

Probability & Slides - 1

Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X +

scaler.com/meetings/i/dsml-advanced-probability-and-statistics-1-3/live

DSML Advanced : Probability and Statistics - 1 | Lecture

00:06:19

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Srikanth Varma Chekuri (You) (Screen)

64 People

Chat

Notify me about Nothing

Akshata Joshi To: Everyone 9:06 pm Pin a message

saivasa gantasala To: Everyone 9:06 pm

trails

vikas To: Everyone 9:06 pm hypothesis testing

Kiran To: Everyone 9:06 pm hypothesis testing

Start Doubt Session

To: Everyone Enable/Disable Chat

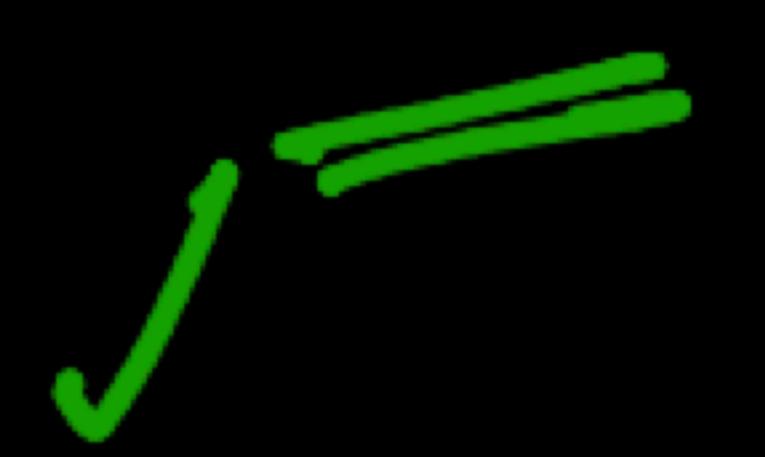
Type message

2 / 2

Ops:  
~~not~~

- chat window Ques @ end of each Session/concept  
[flow]
- general topic → Questions → end of class
- Maths → slow

## Prob & stats



↳ Tricky, non-trivial

→ Terminology → confusing ↓

→ practical examples + Math

→ revise after the class + Assessment

→ Remedial Sessions



della →  $\frac{\text{~25 deaths}}{1000 \text{ cases}}$  event 2  
(det)  $\xrightarrow{=} 0.025$

likelihood  $\xrightarrow{=}$  Omicron  $\rightarrow \frac{12}{2000} =$  fatality rate  
 $\xrightarrow{=} \frac{6}{1000} = 0.006$

which is less dangerous?

Probability is likelihood of an event occurring

✓  $0 \leq P(\text{event}) \leq 1$

100%  
0%



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0 ≤ p(event) ≤ 1 → certain

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00:23:50

8 / 8

Srikanth Varma Chekuri (You)

Chat

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Dipti Krishna To: Everyone 9:23 pm never occurs 9:23 pm

vikas To: Everyone 9:23 pm probability is not same as likelihood right ? P(A/B) vs L(B/A)

