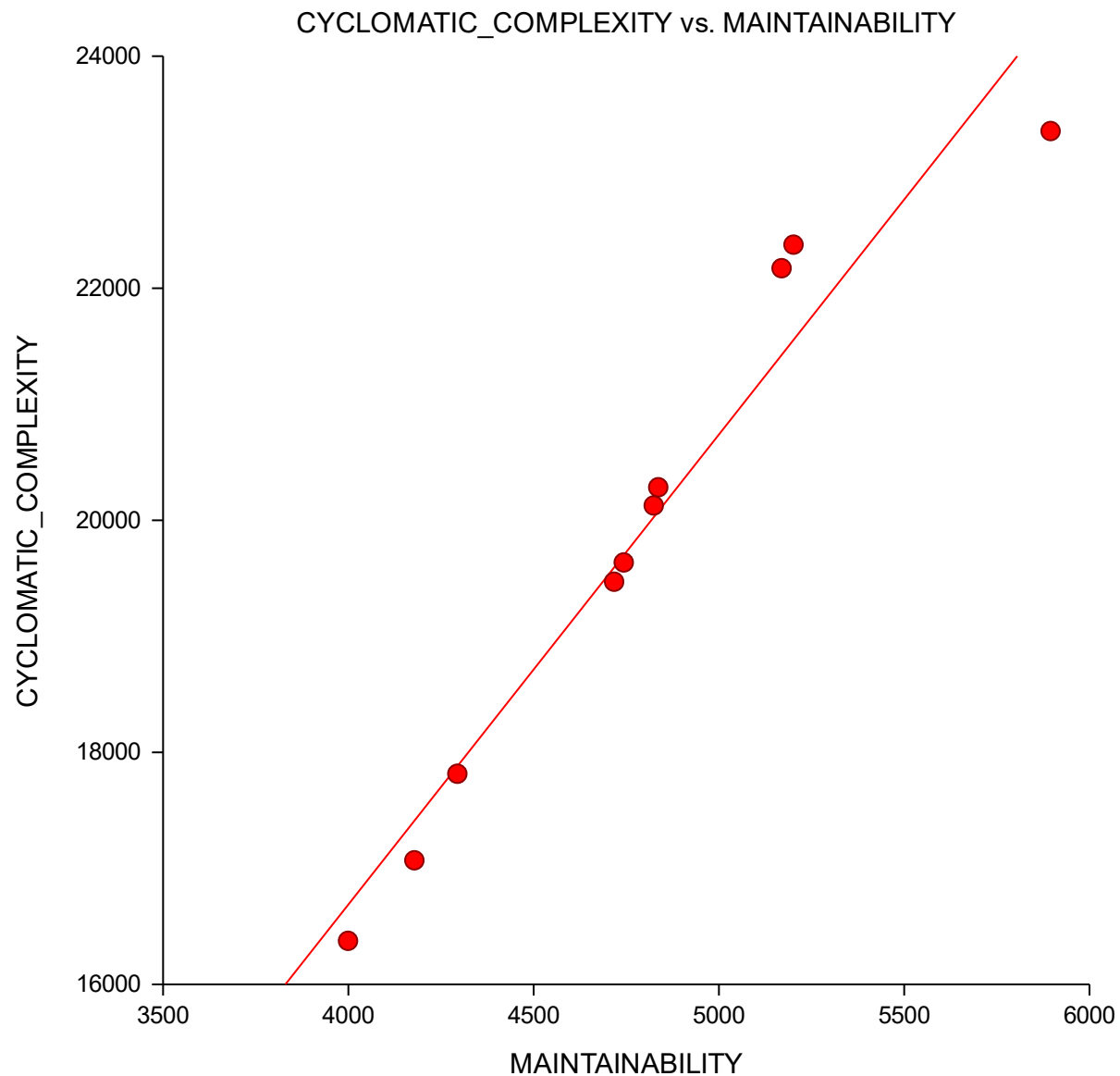


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Linear Regression Report

Dataset Untitled
Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

Linear Regression Plot Section



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Linear Regression Report

Dataset Untitled
 Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

Run Summary Section

Parameter	Value	Parameter	Value
Dependent Variable	CYCLOMATIC_COMPLEXITY		Rows Processed
10			
Independent Variable	MAINTAINABILITY	Rows Used in Estimation	10
Frequency Variable	None	Rows with X Missing	0
Weight Variable	None	Rows with Freq Missing	0
Intercept	458.8101	Rows Prediction Only	0
Slope	4.0559	Sum of Frequencies	10
R-Squared	0.9475	Sum of Weights	10.0000
Correlation	0.9734	Coefficient of Variation	0.0284
Mean Square Error	318085.8	Square Root of MSE	563.9909

Summary Statement

The equation of the straight line relating CYCLOMATIC_COMPLEXITY and MAINTAINABILITY is estimated as: $CYCLOMATIC_COMPLEXITY = (458.8101) + (4.0559) MAINTAINABILITY$ using the 10 observations in this dataset. The y-intercept, the estimated value of CYCLOMATIC_COMPLEXITY when MAINTAINABILITY is zero, is 458.8101 with a standard error of 1625.5548. The slope, the estimated change in CYCLOMATIC_COMPLEXITY per unit change in MAINTAINABILITY, is 4.0559 with a standard error of 0.3376. The value of R-Squared, the proportion of the variation in CYCLOMATIC_COMPLEXITY that can be accounted for by variation in MAINTAINABILITY, is 0.9475. The correlation between CYCLOMATIC_COMPLEXITY and MAINTAINABILITY is 0.9734.

A significance test that the slope is zero resulted in a t-value of 12.0130. The significance level of this t-test is 0.0000. Since $0.0000 < 0.0500$, the hypothesis that the slope is zero is rejected.

The estimated slope is 4.0559. The lower limit of the 95% confidence interval for the slope is 3.2773 and the upper limit is 4.8345. The estimated intercept is 458.8101. The lower limit of the 95% confidence interval for the intercept is -3289.7261 and the upper limit is 4207.3462.

