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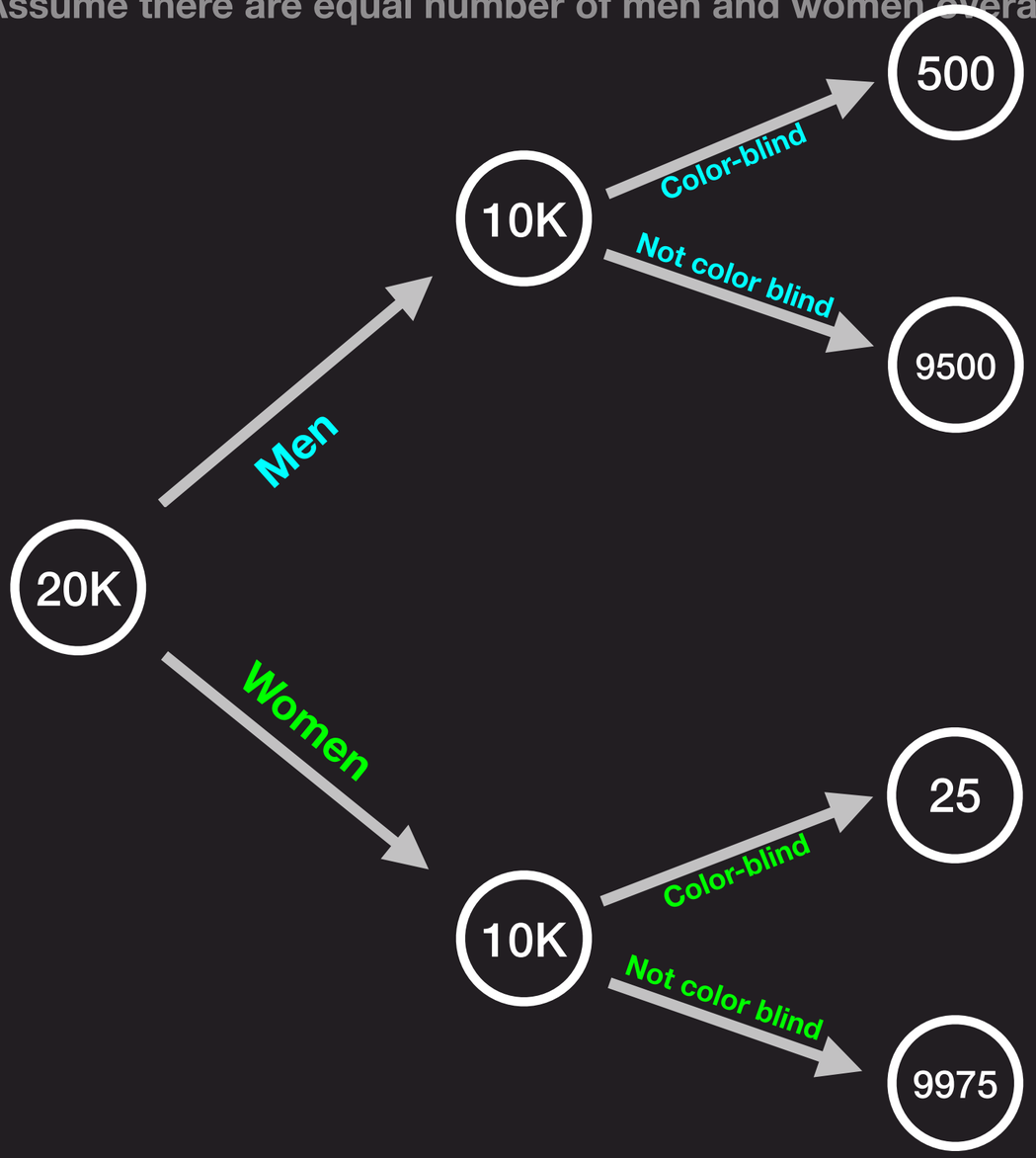