GEOMRTT Yes  No 

To: Everyone Enable/Disable Chat

Type message

Start Doubt Session

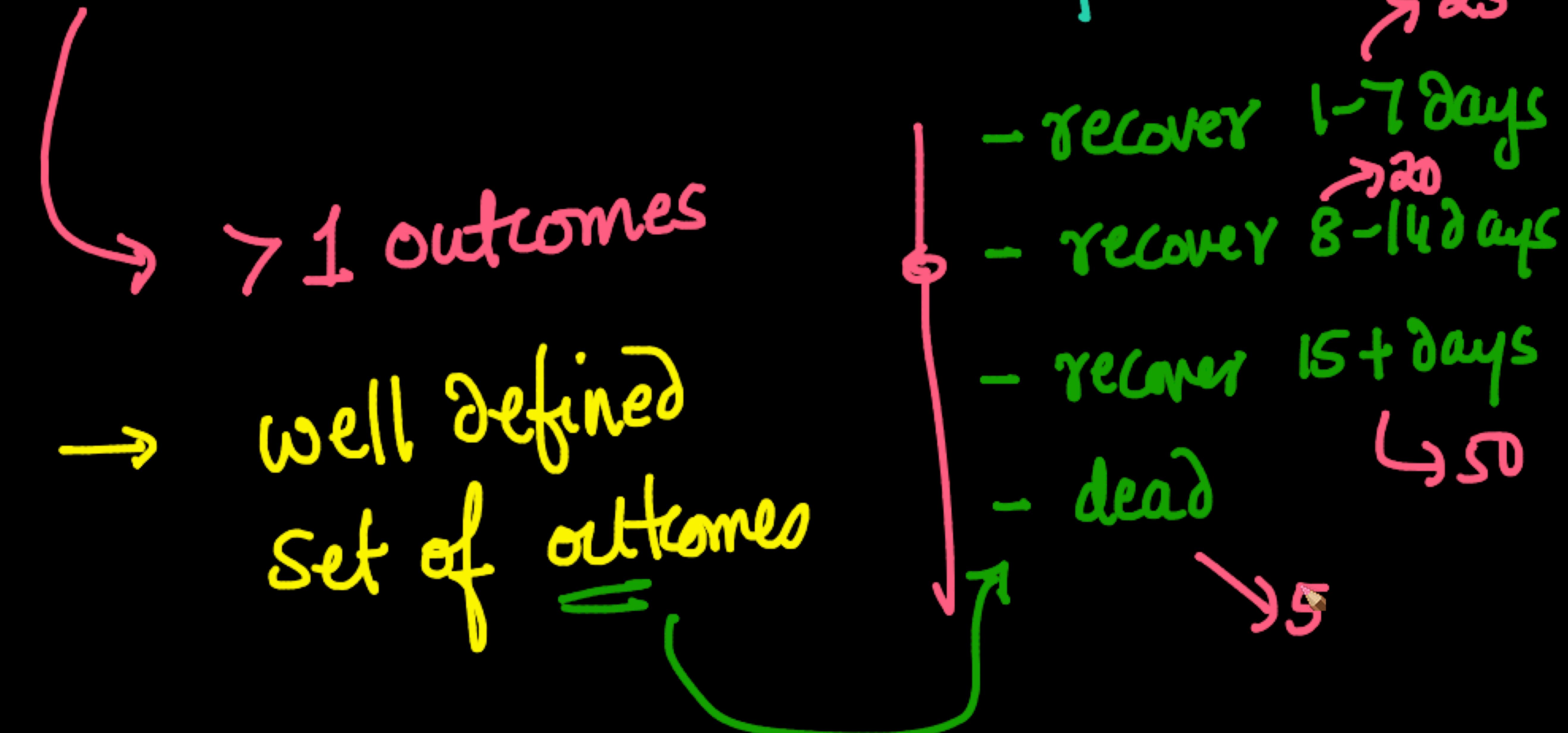
People 72

Chat

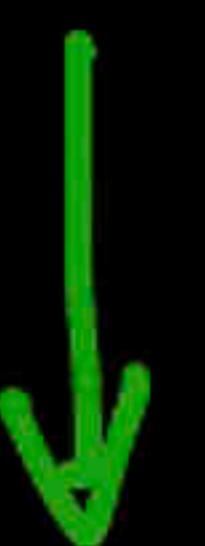
Questions

Start Doubt Session

Experiment: administer medicine to a covid patient



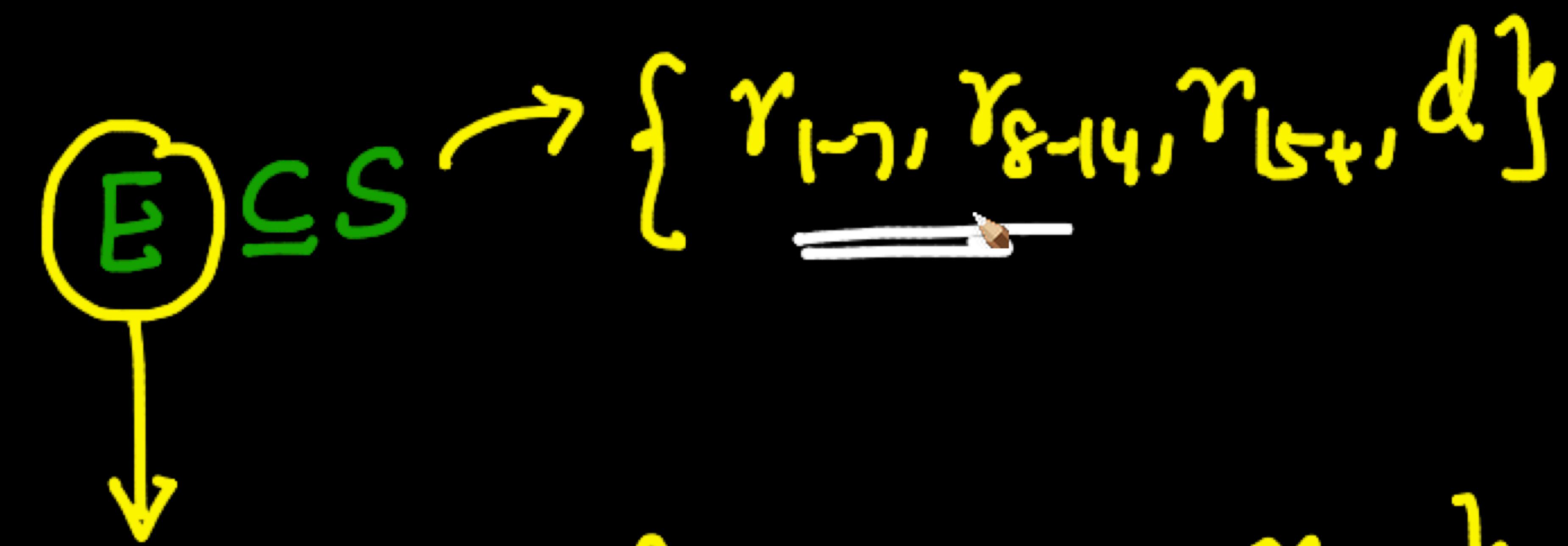
Sample Space : Set of all possible  
(S) outcomes



$$S = \{ \gamma_{1-7}, \gamma_{8-14}, \gamma_{15+}, d \}$$

Event:

(E)



$E_1: \underline{\text{recovered}} = \{ \gamma_{1-7}, \gamma_{8-14}, \gamma_{15+} \}$

$E_2: \text{recovered under } 14 \text{ days} = \{ \gamma_{1-7}, \gamma_{8-14} \}$

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sel → { }

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(a, b)

↑

Tuple

GEOMRTT

Srikanth Varma Chekuri (You) (Screen)

00:31:43

12 / 12

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

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9:30 pm

18

Narendra Sharma To: Everyone 9:30 pm

(a) is subset of (a b c d)

9:31 pm

17

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12 / 12

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Srikanth Varma Chekuri (You)