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Linear Regression Report

Dataset Untitled
Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

Regression Estimation Section

Parameter	Intercept B(0)	Slope B(1)
Regression Coefficients	458.8101	4.0559
Lower 95% Confidence Limit	-3289.7261	3.2773
Upper 95% Confidence Limit	4207.3462	4.8345
Standard Error	1625.5548	0.3376
Standardized Coefficient	0.0000	0.9734
T Value	0.2822	12.0130
Prob Level (T Test)	0.7849	0.0000
Reject H0 (Alpha = 0.0500)	No	Yes
Power (Alpha = 0.0500)	0.0572	1.0000
Regression of Y on X	458.8101	4.0559
Inverse Regression from X on Y	-617.1857	4.2807
Orthogonal Regression of Y and X	-558.4280	4.2685

Notes:

The above report shows the least-squares estimates of the intercept and slope followed by the corresponding standard errors, confidence intervals, and hypothesis tests. Note that these results are based on several assumptions that should be validated before they are used.

Estimated Model

$(458.810070897918) + (4.05589475282147) * (\text{MAINTAINABILITY})$

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Linear Regression Report

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Correlation and R-Squared Section

Parameter	Pearson Correlation Coefficient	R-Squared	Spearman Rank Correlation Coefficient
Estimated Value	0.9734	0.9475	1.0000
Lower 95% Conf. Limit (r dist'n)	0.8771		
Upper 95% Conf. Limit (r dist'n)	0.9927		
Lower 95% Conf. Limit (Fisher's z)	0.8880		1.0000
Upper 95% Conf. Limit (Fisher's z)	0.9939		1.0000
Adjusted (Rbar)		0.9409	
T-Value for H0: Rho = 0	12.0130	12.0130	
Prob Level for H0: Rho = 0	0.0000	0.0000	0.0000

Notes:

The confidence interval for the Pearson correlation assumes that X and Y follow the bivariate normal distribution. This is a different assumption from linear regression which assumes that X is fixed and Y is normally distributed.

