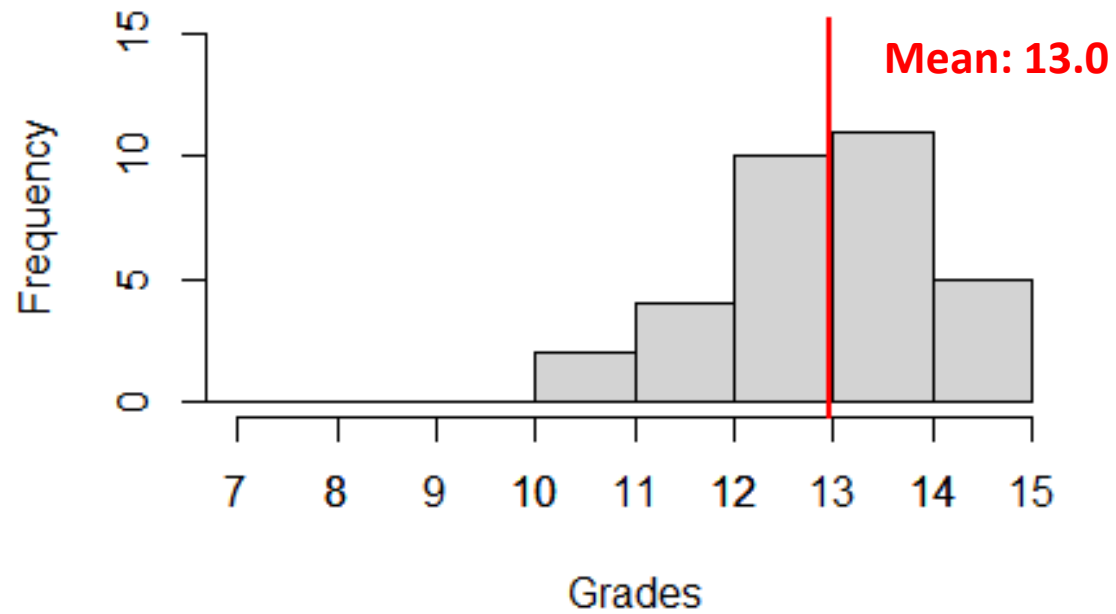
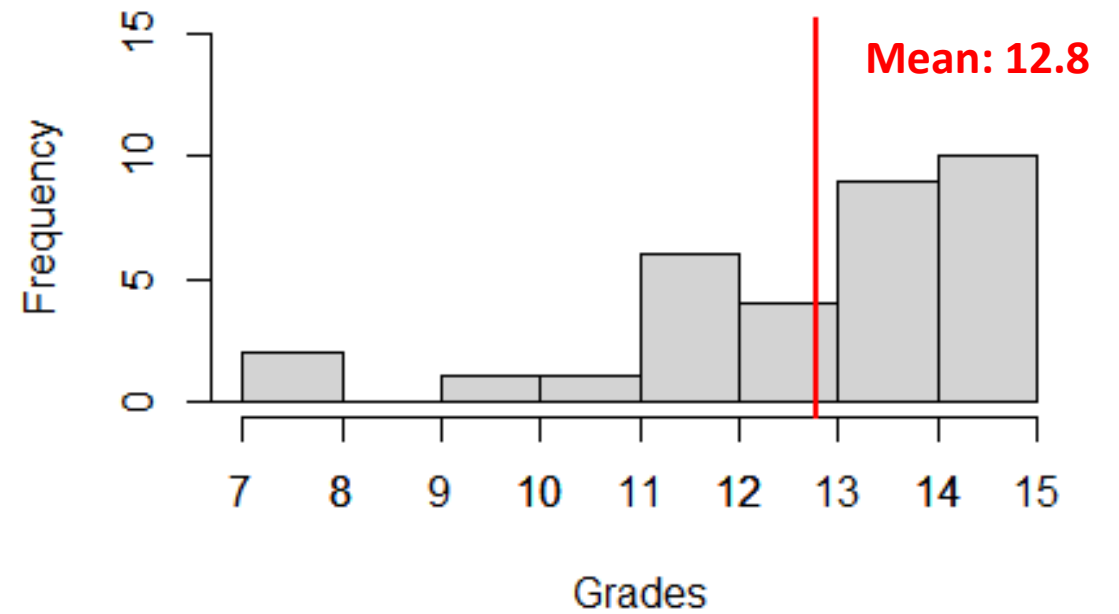


