Homework (Bognar)
Introduction to Mathematical Statistics II (STAT:3101)

1. Suppose $X_1, \ldots, X_{10}$ are iid continuous random variables with pdf $f(x)$ and cdf $F(x)$. The observed data $x_1, \ldots, x_{10}$ yielded (after sorting)

$$0.12 \quad 0.18 \quad 0.20 \quad 0.45 \quad 0.58 \quad 0.72 \quad 0.88 \quad 0.92 \quad 1.48 \quad 1.92$$

We wish to test $H_0 : F(x) = x/2,\ 0 < x < 2$ (i.e. the X_i's are iid $Unif(0, 2)$) vs H_a : not H_0 at the $\alpha = 0.05$ significance level using the Kolmogorov-Smirnov test.

(a) Determine the empirical cdf $F_n(x)$. *Be sure to define* $F_n(x)$ *for all* $x \in (-\infty, \infty)$.

(b) Make a big, beautiful plot showing the empirical cdf $F_n(x)$ and $F_0(x)$ (i.e. the cdf under H_0).

(c) Determine the value of D, the Kolmogorov-Smirnov statistic.

(d) Determine the critical region for the test, i.e. find $C = \{D : D \geq \qquad \}$.

(e) What is your decision and final conclusion?