

# what is probability?

## Frequentist interpretation of the probability

- probability as the long-run fraction of time that it would happen if the random process occurs over and over again under the same conditions
- many interesting random phenomena cannot be repeated over and over again, e.g., weather

## Bayesian interpretation of the probability

- probability as a subjective degree of belief: for the same event, two separate people could have different viewpoints and therefore assign different probabilities

"Probability is orderly opinion... inference from data is nothing other than the revision of such opinion in the light of relevant new information."

– Thomas Bayes (1701-1761)

*both interpretations agree on the probability rules introduced!*

# terminology for probability theory

- **experiment**  
process of observation or measurement
- **outcome**  
result obtained through an experiments
- **sample space**  
set of all possible outcomes of an experiment
  - finite
  - infinite
- **Events**  
a subset of a sample space (what we are interested in)

