Week 3 Monday

Historical Figure

Make sure you know your neighbors' names. Then take about 2 minutes to discuss:

If you could meet any historical figure, who would you choose and why?

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Bayes' Theorem, Tree Diagrams

1. Lupus is a medical phenomenon where antibodies that are supposed to attack foreign cells to prevent infections instead see plasma proteins as foreign bodies, leading to a high risk of blood clotting. It is believed that 2% of the population suffer from this disease. The test is 98% accurate if a person actually has the disease. The test is 74% accurate if a person does not have the disease.

There is a line from the Fox television show House that is often used after a patient tests positive for lupus: "It's never lupus." Do you think there is truth to this statement? Use appropriate probabilities to support your answer. 2. Dan's Diner employs three dishwashers. Al washes 40% of the dishes and breaks only 1% of those he handles. Betty and Chuck each wash 30% of the dishes, and Betty breaks only 1% of hers, but Chuck breaks 3% of the dishes he washes. (He'll probably need a new job soon...) You go to Dan's for dinner one night and hear a dish break at the sink. What's the probability that Chuck is responsible?

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3. A doctor is called to see a sick child. The doctor has prior information that 90% of sick children in that neighborhood have the flu, while the other 10% have measles. Assume for simplicity all sick children in this neighborhood have one of these two illnesses. A well-known symptom of measles is a rash; the probability of having a rash if one has measles is 95%. However, occasionally children with flu also develop rash, and the probability of having a rash if one has flu is 8%. Upon examining the child, the doctor finds a rash. What is the probability that the child has measles?

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4. There are three identical cards except that both sides of the first card are red, both sides of the second card are blue, and the third card has one red side and one blue side. One card is randomly selected from these three and set down on a table. The visible side of the card is red. What is the probability that the other side is also red?

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