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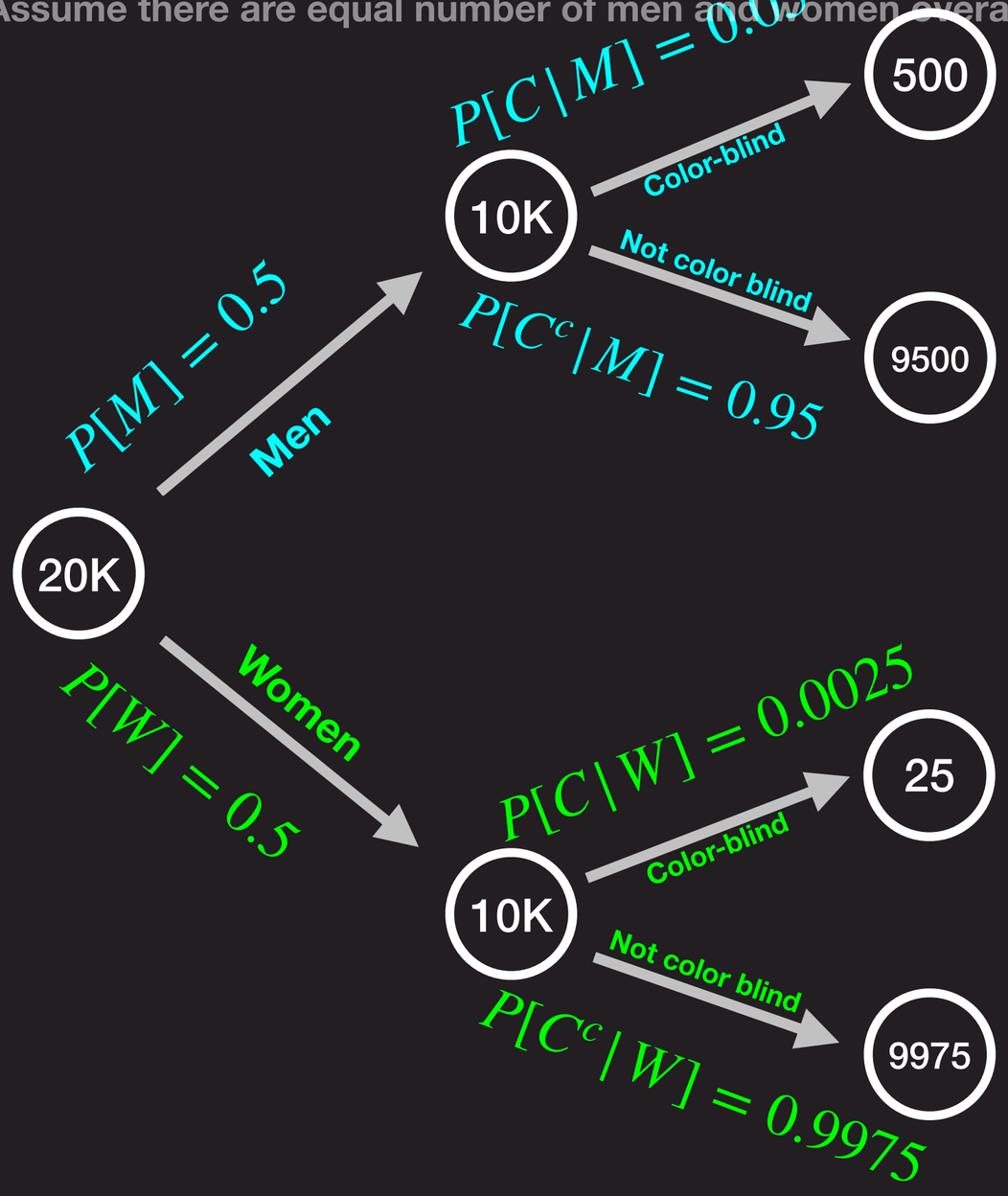

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$$P[M|C] = \frac{P[C|M]P[M]}{P[C|M]P[M] + P[C|W]P[W]}$$

$$= \frac{\frac{500}{10K}\frac{10K}{20K}}{\frac{500}{10K}\frac{10K}{20K} + \frac{25}{10K}\frac{10K}{20K}}$$