74 People

Chat

Questions 2

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$S = \{a, b\} = \{b, a\}$

$t = (a, b) \rightarrow \underline{\text{order}}$

$\neq (b, a)$

set is immutable and no order

Abhilash M To: Me 9:33 pm

Sets are homogenous

Himachal Banik To: Everyone 9:33 pm

but i think in python sets are also not ordered by default

Start Doubt Session

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00:32:44

13 / 13

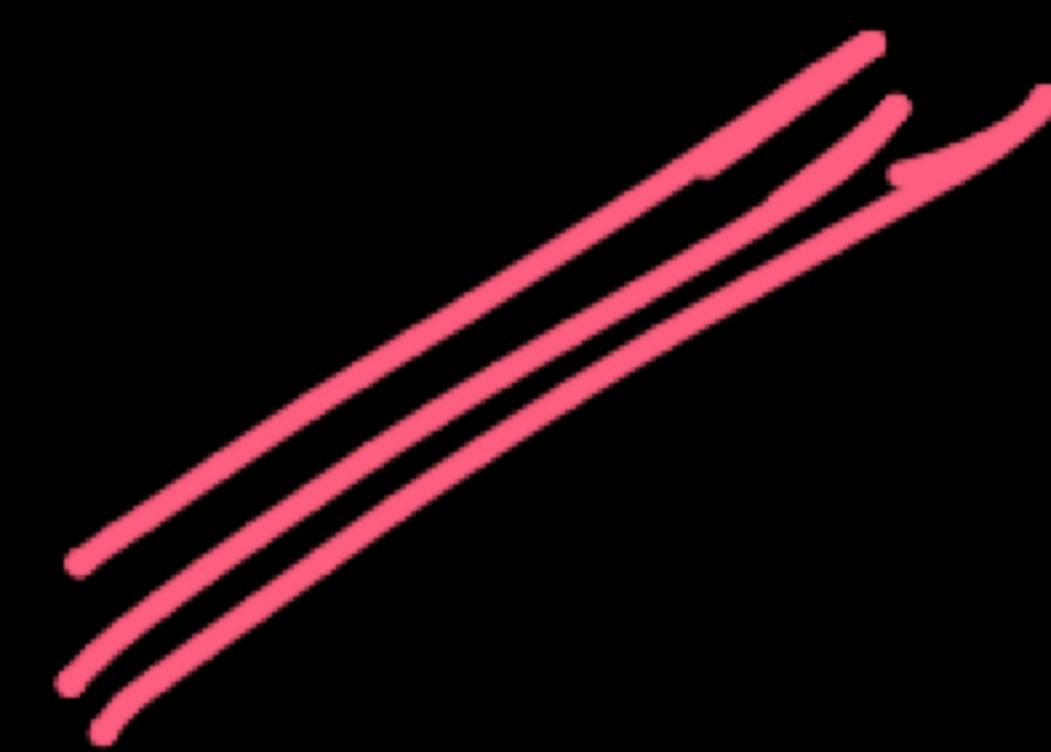
$$P(\text{E} = \text{recovered}) = \frac{25 + 20 + 50}{100} = \underline{\underline{0.95}}$$

✓  $\gamma_{1-7} : 25$

✓  $\gamma_{8-14} : 20$

✓  $\gamma_{15\mu} : 50$

$d : 5$



COIN: May / May not be fair

Expt: toss

$$E = \{H\}$$

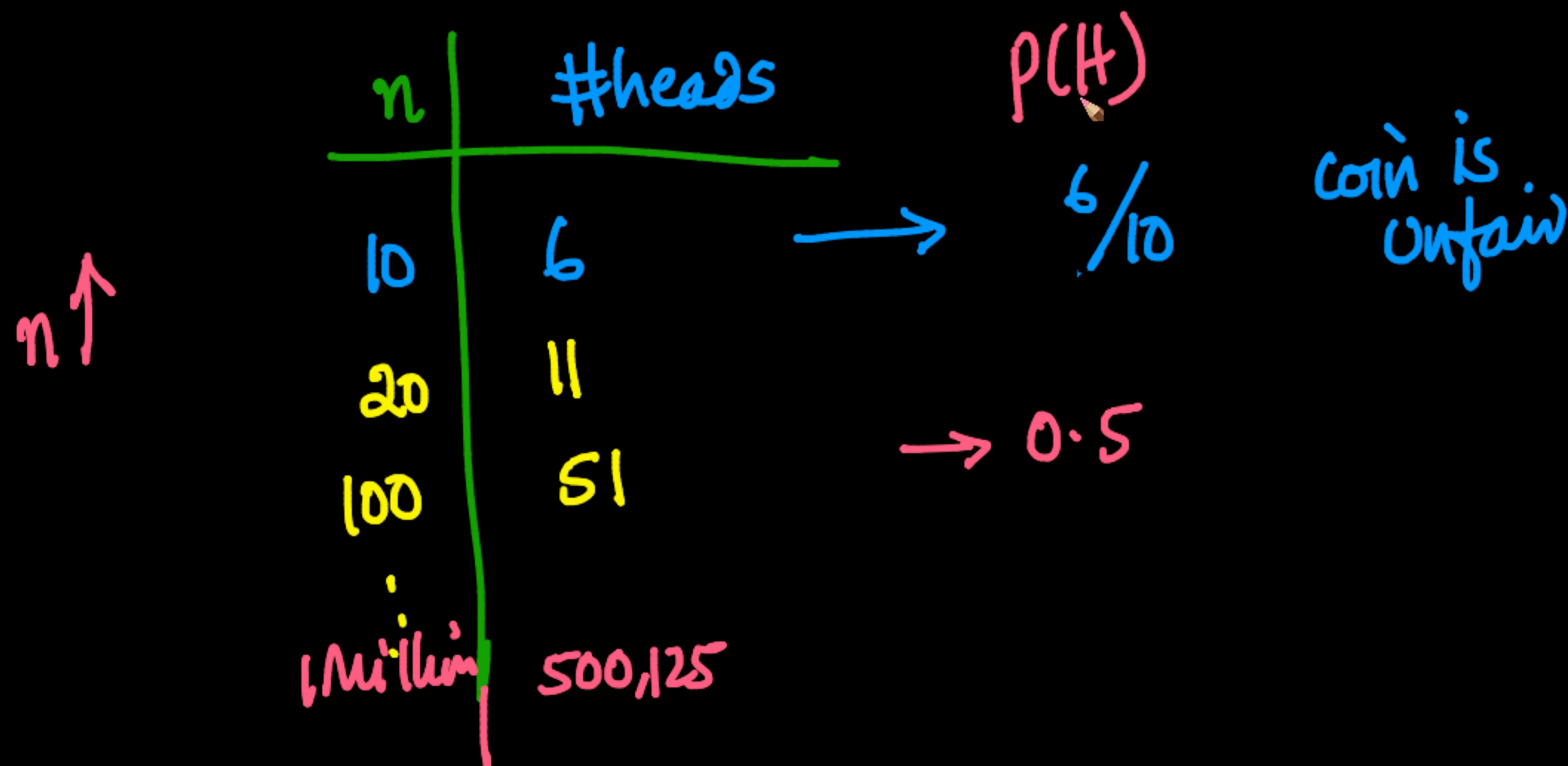
$$S = \{H, T\}$$

Fair

heads & tails are equally likely

$$P(H) = \underline{0.5} \text{ for a fair coin}$$

toss  $n$  - times  
(tails)



event

$$p(H) = \frac{\text{# times head occurs}}{n} \text{ as } n \rightarrow \infty$$

if  $p(H) \rightarrow 0.5$  as  $n \rightarrow \infty$   
then coin is fair

else not-fair

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N = 10,000

#heads = 5,022

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00:42:23

00:00

GEOMRTT

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Pin a message + 9:42 pm

Biswaroop Banerjee To: Me 9:42 pm

if the result keep improving we can stop

Pavan To: Everyone 9:42 pm

suppose if it tends from 0.6 to 0.5 and if it again moves to 0.4, then how?

