Homework 1. Due February 5.

1. The following data are observations of the time of service of customers at a local supermarket.

3.5 3.0 2.7 2.85 3.15 3.6 5.2 5.5 5.9 3.45 4.05 4.8 5.05 5.4 5.8 6.45 5.85 5.45 5.1
5.8 5.4 5.0 4.5 3.9 3.4 2.9 2.6 2.65 2.95 2.5 2.9 3.3 3.8 4.5 5.0 5.3 5.7 6.3 6.3
5.6 5.65 6.05 5.6 6.0 5.9 5.55 5.25 3.25 3.25

(a) Construct a stem-and-leaf display of the data.
(b) Construct a histogram with 10 classes.
(c) Construct a boxplot. Are there any outliers?
(d) Find mean and variance for the first 5 observations

2. Consider a system of components A, B, C and D as shown in the following figure.

![Diagram of components A, B, C, and D]

Each component is on if there is a route from 0 to 1 through this component and each component in this route is not defective. The component A is defective with probability 0.1; the component B is defective with probability 0.2; the component C is defective with probability 0.3; the component D is defective with probability 0.4.

(a) What is the probability that all components are on?
(b) What is the probability that at least 1 component is on?
(c) What is the probability that exactly 1 component is on?
(d) What is the probability that exactly 2 components are on?
(e) What is the probability that at least 1 component is on given that all components are on?
(f) What is the probability that all components are on given that at least 1 component is on?
(g) What is the probability that component A is on given that component D is on?
(h) What is the probability that component D is on given that component A is on?

The quality of all elements in the set does not depend on each other.

3. (extra credit - 1 point) Let A and B be independent and disjoint (mutually exclusive) events. What can you say about P(A) and P(B)? Why?