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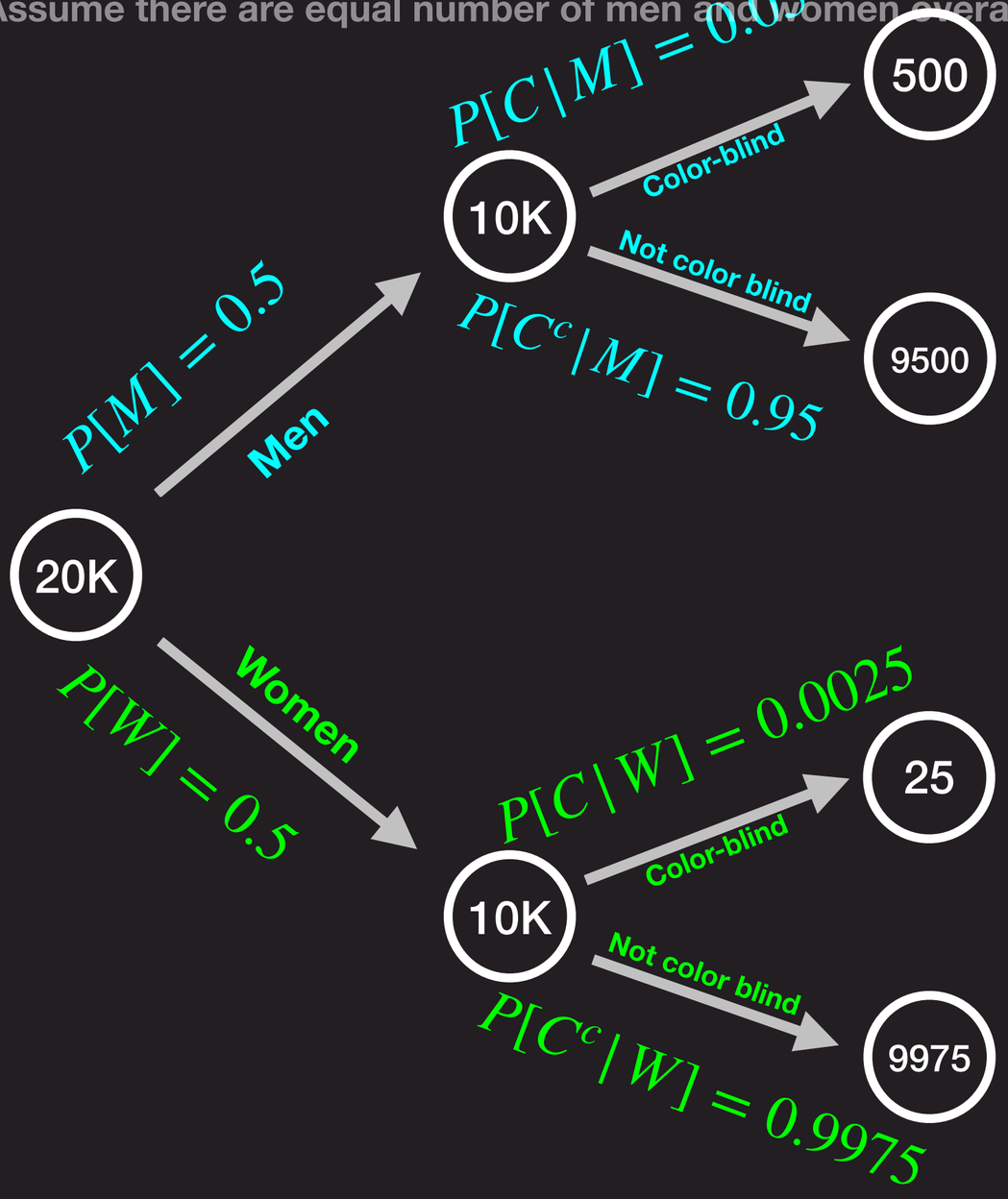

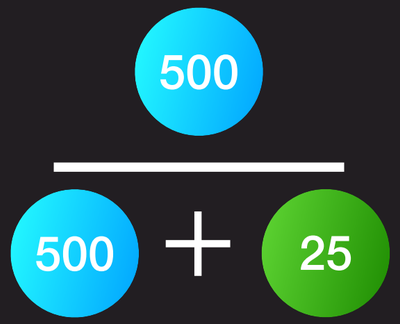

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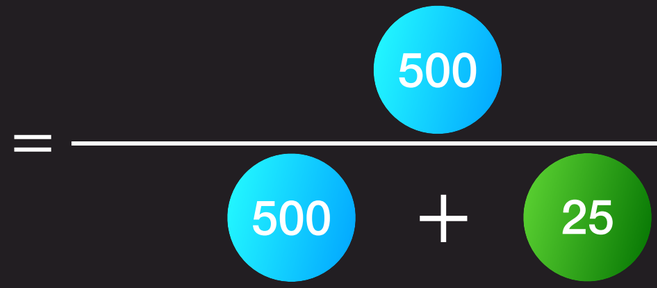

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The probability of Sachin scoring a century is 46/360. Probability of winning when he scores a century is 30/46. Probability of winning when he does not score a century is 154/314. Given that a match was won, what is the probability that he scored a century.