9:42 pm

1

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18 / 18

74 People

Chat 2 Questions

Yes No

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00:43:45

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$n \rightarrow \infty$

$P(H) \rightarrow 0.4$

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

BISWAROOP BANERJEE To: Me 9:42 pm

Pavan To: Everyone 9:42 pm

suppose if it tends from 0.6 to 0.5 and if it again moves to 0.4, then how?

9:42 pm 1

Saksham Khandelwal To: Everyone 9:43 pm

event is outcome from the coin(H,T)?

GEOMRTT Yes Thumbs Up No Thumbs Down

To: Everyone Enable/Disable Chat

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People 74

Chat

Questions 2

Start Doubt Session

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$S = \{H, T\}$

$E \subseteq S$

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GEOMRTT

Srikanth Varma Chekuri (You) (Screen)

00:44:30

00:00

20 / 20

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Pin a message

9:42 pm

1

Saksham Khandelwal To: Everyone 9:43 pm

event is outcome from the coin(H,T)?

Himachal Banik To: Everyone 9:43 pm

sample space is (H,T)

3 New Messages

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

Yes No

75 People

Chat

2 Questions

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?

2

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Update

+ Code + Text

✓ RAM  
Disk

```
# Fair-Dice throws
import random

# throw dice i times
for i in [5, 10, 100, 10000, 1000000]:

    wins = 0
    throws = int(i) # n

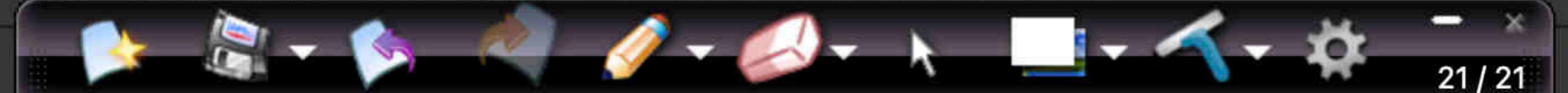
    for j in range(throws):
        #random number generator
        wins += int(random.randint(1,6)==6)

    print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))
```

Fair-Dice

$$\mathcal{S} = \{1, 2, 3, 4, 5, 6\}$$

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



Live | DSML Advanced : Pr

Probability Theory-1.ipynb - Co



+ Code

+ Text



# Fair-Dice throws

import random

# throw dice i times

for i in [5, 10, 100, 10000, 1000000]:

wins = 0

throws = int(i) # n

for j in range(throws):

#random number generator

wins += int(random.randint(1,6)==6)

print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))

No. of trials: 5, P(Win) : 0.0

No. of trials: 10, P(Win) : 0.3

No. of trials: 100, P(Win) : 0.11

No. of trials: 10000, P(Win) : 0.168

No. of trials: 100000, P(Win) : 0.166637

# Simulalim

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+ Code + Text

✓ RAM Disk



```
# Fair-Dice throws
import random

{x}

# throw dice i times
for i in [5, 10, 100, 10000, 1000000]:
    wins = 0
    throws = int(i) # n

    for j in range(throws):
        #random number generator
        wins += int(random.randint(1,6)==6)

    print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))
```

5 →

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



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colab.research.google.com/drive/14YnmpmKcJmbkF-O7yrfFttavebeYDp-r

Update

+ Code + Text

✓ RAM Disk



```
# Fair-Dice throws
import random

{x}

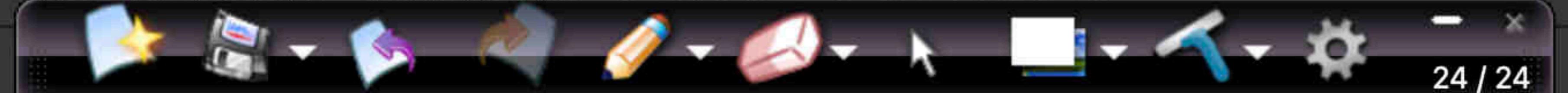
# throw dice i times
for i in [5, 10, 100, 10000, 1000000]:

    wins = 0
    throws = int(i) # n

    for j in range(throws):
        #random number generator
        wins += int(random.randint(1,6)==6)

    print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))
```

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



Expt: throw dice

$S = \{1, 2, 3, 4, 5, \underline{6}\}$

$E = \{6\} \subseteq S$

 $\frac{1}{6}$ 

$P(\text{observing } E) = \frac{1}{6}$

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+

colab.research.google.com/drive/14YnmpmKcJmbkF-O7yrfFttavebeYDp-r

+ Code + Text

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Disk 

1,2,3,4,5,6

 # Fair-Dice throws  
import random  
  
# throw dice i times  
for i in [5, 10, 100, 10000, 1000000]:  
  
 wins = 0  
 throws = int(i) # n  
  
 for j in range(throws):  
 #random number generator  
 wins += int(random.randint(1,6)==6)  
  
 print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws)) No. of trials: 5, P(Win) : 0.0  
No. of trials: 10, P(Win) : 0.3  
No. of trials: 100, P(Win) : 0.11  
No. of trials: 10000, P(Win) : 0.168  
No. of trials: 1000000, P(Win) : 0.166637

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← → Ccolab.research.google.com/drive/14YnmpmKcJmbkF-O7yrfFttavebeYDp-rUpdate ⋮+ Code + Text✓ RAM  
Disk

```
# Fair-Dice throws
import random

{x}

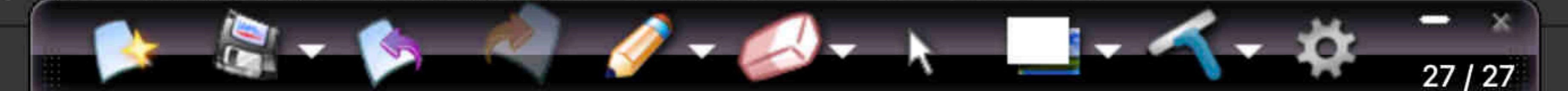
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```



```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



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Probability Theory-1.ipynb - Co



+ Code

+ Text



# Fair-Dice throws

import random

# throw dice i times

for i in [5, 10, 100, 10000, 1000000]:

wins = 0

throws = int(i) # n

for j in range(throws):

#random number generator

wins += int(random.randint(1,6)==6)

print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))

