

# A.L.B.U.S.

Automated Language Building  
Using Spreadsheets

Azkatraz 2009

San Francisco, CA

Presenter: Keith Melchiors

# ALBUS: Outline

- From substitution cipher to fictional language
- Basic string manipulation in excel
- Excel How-To for required functions
- Crafting a convincing cipher-based language
- Examples and demonstration

Questions welcome throughout!

# What is a Substitution Cipher?

- A substitution cipher is a simple encryption algorithm (or “code”) that switches normal characters into ciphertext characters based on a user defined “key”
- For example: Use the key to decode this word:

Encoded Word:

“MILLA”

Encryption Key:

Cipher Letter:	Normal Letter:
A	Y
I	A
L	R
M	H

# What is a Substitution Cipher?

- By selecting a ciphertext letter for each letter of the alphabet, you can encrypt the entire English language.
- Using this simple substitution cipher in an artful way can produce pseudo-languages that sound foreign... but are simply encrypted English.
- Manual encryption using a key is slow and tedious.... this is where Excel comes in handy!

# Why use Excel?

- Excel (Or OpenOffice Calc) uses input from one cell to calculate what appears in another cell
- Excel can work with letters or numbers
- Excel can do in seconds what a human would require hours to accomplish
- Using Excel, we can:
  - Deconstruct a phrase letter-for-letter
  - Apply our substitution rules
  - Reconstruct the phrase (in a split second!)

# Excel: Types of Input

Input	Description
Numerical	Numbers can be directly entered into cells and functions for mathematical / logical purposes.
Letters / Symbols	Text and symbols are often entered as raw data.
Functions & Equations	Equations calculate numbers. Functions can calculate OR use logic to arrive at an answer.
References	Relative references move in relation to a copied function. Absolute references stay exactly where you initially put them.

# Excel: Basic String Manipulation

## Useful Functions Include:

Function	What it does
=Len(A)	Calculate the length of String A (the number of characters)
=Left(A,#)	Return the left-most # characters in String A
=Right(A,#)	Return the right-most # characters in String A
=Concatenate(A,B,C[,...]) =A&B&C[...]	Join A, B, C (etc.) into a single string.

# Excel: Logical Operators

## Useful Functions Include:

Function	What it does
=If(A,B,C)	If A is true (for example, "1+1=2"), Then do B ("Correct"). Otherwise, do C ("Incorrect").
=Vlookup(A,B,C,D)	<ul style="list-style-type: none"><li>•Lookup value A within the first column of table B.</li><li>•When you find A, count over C columns and display whatever you find there.</li></ul> <p>[Set D to "False" to find only an exact match with A] [Set D to "True" if the vlookup is looking for a number, and it is allowed to find the closest match without going over (like The Price Is Right).]</p>

# Excel: Example Syntax

	A	B	C	D	E
1					
2		<b>Name</b>	<b>Hair Color</b>		
3		Harry	Black		
4		Ron	Red		
5		Hermione	Brown		
6					
7					
8		<b>Function</b>	<b>Syntax</b>	<b>Result</b>	
9		Len	=Len(B3)	5	
10		Left	=Left(B3)	H	
11		Right	=Right(B3)	y	
12		Left & Right	=Right(Left(B5,4),1)	m	
13		If [true]	=If(B4="Ron","Alpha","Bravo")	Alpha	
14		If [false]	=If(B4=B5,"Kappa","Gamma")	Gamma	
15		Vlookup	=VLOOKUP("Ron",B3:C5,2,FALSE)	Red	
16					

# ALBUS: Step By Step

- 1) Create a substitution key.
- 2) Deconstruct the original phrase into individual characters (with the help of an index column).
- 3) Apply the substitution to each character.
- 4) Reconstitute the encrypted phrase (via concatenation)

# ALBUS Tips & Tricks

- In general, replace a vowel with a vowel and a consonant with a consonant
- To make a natural sounding language, try to find letter pairs that are similar in enunciation
- Excel tip: Use the single apostrophe > ' < (the one next to the enter key) to make a cell blank
- Use the dollar sign > \$ < before a row/column reference to make it absolute. (E24 → \$E\$24)
- OpenOffice uses semicolons instead of commas

# Copyright / Fair Use Issues

- The birth of the ALBUS spreadsheet: “Long ago, in a far away land...”
- Using an ALBUS language will ensure that your fiction does not resemble published works
- Due to the almost infinite combination of letter pairs, its possible for ALBUS users to create very different languages.
- You can use any language as the basis for the “normal text” - the methodology stays the same

# Questions?

Great! Let's get to the walkthrough...

# But First...

To download this presentation and the example spreadsheet file....

<http://keithmelchiors.com/Azkatraz.aspx>