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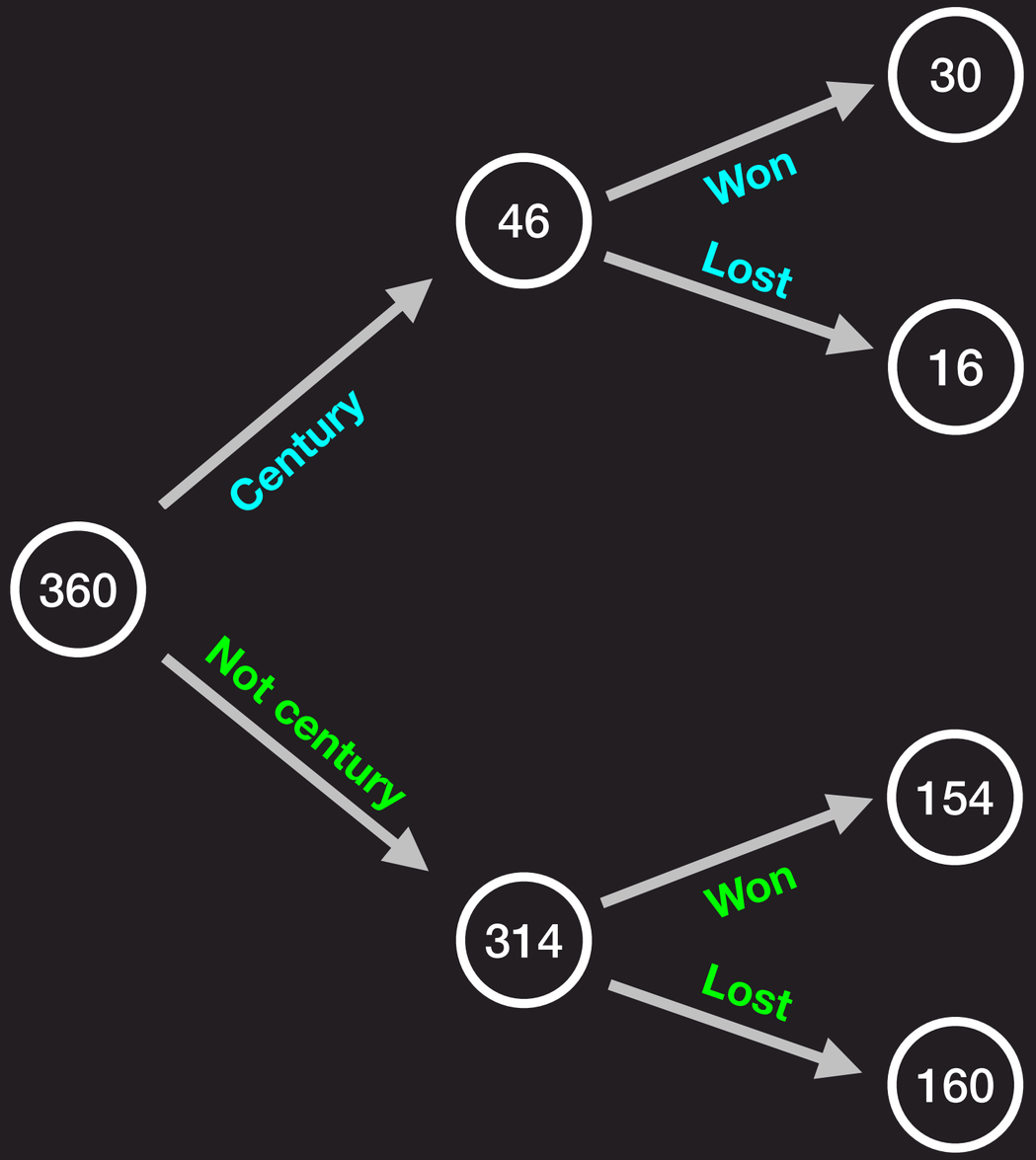


$$\frac{30}{30 + 154} = 0.163$$

Binomial Distribution

If we toss a dice 10 times, and defining getting a “6” as winning, what is the probability of winning 2 times out of 10?

$$P[X = 2] = {}^{10}C_2 \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right)^8$$

If we toss a coin 20 times, and defining getting a “heads” as winning, what is the probability of winning 15 times out of 20?

$$P[X = 15] = {}^{20}C_{15} \left(\frac{1}{2}\right)^{15} \left(\frac{1}{2}\right)^5$$

If X is random variable that follows the Binomial distributions with parameters “n” and “p”, then

$$P[X = k] = {}^{n}C_k \; p^k \; (1-p)^{(n-k)}$$

Quiz Time! Just for now, please don't answer in chat

You toss a coin two times. Suppose you get 1 Rs for every Heads

Q1) What are the possible amounts that you will receive out of this?