No. of trials: 5, P(Win) : 0.0

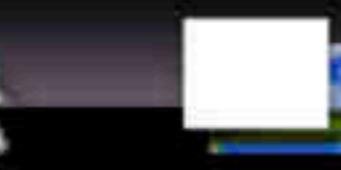
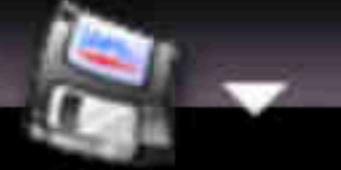
No. of trials: 10, P(Win) : 0.3

No. of trials: 100, P(Win) : 0.11

No. of trials: 10000, P(Win) : 0.168

No. of trials: 1000000, P(Win) : 0.166637

#times we observed

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Disk

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Update

+ Code + Text

✓ RAM Disk

User Icons

Up Down Reload Comment Gear Print Delete More

```
# Fair-Dice throws
import random

{x}

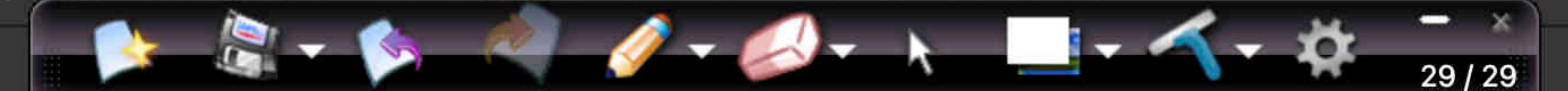
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```

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



+ Code + Text

Reconnect



```
# Fair-Dice throws
import random

{x}

# throw dice i times
for i in [5, 10, 100, 10000, 1000000]:

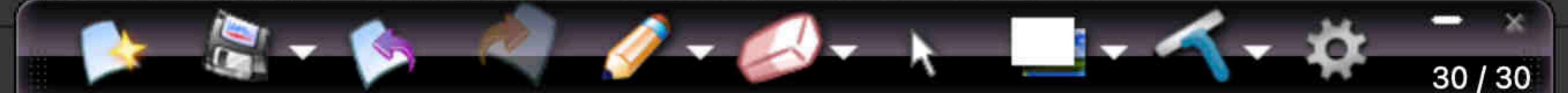
    wins = 0
    throws = int(i) # n

    for j in range(throws):
        #random number generator
        ✓ wins += int(random.randint(1,6)==6)

    print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))
```

{1,2,3,4,5,6}

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



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Update

+ Code + Text

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▼

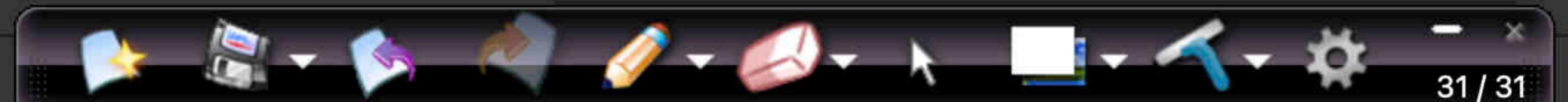
```
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```

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



+ Code + Text

Reconnect



```
# throw dice i times
for i in [5, 10, 100, 10000, 1000000]:

    wins = 0
    throws = int(i) # n

    for j in range(throws):
        #random number generator
        wins += int(random.randint(1,6)==6)

    print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))
```

$$\frac{1}{6} = 0.1666 \dots$$

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.3
No. of trials: 100, P(Win) : 0.11
No. of trials: 10000, P(Win) : 0.168
No. of trials: 1000000, P(Win) : 0.166637
```



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```
# throw dice i times
for i in [5, 10, 100, 10000, 1000000]:

    wins = 0
    throws = int(i) # n

    for j in range(throws):
        #random number generator
        wins += int(random.randint(1,6)==6)

    print("No. of trials: {}, P(Win) : {}".format(throws, wins/throws))
```

```
No. of trials: 5, P(Win) : 0.0
No. of trials: 10, P(Win) : 0.2
No. of trials: 100, P(Win) : 0.15
No. of trials: 10000, P(Win) : 0.1681
No. of trials: 1000000, P(Win) : 0.166326
```

↓  
↓



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Update :

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30 heads  
100

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GEOMRTT

Srikanth Varma Chekuri (You) (Screen)

00:56:33

00:56:33

34 / 34

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Pin a message

calculating the chances here

Vishal Razdan To: Everyone 9:56 pm

can we generalise that every experiment will give nearly fair result for 1Million repetitions

SatyanaRayaNareddy Tadi To: Me 9:56 pm

30

Yes No

To: Everyone Enable/Disable Chat

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Start Doubt Session

74 People

2 Questions

Start Doubt Session

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GEOMRTT

trials  $n = 1 \text{ Million}$

$P(\text{one atom of gold}) = 0.00001$

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01:00:12

00:00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Harpreet Singh To: Everyone 10:00 pm Pin a message +

Himachal Banik To: Everyone 10:00 pm repeat again please

Vishal Razdan To: Everyone 10:00 pm so can we say it is true for 2 outcome exp

To: Everyone Enable/Disable Chat

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Start Doubt Session

74 People

Chat

Questions 2

35 / 35



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GEOMRTT

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01:02:01

Srikanth Varma Chekuri (You) (Screen)

72 People

Chat

Questions 2

Notify me about Nothing

Pin a message

Srikanth Varma Chekuri To: Everyone 10:01 pm

is it a function of the sample space?

Vishal Razdan To: Everyone 10:02 pm

can we say it is true for 2 outcome exp?

Ashwanth Unni To: Everyone 10:02 pm

Its like winning a coin toss and winning a lottery!

Start Doubt Session

To: Everyone Enable/Disable Chat

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37 / 38

Yes No

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<https://www.screencast.com/meetings/i/dsml-advanced-probability-and-statistics-1-3/live>

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GEOMRTT

$0 \leq P(E) \leq 1$

$\checkmark P(S) = ? \rightarrow 1$

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Srikanth Varma Chekuri (You) (Screen)

01:04:13

basic laws!

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Saksham Khandelwal To: Everyone 10:04 pm

Pavan To: Everyone 10:04 pm

1

Hrishabh Amrodia To: Me 10:04 pm

1

10:04 pm

2

Start Doubt Session

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38 / 39

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3

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Srikanth Varma Chekuri (You) (Screen)

01:05:51

00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

vikas

Pin a message +

trial we will need- inversely proportional  
- can we say it like this ?

