacos = taco_number - tacos_to_eat
    printline There are 'leftover_tacos' tacos left.
endfor
```

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Taco If Condition

Negative taco numbers aren't very informative!

```
tacos_to_eat = 10

for taco_number from 1 to 20
    leftover_tacos = taco_number - tacos_to_eat

    if leftover_tacos > 0
        printline There are 'leftover_tacos' tacos left!
    endif

    if leftover_tacos < 1
        printline There are no tacos left!
    endif
endfor
```

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Taco Else Conditions

There's a more elegant way to do this though!

```
tacos_to_eat = 10

for taco_number from 1 to 20
    leftover_tacos = taco_number - tacos_to_eat

    if leftover_tacos > 1
        printline Tacosaurus is full! There are 'leftover_tacos' tacos left. :D
    elif leftover_tacos == 1
        printline Tacosaurus is full! There is 1 taco left. :)
    elif leftover_tacos == 0
        printline Tacosaurus is full! But there are no tacos left. :|
    else
        printline Tacosaurus is still hungry! There are no tacos left. :(
    endif
endfor
```

Segment Duration

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Using TextGrids

- ▶ Download the WAV file and TextGrid from
  http://phon.wordpress.ncsu.edu/workshops/.
- ▶ Open them in Praat.
- ▶ Let's look at the structure of a TextGrid!
- ▶ TextGrids like this are generated using **forced alignment**
  (`http://phon.wordpress.ncsu.edu/lab-manual/`
  `forced-alignment/`) or by hand.
- ▶ 99% of the scripting you'll do will be based off of having a
  WAV file and a TextGrid.

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Manually Determining Segment Length

1. Select the TextGrid
2. Select "Query" and then "Query Interval Tier" and "Get Number of Intervals..."
3. Now select "Query" and "Query Interval Tier" and "Get Starting Point". Put in the value '5'
4. Now select "Query" and "Query Interval Tier" and "Get End Point". Put in the value '5'
5. Now we can calculate the duration of that individual interval by subtracting the start time from the end time.

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Paste History

(Nearly) every operation you need in a script can be done using the
Praat Menus.

To see the operations we've just done as actual script commands,
select *Praat → New Praat Script*. In the praat script window,
select *Edit → Paste History*.

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Automating Duration Measurements

Select our TextGrid
Find out how many intervals are on the tier
Delete our output file (from previous runs)

Start a for loop from 1 to the number of intervals
   Get the start time of the n'th interval
   Get the end time of the n'th interval
   Subtract the two to get the duration
   Get the label of the interval
   Add a line to the output file giving the label and duration
End the For loop

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Automating Duration Measurements

```
select TextGrid YourTextGridNameHere
num_phone = Get number of intervals... 1
filedelete our_output.csv

for interval from 1 to num_phone
    start_time = Get starting point... 1 'interval'
    end_time = Get end point... 1 'interval'
    curr_duration = 'end_time' - 'start_time'
    curr_label$ = Get label of interval... 1 'interval'
    fileappend our_output.csv 'curr_label$','curr_duration''newline$'
endfor
```

Get Formants

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Get Formants

Let's practice editing an existing script by downloading and opening the get_formants.praat script:
(http://phon.chass.ncsu.edu/manual/get_formants.praat)

Let's work through the structure of the script as a group!

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Altering Get Formants

Let's suppose we're only interested in measuring the /ɪ/ vowel in stressed position (**IH1**).

Edit the get_formants.praat script to only get the output for these segments.

Introduction
Definitions
Examples
Wrap-Up

Tacosaurus
Segment Duration
Get Formants

Altering Get Formants

What if we wanted to measure the middle 50% of that vowel and make measurements every 5 ms?

Edit the get_formants.praat script to get measurements at these points.

Wrap-Up

Introduction
Definitions
Examples
Wrap-Up

Wrap-Up
Questions
Resources

Scripting & You!

99% of the scripts you'll use are variations on the same basic process:

1. Find out how to measure your variable (remember paste history!)

2. Make a for loop and iterate over all your textgrid segments

3. For every segment/loop, make your measurements

4. Save your measurements

5. ???

6. Profit

Introduction
Definitions
Examples
Wrap-Up

Wrap-Up
Questions
Resources

Questions?

1. Do you have any concepts you're not 100% on?
2. What sorts of things are you interested in measuring via scripting for your own projects?
3. General questions?

Introduction
Definitions
Examples
Wrap-Up

Wrap-Up
Questions
Resources

Resources

- ▶ **Phon Lab Manual** (http://phon.wordpress.ncsu.edu/lab-manual/scripts/praat-scripting/)
- ▶ **Phon Lab Script Repository** (http://phon.wordpress.ncsu.edu/lab-manual/scripts/script-repository/)
- ▶ **Praat Manual** (http://www.fon.hum.uva.nl/praat/manual/Scripting.html)
- ▶ **Fairly Active Yahoo Group** (https://uk.groups.yahoo.com/neo/groups/praat-users/info)
- ▶ **Will Styler's Praat Resources** (http://savethevowels.org/praat/)
- ▶ **Kevin McGowan's 2013 Institute Praat Scripting Class** (https://drive.google.com/a/ncsu.edu/folderview?id=0ByAC-QTMbxfFY2tNUTBQVEJ3WEE&usp=sharing)

Introduction
Definitions
Examples
Wrap-Up

Wrap-Up
Questions
Resources