Probability 101

We teach probability the old fashioned way. We urn it.

Interactive Probability Instruction

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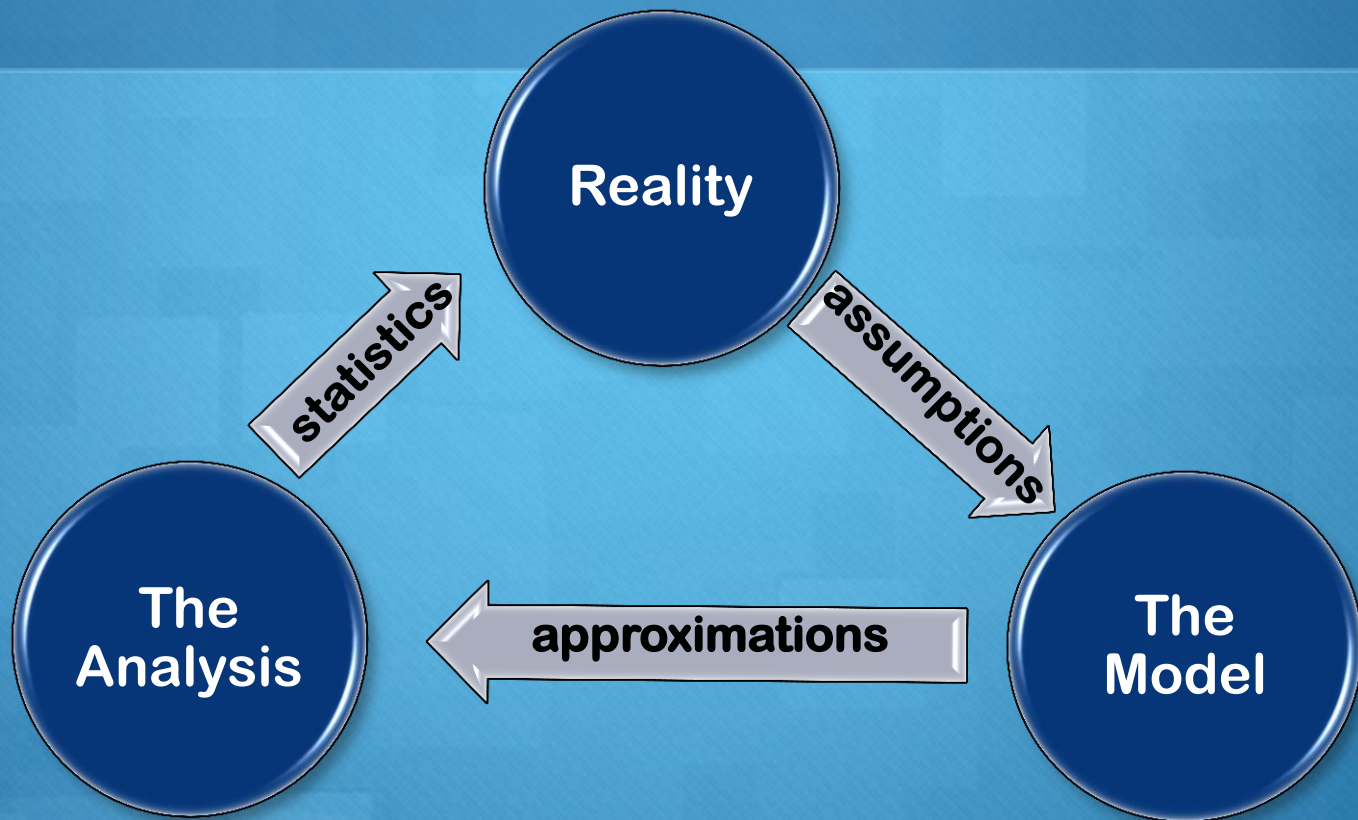
www.distributome.org/meetings/JMM_2014
www.distributome.org/V3

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A Paradigm

Questions to ask (to understand how well probability statements reflect reality)

- What assumptions are being made? Are they realistic?

- Can model deviations from reality be quantified?

- What approximations are being made?

- Are they accurate? Are they necessary?

- Do data agree with model predictions?

- Does the model need to be refined or simplified?

Jigsaw Review

- Teams work together on solving a set of problems.

- New teams are formed taking one member from each original team.

- Members of the solving team must explain the solution to their problems to their new team.

What's the distribution? A

- X = how much ice will be used on the next full Southwest Airline flight from Denver, CO to Raleigh/Durham, NC.

- X = how long until the next 2001 Toyota Prius hybrid goes through a toll booth on the Golden Gate Bridge.

- X = how many randomly chosen people will it take to find 10 who are left-handed.

- X= how many randomly chosen people will it take find one who is left-handed.

What's the distribution? B

- X = the number of red-flowering plants in 100 crosses between pink flowering plants

- X = the position (degrees clockwise from you) of a fish swimming in a cylindrical tank.

- X = median position of the same fish wrt the first person visiting the aquarium each day this week.

- X = the average amount of time that a sample of 500 regular subscribers to the New York Times spend on the Sunday crossword puzzle.

What's the distribution? C

○ X = how many 2001 Toyota Prius hybrids go across the Golden Gate bridge tomorrow.

○ X = the average age of the quarters in the pockets of 100 men at a NY Yankees baseball game.

○ Four participants in this workshop will be picked to form the first team for a "jigsaw review". X = how many graduate students are on that team.

○ X = In a sample of just one person – how many favor imposing a uniform sales tax on internet purchases.

What's the distribution? D

- X = how many hours until the next diet coke is purchased from a vending machine.

- X = how many hours until five separate people purchase a diet coke from a vending machine.

- X = how many of the next ten parties that a waiter serves will leave a tip of more than 20% of the bill.

- X = the birth month of the next person to board a plane from Honolulu to Los Angeles.

Follow-ups

○ **A:** Worldwide 11% of people are left-handed. Are the workshop participants unusual in this regard?

○ **B:** An icthyologist suggests that fish will tend to shy away from the visitor. What median angles would give strong evidence for this theory?

○ **C:** Is the number of grad students in your team unusual? What about the highest number in any team?

○ **D:** Do you think it's likely to have at least two months with no birthdays for the people in the room?

○ **ALL GROUPS:** suggest your own follow-up that can be investigated by students