Already Answered Answer Now

10:04 pm 1

10:05 pm 3

GEOMRTT

Yes No

To: Everyone Enable/Disable Chat

Type message

Start Doubt Session

70 People

3 Chat Questions

39 / 40

Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X +

scaler.com/meetings/i/dsml-advanced-probability-and-statistics-1-3/live

DSML Advanced : Probability and Statistics - 1 | Lecture

GEOMRTT

3R, 2B ✓

$n = 300$

$\frac{6}{5} \times 300 = 120$

You are sharing your screen now

Stop Sharing

$n \rightarrow \infty$

$p(\text{Blue}) = \frac{2}{5}$

Srikanth Varma Chekuri (You) (Screen)

01:08:00

40 / 41

OK 00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Pin a message

vikas To: Everyone 10:06 pm  
3 red, 2 blue, 300 times

vikas To: Everyone 10:06 pm  
with replacement

10:07 pm

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

70 People

3 Questions

Start Doubt Session

Yes No

40 / 41

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DSML Advanced : Probability and Statistics - 1 | Lecture

Expt: pick a ball

$\Omega: \{B, R\}$

You are sharing your screen now

Stop Sharing

E: {B}  $P(B) = \frac{2}{5}$

Srikanth Varma Chekuri (You) (Screen)

01:08:46

1 2 3 4 5 6 7 8 9 0

41 / 42

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Pin a message

what would be the answer if it was without replacement?

Ashish Sharma To: Everyone 10:08 pm

Can you please explain what is sample and event here

10:08 pm

7

GEOMRTT

Yes No

To: Everyone Enable/Disable Chat

Type message

Start Doubt Session

70 People

3 Questions

Start Doubt Session

41 / 42

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R, R, R, B, B

n = 300

You are sharing your screen now

Stop Sharing

Srikanth Varma Chekuri (You) (Screen)

01:09:30

GEOMRTT

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43

OK 00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Ajay chinni To: Everyone 10:09 pm Pin a message +

Adith Patel To: Everyone 10:09 pm 5 times only

Abhishek Goyal To: Everyone 10:09 pm 5

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

71 People

3 Questions

42 / 43

Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X +

scaler.com/meetings/i/dsml-advanced-probability-and-statistics-1-3/live

DSML Advanced : Probability and Statistics - 1 | Lecture

01:10:19

You are sharing your screen now

Stop Sharing

Srikanth Varma Chekuri (You) (Screen)

71 People

Chat 3 Questions

Notify me about Nothing

Vishal Razdan To: Everyone 10:10 pm

sorry got confused can u repeat

Narendra Sharma To: Everyone 10:10 pm

1- 3/5 + 2/4 +1/3 ( After this all red ) :

10:10 pm

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

43 / 44

$\gamma = 300 \times$

~~R, R, R, B, B~~

GEOMRTT

Srikanth Varma Chekuri (You)

Chat

Pin a message

1

Yes No

Start Doubt Session

Enable/Disable Chat

Type message

43 / 44

events  $\subseteq$  Sample-Space JOINT PROB:

{  $m_l$ : patient is given medicine  $M_l$   
 $s$ : patient survived

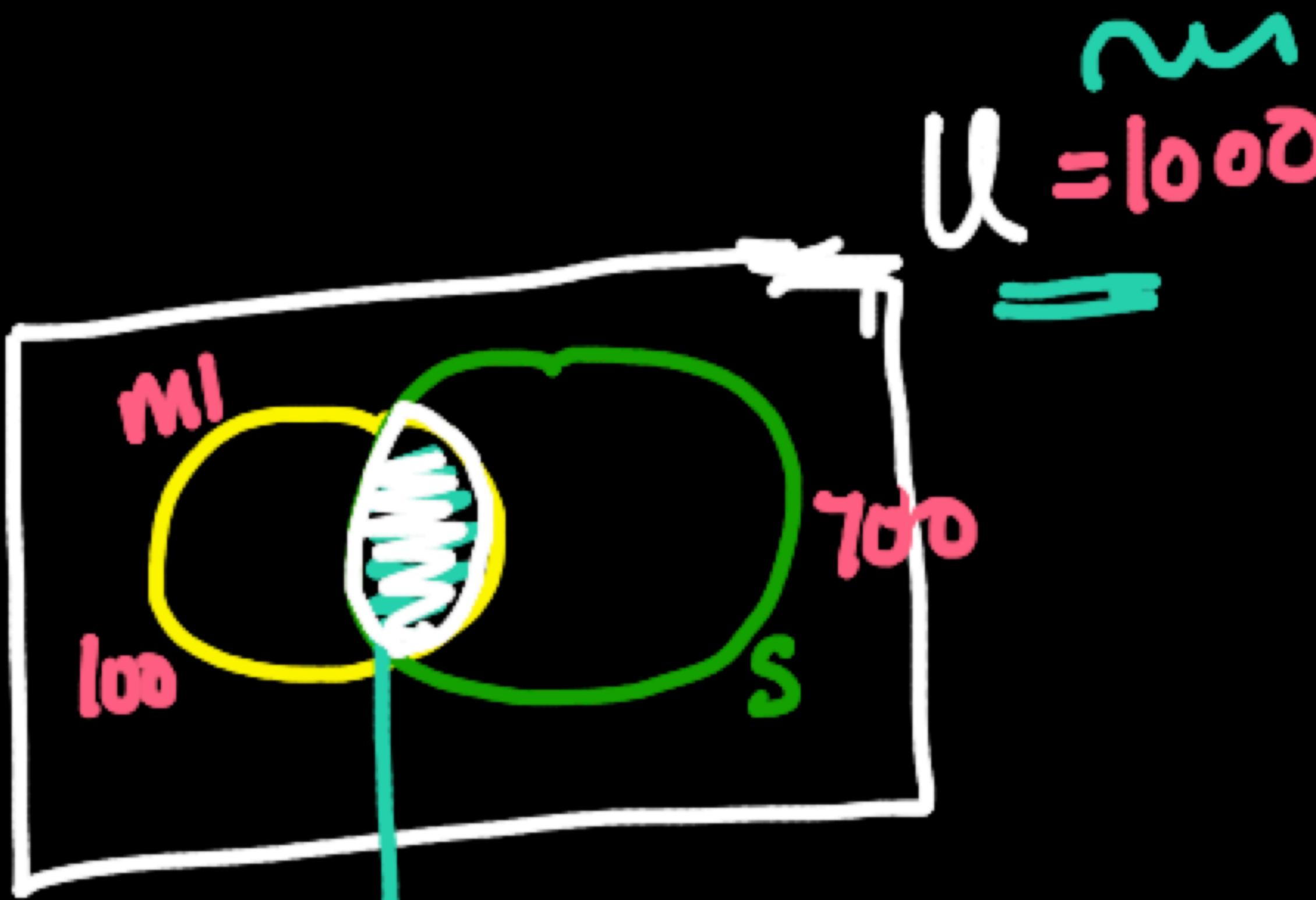
(=1000)  $U$ : Universe of covid patients