Two confidence intervals are given. The first is based on the exact distribution of Pearson's correlation. The second is based on Fisher's z transformation which approximates the exact distribution using the normal distribution. Why are both provided? Because most books only mention Fisher's approximate method, it will often be needed to do homework. However, the exact methods should be used whenever possible.

The confidence limits can be used to test hypotheses about the correlation. To test the hypothesis that rho is a specific value, say r_0 , check to see if r_0 is between the confidence limits. If it is, the null hypothesis that $\rho = r_0$ is not rejected. If r_0 is outside the limits, the null hypothesis is rejected.

Spearman's Rank correlation is calculated by replacing the original data with their ranks. This correlation is used when some of the assumptions may be invalid.

Summary Matrices

Index	X'X 0	X'X 1	X'Y 2	X'X Inverse 0	X'X Inverse 1
0	10	47856	198687	8.307283	-0.001714996
1	47856	2.318101E+08	9.621542E+08	-0.001714996	3.583659E-07
2 (Y'Y)			3.996101E+09		
Determinant		2.790444E+07			3.583659E-08

Variance - Covariance Matrix of Regression Coefficients

Index	VC(b) 0	VC(b) 1
0	2642429	-545.5157
1	-545.5157	0.1139911

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Linear Regression Report

Dataset Untitled
 Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

Tests of Assumptions Section

Assumption/Test	Test Value	Prob Level	Is the Assumption Reasonable at the 0.2000 Level of Significance?
Residuals follow Normal Distribution?			
Shapiro Wilk	0.9408	0.562446	Yes
Anderson Darling	0.3795	0.404466	Yes
D'Agostino Skewness	-0.1672	0.867243	Yes
D'Agostino Kurtosis	0.7113	0.476882	Yes
D'Agostino Omnibus	0.5339	0.765701	Yes
Constant Residual Variance?			
Modified Levene Test	3.1572	0.113492	No
Relationship is a Straight Line?			
Lack of Linear Fit F(0, 0) Test	0.0000	0.000000	No

No Serial Correlation?

Evaluate the Serial-Correlation report and the Durbin-Watson test if you have equal-spaced, time series data.

Notes:

A 'Yes' means there is not enough evidence to make this assumption seem unreasonable. This lack of evidence may be because the sample size is too small, the assumptions of the test itself are not met, or the assumption is valid.

A 'No' means the that the assumption is not reasonable. However, since these tests are related to sample size, you should assess the role of sample size in the tests by also evaluating the appropriate plots and graphs. A large dataset (say $N > 500$) will often fail at least one of the normality tests because it is hard to find a large dataset that is perfectly normal.

Normality and Constant Residual Variance:

Possible remedies for the failure of these assumptions include using a transformation of Y such as the log or square root, correcting data-recording errors found by looking into outliers, adding additional independent variables, using robust regression, or using bootstrap methods.

Straight-Line:

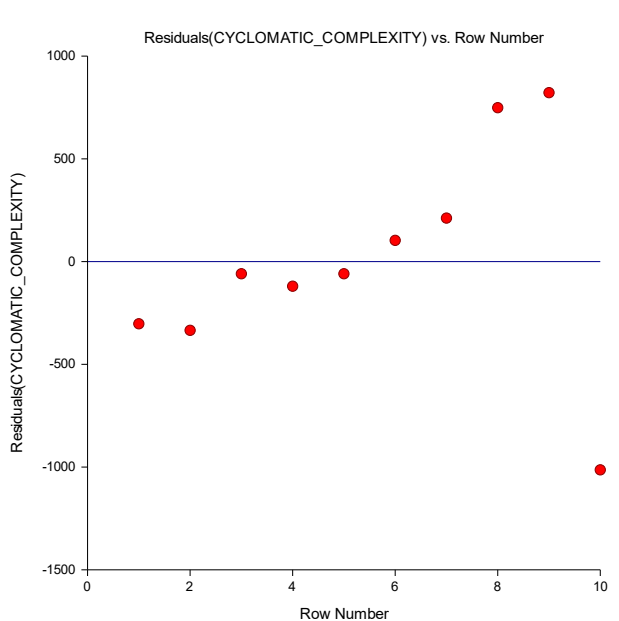
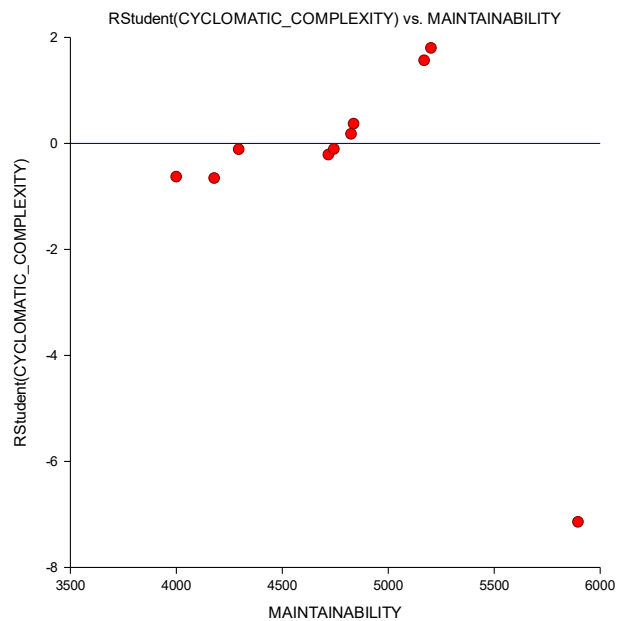
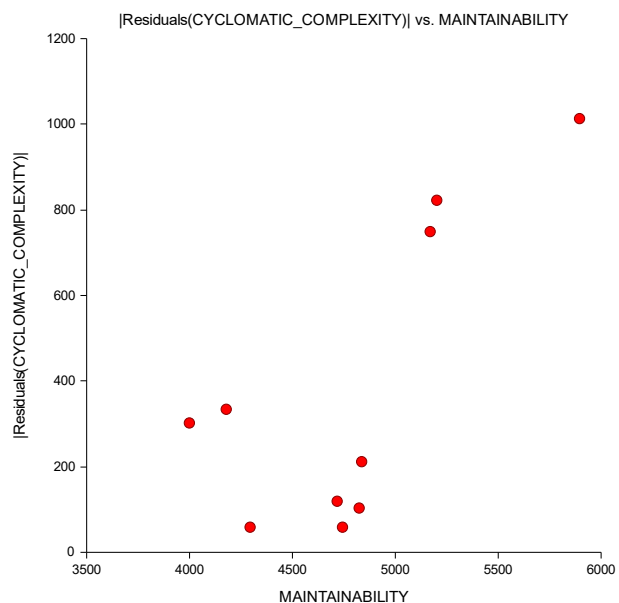
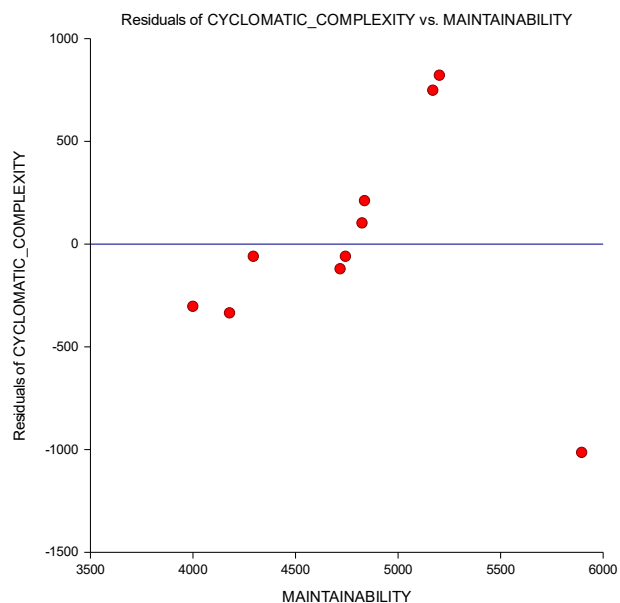
Possible remedies for the failure of this assumption include using nonlinear regression or polynomial regression.

