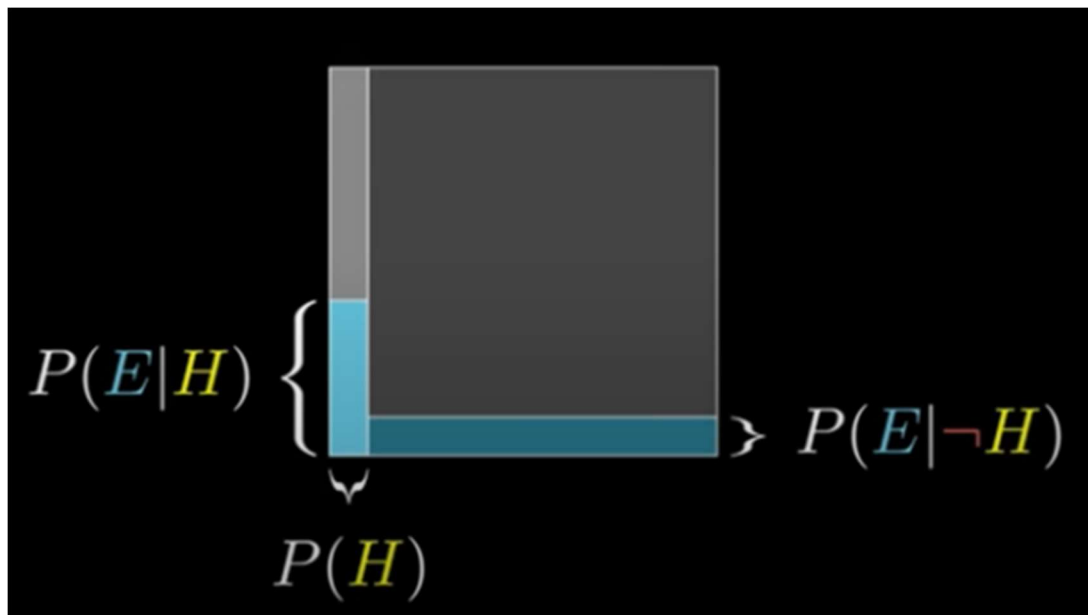


04-03 Statistics – Task 2

Conditional Probability – $P(B)$, $P(A \text{ and } B)$, $P(A|B)$

- You work for a risk analysis insurer. You have read that this year, out of all drivers on the road, 5% have had accidents under the age of 25. You have also read that 10% of all drivers are under the age of 25. A new client approaches you and states that their age is 22. You want to calculate the chance that this driver has had an accident this year based on their age.
 - A = had an accident this year
 - B = age under 25
 - $P(B) = 10\% = 0.1$
 - $P(A \text{ and } B) = 5\% = 0.05$
 - $P(A|B) = P(A \text{ and } B) / P(B) = 0.05 / 0.1 = 0.5 = 50\%$
- Your friend told you that they would buy you lunch if you can flip a coin and have it land on heads twice. You flip it the first time, and it lands on heads. What are your chances now of it landing on heads again?
 - Coin tosses are independent events so conditional probability theorems cannot be used.
 - Therefore the probability is $0.5 * 0.5 = 0.25$ or 25%
- You were always told that knowing Maths helps you to achieve 80% in Computer Science. You read some statistics showing that 30% of all Computer Science graduates took Maths and achieved 80%. Overall, 60% of all Computer Science graduates took Maths. Considering you took Maths, what are your chances of achieving 80%?
 - A = Achieving 80%
 - B = Took maths
 - $P(B) = 60\% = 0.6$
 - $P(A \text{ and } B) = 30\% = 0.3$
 - $P(A|B) = P(A \text{ and } B) / P(B) = 0.3 / 0.6 = 0.5 = 50\%$

Bayes Theorem



Tested Negative	7	29
Tested Positive	63	1
	Has COVID	Doesn't have COVID

- Using this diagram, and information learned from the video, state the
- following:
 - **H:** our hypothesis
 - **The person has COVID**
 - **E:** our evidence
 - **The person has been tested for COVID**
- Then, give the values for the following:
 - **$P(H) = 0.7$ or 70%**
 - **$P(E|H) = 0.9 = 90\%$**
 - **$P(E) = 1 = 100\%$**
 - **$P(H|E) = P(E|H)P(H) / P(E) = 0.9 * 0.7 / 1 = 0.63 = 63\%$**