(=100)  $M_l$

(=700)  $S$

$$P(M_1 \text{ and } S) = \frac{95}{1000}$$

↳ eqn: read it in english

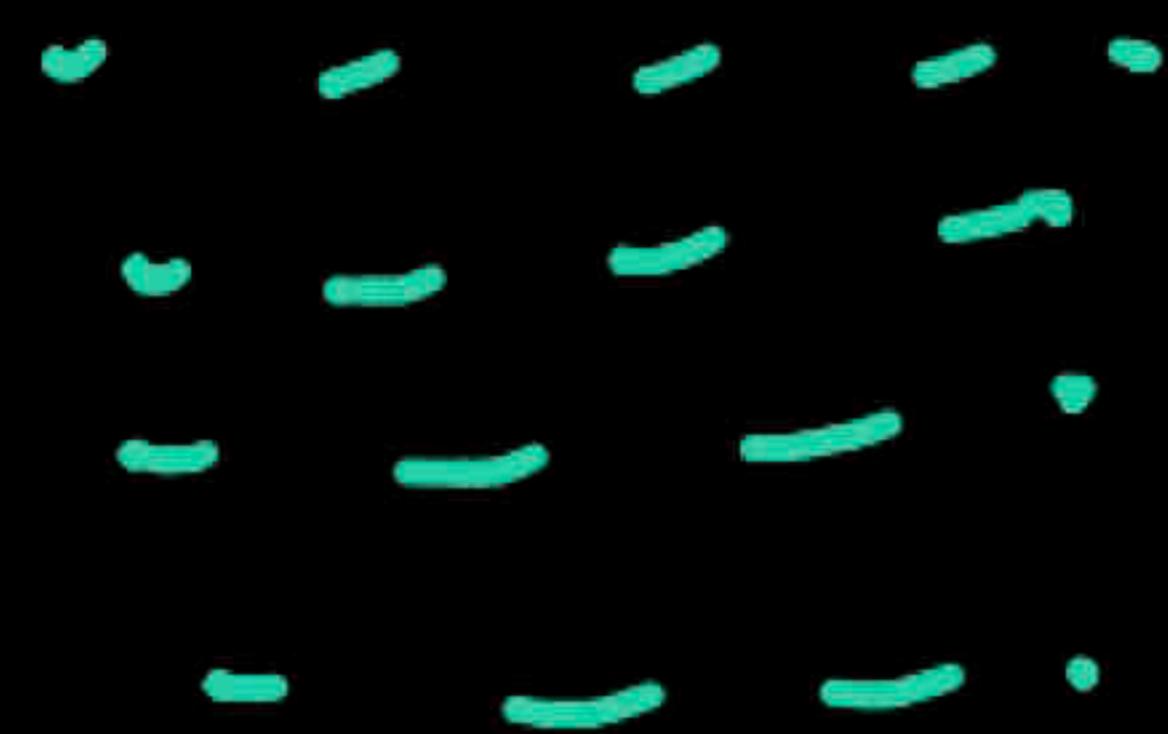


$$95 = M_1 \cap S$$

$$P(M_1) = \frac{100}{1000} = 0.1$$

$$P(S) = 700/1000 = 0.7$$

#(m<sub>1</sub> and s) = 95

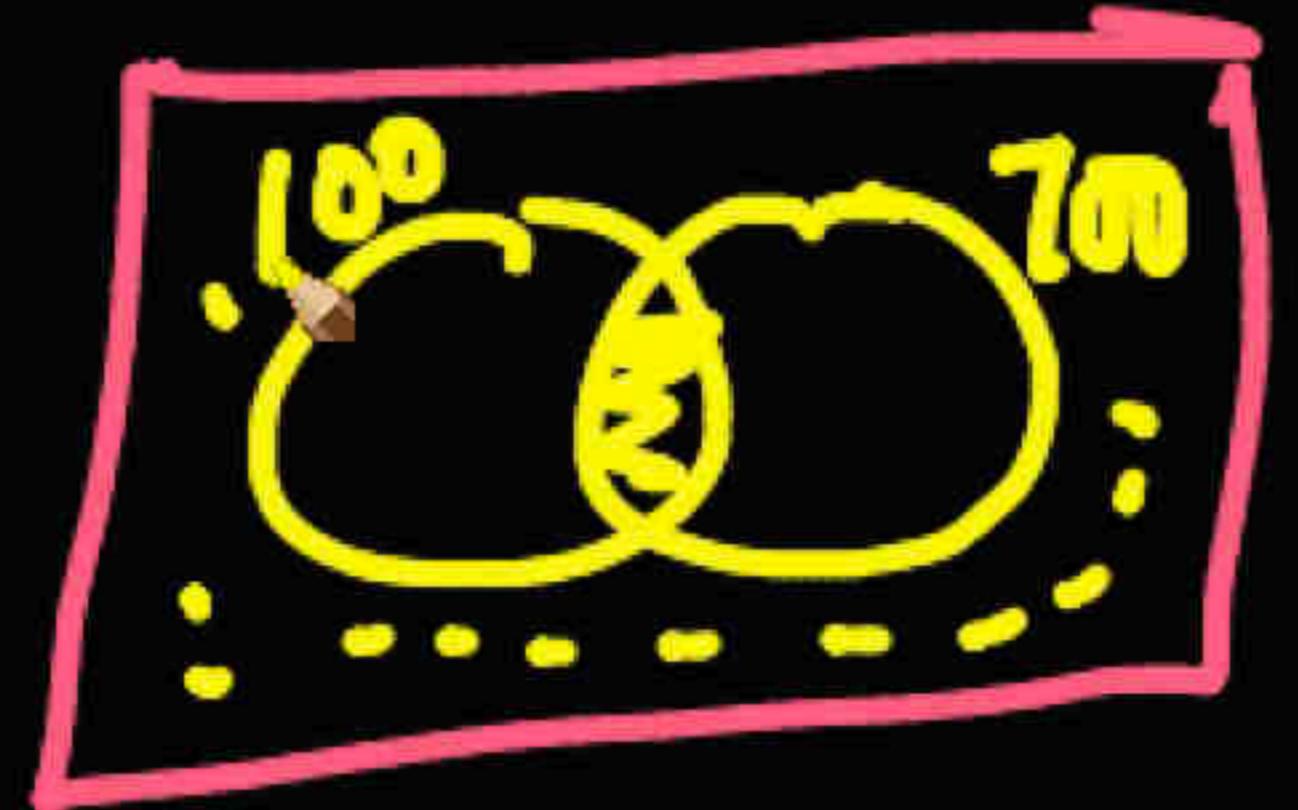


Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X +

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U=1000



You are sharing your screen now

Stop Sharing

Srikanth Varma Chekuri (You) (Screen)

01:20:46

100 700

OK 00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Pin a message

Anshu Priyadarshini To: Me 10:19 pm  
why it can't be 95/(100+700) ? as sample is 700+100

