

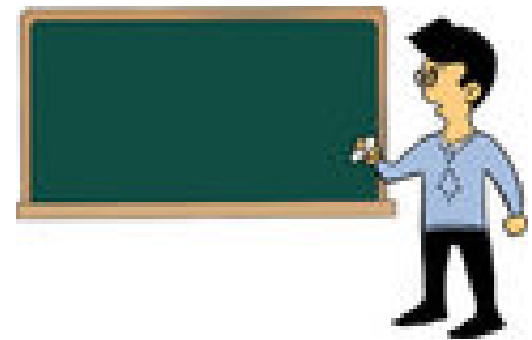
# New Features in TamStat

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# TamStat in the Classroom

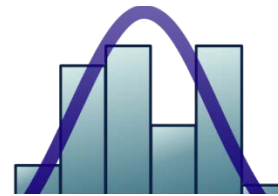
- ▶ Spring 2016:

- Statistics for Business II (Undergraduate Course) – Inferential Statistics and Regression
- Management Science Module (MBA Course) – (Decision Science) – Simulation



# Fall 2016

- Statistics for Business I (Undergraduate Course) – Statistical Measures, Probability, Discrete and Continuous Distributions



- Management (Decision) Science (Undergraduate Course) – Simulation



# Management Science Module (MBA Students)



- ▶ Created an executable file which allows students to run on Windows PC by simply downloading it. No installer necessary.
- ▶ Crystal Ball Simulation program runs on Excel, but students must use lab or install trial version for 15 days on their PCs.
- ▶ TamStat simulation – easy to install and easy to run.
- ▶ Students did well on take home final exam using TamStat

# Inferential Statistics Class (Undergraduate)



## ▶ Most common complaints

1. TamStat won't run on a MAC
  - Dyalog free download permits use on a Mac (without GUI)
  - HTML5 will permit GUI on all platforms
2. Can't use TamStat on a test
  - Can't use Minitab or Excel on a test either except in computer lab.
  - Individual student taking reader class brought in PC.
3. Understanding TamStat Syntax
  - Introduce basic APL concepts such as arrays, functions, and operators.
  - Create expression builders



# Introduce APL Syntax Using Concepts Familiar to Students

## ▶ Arrays

Scalars, Vectors and Matrices as:  
items, lists and tables

## ▶ Functions

Monadic, Dyadic, and Summary Functions

$$f(x) = \sqrt{x} \quad f(x, y) = x + y \quad y = f(x_1, x_2, \dots, x_n) = f(\vec{x})$$

## ▶ Operators

Derivative, Inverse, and Composition

$$y = f'(x) \quad y = f^{-1}(x) \quad y = (f \circ g)(x)$$

Calculus      Pre-Calculus      Pre-Calculus

# Keep it simple!



- ▶ Maximum of one or two functions per expression
- ▶ Maximum of one operator
- ▶ Assign result for use in subsequent expression
- ▶ Don't try to use complex one-liners!
- ▶ This avoids confusion over order of operations

# Expression Builders



- ▶ **Distribution Wizard**
  - Probability, CriticalValue, RandomVariable
- ▶ **Hypothesis Wizard**
  - Mean, Proportion, Variance, one and two variables
- ▶ **Graphics Wizard**
  - Frequencies, BarCharts, Histograms, BoxPlots
- ▶ **Regression Wizard**
  - Simple and multiple regression, confidence and prediction intervals, residual plots



# TamStat Demo



# Distribution Wizard

- ▶ 5 .2 binomial prob = 2
- ▶ 5 .2 binomial prob <= 2
- ▶ 5 .2 binomial randomVariable 10
- ▶ 5 .2 binomial theoretical mean 0
- ▶ normal prob < 1.5
- ▶ normal prob > 1.5
- ▶ normal prob between 1 2
- ▶ normal criticalValue > .90
- ▶ 5 tDist criticalValue < .05
- ▶ 5 chiSquare criticalValue < .01
- ▶ normal random variable 5

# Hypothesis Wizard

- ▶ `D<-import ‘ ’`
- ▶ `D.Height mean hypothesis = 68`
- ▶ `D.(State eq ‘PA’) proportion hypothesis > .25`
- ▶ `D.Height var hypothesis > 9`

# Graphics Wizard

- ▶ frequency D.State
- ▶ frequency D.State D.Sex
- ▶ barChart D.State
- ▶ barChart D.State D.Sex
- ▶ boxPlot D.Height
- ▶ boxPlot D.Height D.Sex
- ▶ histogram D.Height

# Regression Wizard

- ▶ `MODEL ← Regress D.Height D.ShoeSize`
- ▶ `MODEL.f 9.5`
- ▶ `MODEL.f confInt 9.5`
- ▶ `MODEL.f predInt 9.5`
- ▶ `MODEL ← Regress D.Height D.ShoeSize D.(Sex eq 'M')`

# Regression Problem

- ▶ **CSI Scranton:** You are investigating a murder and you find a bloody footprint near the victim. When you measure it, it matches a size 9-1/2 shoe. How tall is the suspect?
- ▶ After determining that the shoe print is that of a male suspect, find a model for determining the height of the suspect.
- ▶ Find a 95% prediction interval for the height of the suspect.