Lab 1 Grade Distribution



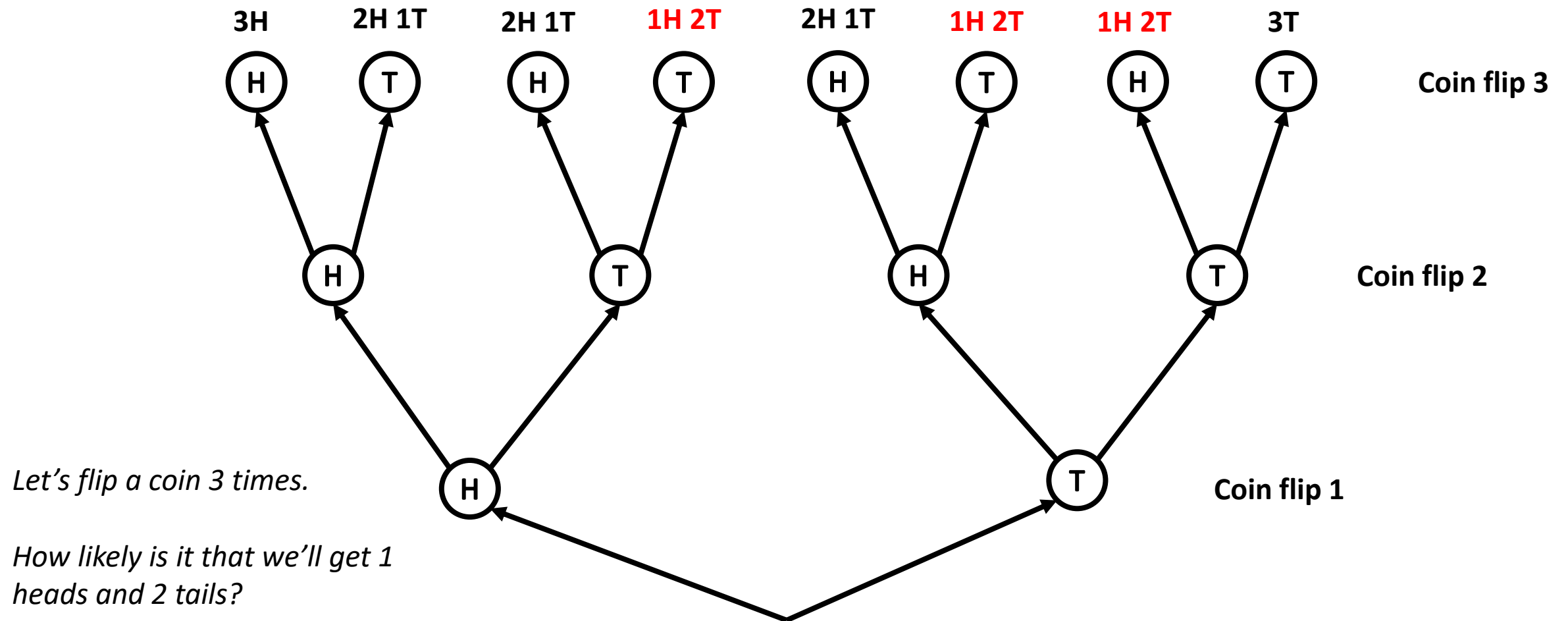
Lab 2 Grade Distribution



Excluding zeros

Bernoulli trials, or coin flips

3 out of 8 possible outcomes are 1H 2T



Number of successes in a Bernoulli trial

*We can get the same answer
from this equation*

$$\binom{N}{y} = \frac{N!}{y! (N - y)!}$$

*N = number of trials
y = number of successes (heads)*

$$\binom{3}{2} = \frac{3!}{2! (3 - 2)!}$$

$$\binom{3}{2} = \frac{3 * 2 * 1}{2 * 1 * 1} = 3$$

Parameter likelihoods

Likelihood- the accumulated evidence for a certain parameter value or model

$$L(p|N, y)$$

translates to

The likelihood of a certain value of p assuming observed values of N and y

Likelihood can also be used to compare models

$$L(\hat{\theta}|data)$$

translates to

The likelihood of a certain model
assuming the observed data

Parsimony: think-pair-share

Model A: Survival \sim time

$$L(\text{Model A}|\text{data}) = 0.2$$

Model B: Survival \sim time + age + sex

$$L(\text{Model B}|\text{data}) = 0.2$$

*Models A and B have identical
likelihoods: which is the better
model?*

AIC uses likelihood for model selection

Penalty for # of parameters
(parsimony)

$$AIC = -2 \ln(L(\hat{\theta}|data)) + 2K$$

Likelihood of the model

*The best model is the one with the
smallest AIC*

Table 1. Model selection results of top 13 models from a set of 26 based on Akaike's Information Criterion using quasi-likelihood adjustments (QAIC; Burnham and Anderson 2002) to predict number of cougars killed/100 km², Oregon, USA, 1990–2009, where K =number of model parameters, $\Delta QAIC$ =difference in relation to best model within the set, and w =QAIC weight. Data included 400 county-year combinations; all models contained cougar population density as a fixed effect and county and year as random effects on the intercept.

Model		K	$\Delta QAIC$	w
1	Cougar population density + cougar harvest density	5	0.00	0.46
2	Cougar population density + cougar harvest density + population proportion of juvenile male cougars	6	1.11	0.26
3	Cougar population density + cougar harvest density + population proportion of juvenile male cougars + proportion forest cover + human population density	8	4.53	0.05
4	Cougar population density	4	5.51	0.03
5	Cougar population density + cougar harvest density + population proportion of juvenile male cougars + beef cattle density + sheep density + deer relative density index + elk relative density index	10	5.83	0.02
6	Cougar population density + deer relative density index	5	5.86	0.02
7	Cougar population density + population proportion of juvenile male cougars	5	5.98	0.02
8	Cougar population density + proportion forest cover	5	6.44	0.02
9	Cougar population density + beef cattle density + sheep density	6	6.59	0.02
10	Cougar population density + beef cattle density + sheep density + deer relative density index	7	6.78	0.02
11	Cougar population density + human population density	5	7.43	0.01
12	Cougar population density + total annual snowfall	5	7.45	0.01
13	Cougar population density + mean minimum annual temperature	5	7.51	0.01