Homework 6

Due on Dec 3, 2:30pm.

Problem 1

Consider the following data set:

Age	3	7	15	24	85	180	360
Strength	2500	3200	4300	5300	5900	6700	6900

Compute Pearson's correlation, Spearman's correlation and Kendall's tau. Test for significant association between age and strengths using each of the measures of association.

Problem 2

Consider the following data set:

	Nearby	Not Nearby
Low	4	3
High	9	0

In this study, contaminated water was classified as either low contamination or high contamination. The distance of the farm wells from a potential source of organic contamination was classified as either nearby or not nearby.

a) Test for association using permutation chi-square test.

b) Test for significant association between contamination and distance using Fisher's exact test.

Problem 3

Consider the following data set:

55 140 91 122 111 185 203 101 76 145

a) Obtain bootstrap estimates of the MSE, standard error and bias of the sample mean, the sample standard deviation and the sample correlation coefficient respectively.

b) Construct 6 different 95% confidence intervals for the mean of the data.

Problem 4

Consider the following data set:

X	70	69	65	64	66	65	64	66	60	70	66
Y	67	64	62	64	69	70	6	66	63	74	60

a) Test whether there is linear association between X and Y.

b) Suppose we fit a linear model $Y = \beta_0 + \beta_1 X + e$. Make 95% t-pivot Confidence interval for β_1 using Nonparametric Bootstrap and Residual Bootstrap respectively.