Q2) What is the probability of getting 2 Rs?

Q3) What is the probability of getting 1 Rs?

Q4) What is the probability of getting 0 Rs?

Q5) What is the expected amount you will get?

$$ {}^{n}C_{k}\ p^{k}\ (1-p)^{n-k} $$

$$ n = 2 \quad p = \frac{1}{2} $$

Sample space

$$ S = \{\ HH, HT, TH, TT\ \} $$

Let "X" denote the number of heads

$$ X = 0 \longrightarrow \{TT\} $$

$$ X = 1 \longrightarrow \{HT, TH\} $$

$$ X = 2 \longrightarrow \{HH\} $$

$$ E[X] = (0)\left(\frac{1}{4}\right) + (1)\left(\frac{1}{2}\right) + (2)\left(\frac{1}{4}\right) = 1 $$

X	$P[X]$	Binomial	Code
0	$\frac{1}{4}$	$^{2}C_{0}\left(\frac{1}{2}\right)^{2}$	`binom.pmf(k=0, n=2, p=0.5)`
1	$\frac{1}{2}$	$^{2}C_{1}\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)$	`binom.pmf(k=1, n=2, p=0.5)`
2	$\frac{1}{4}$	$^{2}C_{2}\left(\frac{1}{2}\right)^{2}$	`binom.pmf(k=2, n=2, p=0.5)`

You toss two dice.

If both dice are 6, you get 2 Rs

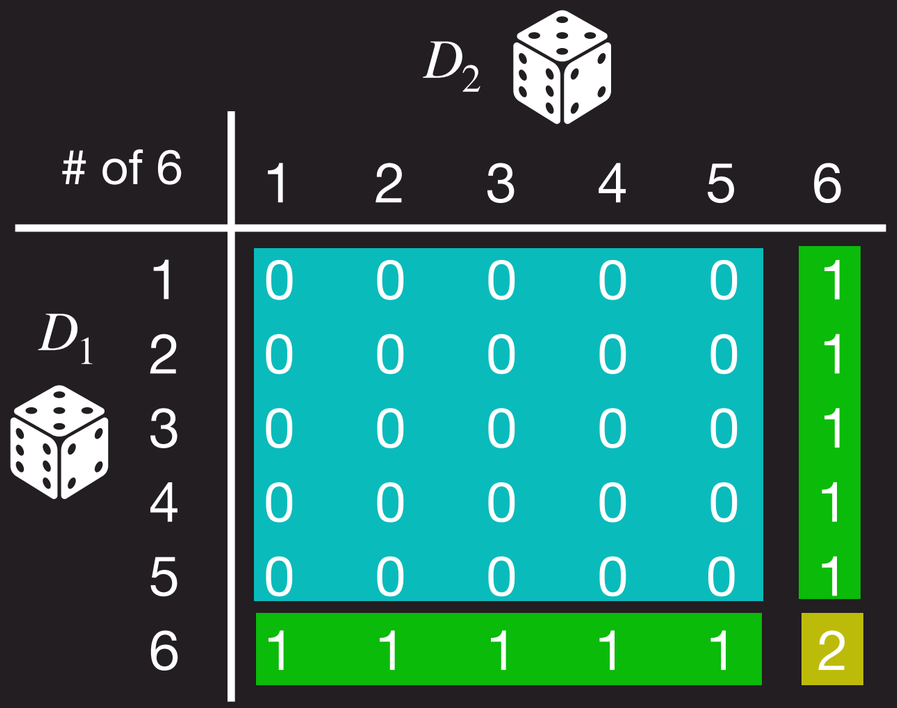
Else if one dice is 6, and another is not 6, then you get 1 Rs

Else, you get 0 Rs

Q 1) What is the probability of getting 0 Rs?

Q 2) What is the probability of getting 1 Rs?

Q 3) What is the probability of getting 2 Rs?



X	$P(X)$	
0	${}^2C_0\left(\frac{5}{6}\right)^2$	$\left(\frac{5}{6}\right)^2$
1	${}^2C_1\left(\frac{1}{6}\right)\left(\frac{5}{6}\right)$	$2\left(\frac{1}{6}\right)\left(\frac{5}{6}\right)$
2	${}^2C_2\left(\frac{1}{6}\right)^2$	$\left(\frac{1}{6}\right)^2$

$$\frac{5 * 5}{36}$$

$$\frac{5 * 1 + 1 * 5}{36}$$

$$\frac{1 * 1}{36}$$