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Linear Regression Report

Dataset Untitled
Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

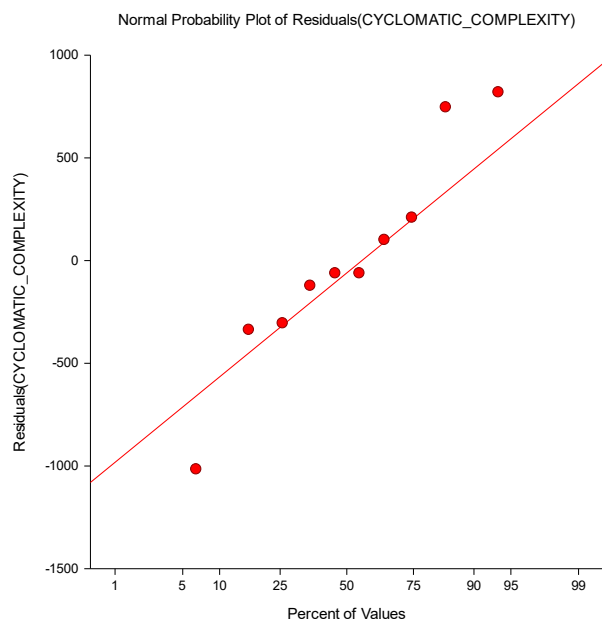
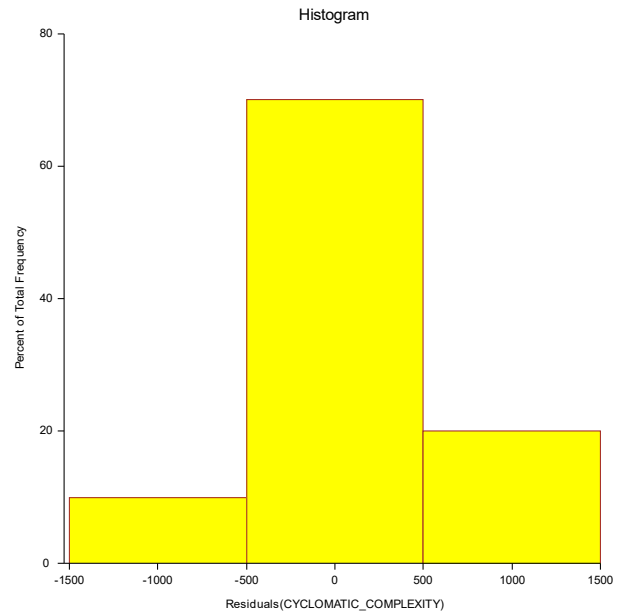
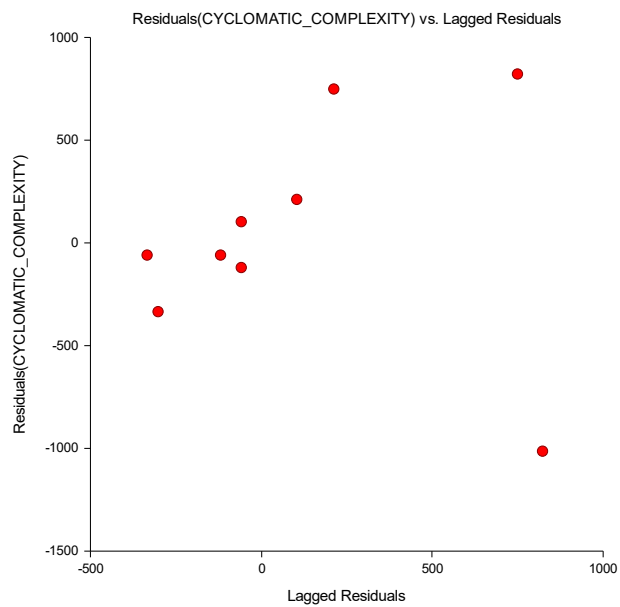
Residual Plots Section



