OVERVIEW

We have come a long way:

Samplespaces
Rules of prob.

Events, Unions, complements, Intersections, inclusion/exclusion

Binomial coeff, permutations, combinations, factorials, cartesian products

Basics and Combinatorics

What are random variables?
- pmf (discrete)
- pdf (continuous)
- CDF → Cumulative distribution function.
- MGF

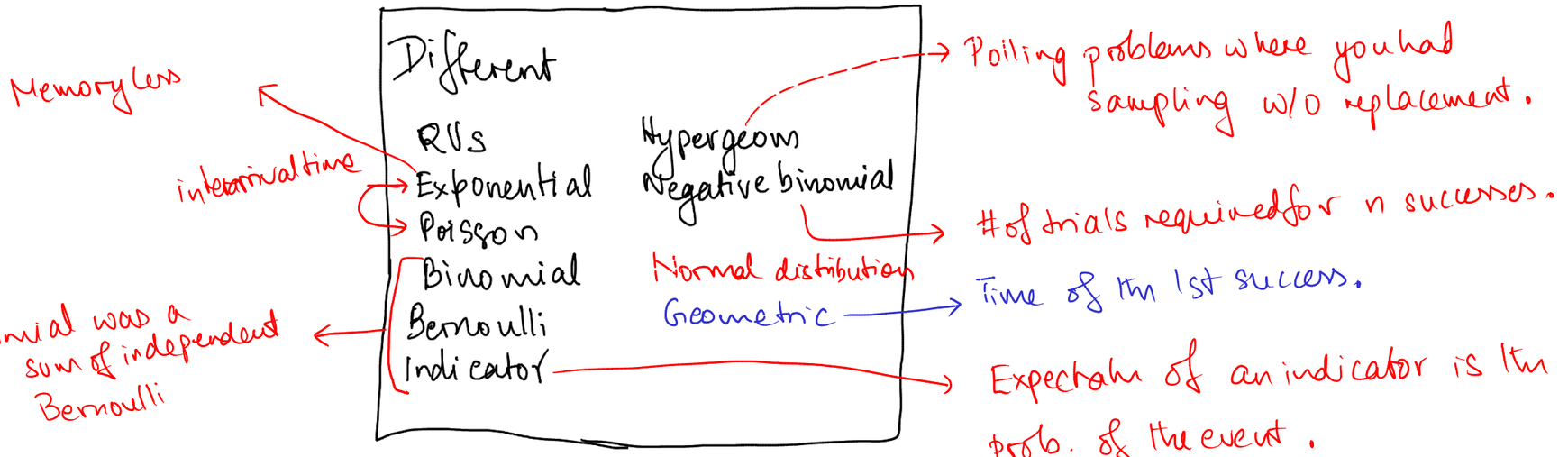
Conditional probability and Independence
- $P(A|B) = P(AB)/P(B)$ → Bayes Rule.
- Weird examples
  - Monty Hall
  - Birthday problem

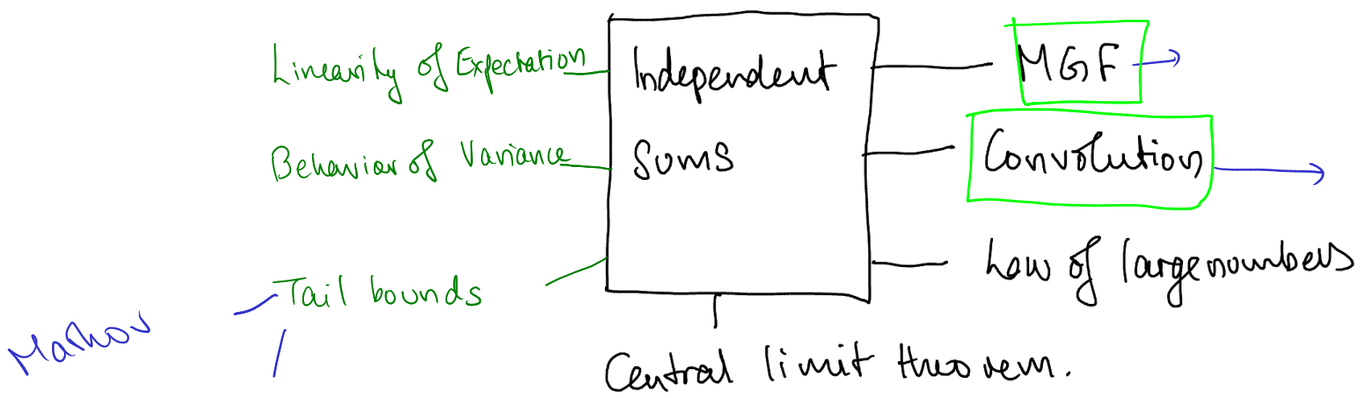
$P(A|B) = P(A)$
$\Leftrightarrow P(A \cap B) = P(A)P(B)$

Dependent RVs
- Joint pmf, pdf, cdf (tables) — marginals & joints. → Joint & cdfs (using area)
- Double integration — integrating joint pdf over areas gave probabilities.
  - → Setup.

← Covariance and correlation
- $Cov(X,Y)$ → $Corr(X,Y)$

do an extra problem.





uniquely associated with rvs,
MGF of a sum is a product of mgfs

Convolution formulas

$$\sum_{i} p_X(i)\, p_Y(k-i) = p_{X+Y}(k)$$

$$\int f_X(u)\, f_Y(t-u) = f_{X+Y}(t)$$

☆ – Problems to do for review

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Henry

Alvin

Aminata