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Linear Regression Report

Dataset Untitled
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Linear Regression Report

Dataset Untitled
 Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

Procedure Input Settings

Autosaved Template File

C:\Users\KASATLA\Documents\NCSS 12\Procedure Templates\Autosave\Linear Regression and Correlation - Autosaved 2018_3_30-1_6_15.t153

Variables Tab

-- Variables -----
 Y: Dependent Variable(s): CYCLOMATIC_COMPLEXITY
 X: Independent Variable: MAINTAINABILITY
 Frequency Variable: <Empty>
 Weight Variable: <Empty>

-- Model Specification -----
 Remove Intercept Unchecked

-- Resampling (Increases computation time) -----
 Calculate Bootstrap C.I.'s Unchecked
 Run Randomization Tests Unchecked

-- Alpha Levels -----
 Alpha for C.I.'s and Tests: 0.050
 Alpha for Assumptions: 0.20

Reports Tab

-- Select Report / Plot Group -----
 Select a Group of Reports and Plots: Display only those items that are CHECKED BELOW
 Show Notes Checked
 Show All Rows Checked

-- Select Reports -----
 .. Summaries
 Run Summary Checked
 Summary Statement Checked
 Descriptive Statistics Unchecked
 Correlation and R-Squared Checked
 Summary Matrices Checked

.. Estimation
 Regression Estimation Checked

.. ANOVA
 ANOVA Unchecked

.. Assumptions
 Assumptions Checked
 Levene Groups: 2
 Durbin-Watson Unchecked
 PRESS Unchecked

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Linear Regression Report

Dataset Untitled
 Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

Procedure Input Settings (Continued)

Reports Tab (Continued)

-- Prediction -----

Predict Y at these X values:	<Empty>
Predicted Y - C.L.	Unchecked
Predicted Y - P.L.	Unchecked

-- Row-by-Row Lists -----

Original Data	Unchecked
Predicted Y Means	Unchecked
Predicted Y Individuals	Unchecked
Simultaneous Bands	Unchecked
Predicted X Means	Unchecked
Predicted X Individuals	Unchecked

-- Regression Diagnostics -----

Residuals	Unchecked
Residual Diagnostics	Unchecked
Leave One Row Out	Unchecked
Outlier Detection Chart	Unchecked
Influence Detection Chart	Unchecked
Outlier-Influence Chart	Unchecked

Report Options Tab

-- Report Options -----

Precision:	Single
Variable Names:	Names

-- Decimal Places -----

Probability:	4
Beta (Coefficients):	4
SE:	4
T:	4
R2:	4
X:	4
Y:	4
Residuals:	4
Std Residuals:	4
Sum Squares:	All
Matrix:	All

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Linear Regression Report

Dataset Untitled
 Y = CYCLOMATIC_COMPLEXITY X = MAINTAINABILITY

Procedure Input Settings (Continued)

Plots Tab

-- Select Plots -----

Y vs X	Checked
RStudent vs X	Checked
Histogram	Checked
Residuals vs X	Checked
Residuals vs Row	Checked
Probability Plot	Checked
Residuals vs X	Checked
Serial Correlation	Checked

-- Plot Options -----

Y vs X Plot Size:	Medium
All Other Plot Sizes:	Small

Resampling Tab

-- Bootstrap Calculation Options -----

-- Sampling -----

Samples (N):	3000
Sampling Method:	Observations
Retries:	50

-- Estimation -----

Percentile Type:	Ave X(p[n+1])
C.I. Method:	Reflection
Bootstrap Confidence Coefficients:	0.90 0.95 0.99

-- Randomization Test Options -----

Monte Carlo Samples:	1000
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Storage Tab

-- Data Storage Options -----

Storage Option:	Do not store data
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