Deepit To: Everyone 10:20 pm  
yes

GEOMRTT Yes No

To: Everyone Enable/Disable Chat

Type message

Start Doubt Session

$P(M_1 \text{ and } S)$  ← JOINT prob

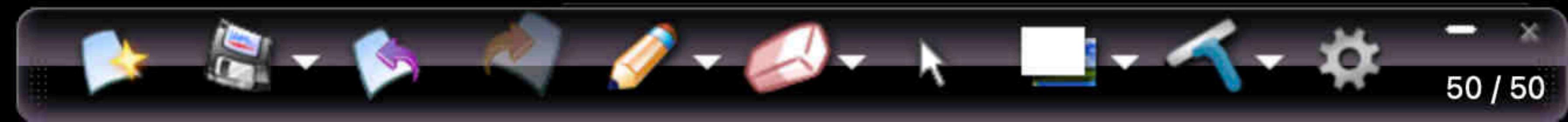
||

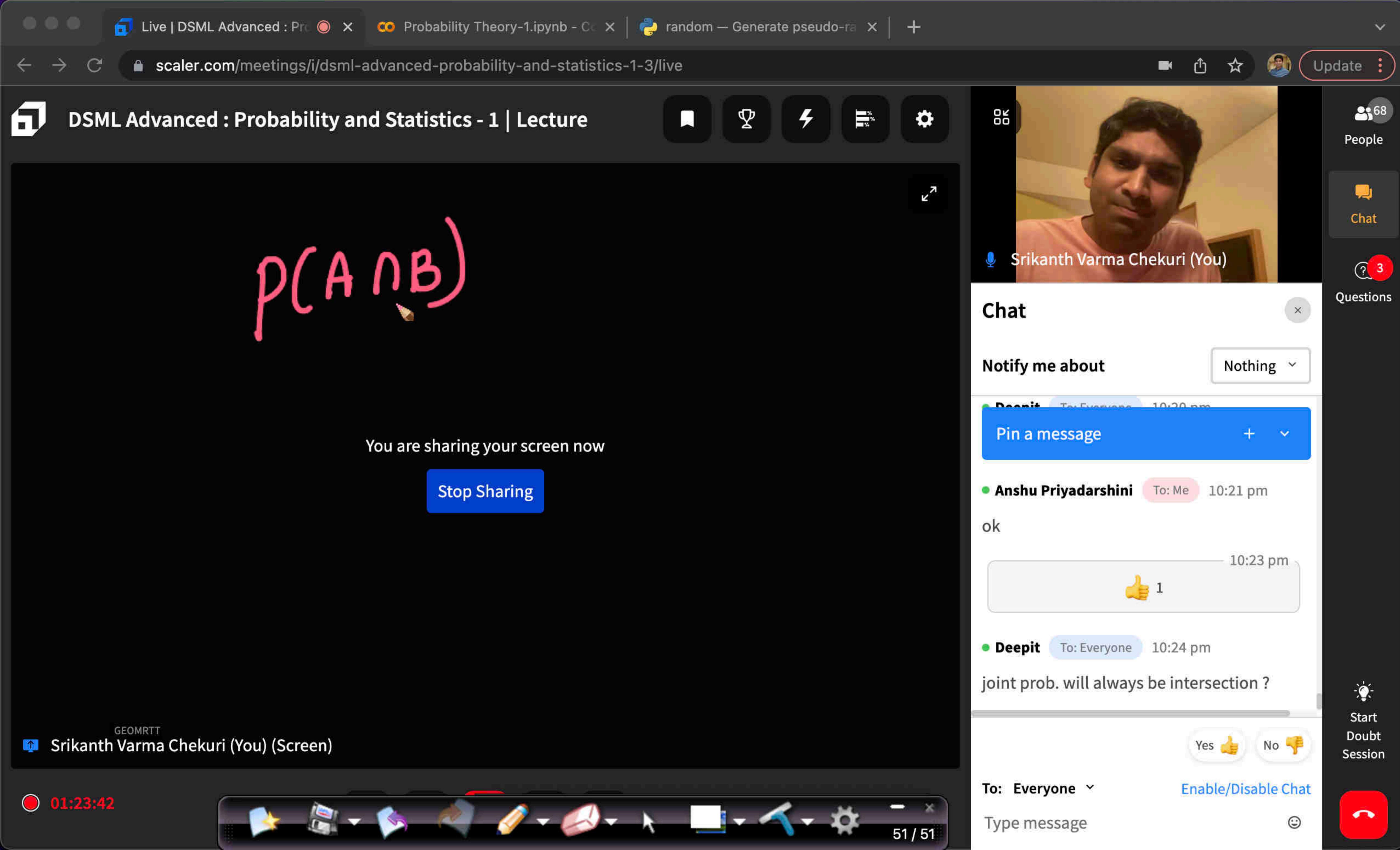
2 or more events jointly  
happen

$P(M_1 \cap S)$

||  $P(M_1, S)$

EQns: poetry  
diagrams: Art





Live | DSML Advanced : Proc X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X +

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Update :

## DSML Advanced : Probability and Statistics - 1 | Lecture



People 70

Chat

Questions 4



Fair dice

A: even number

$$\rightarrow \{2, 4, 6\}$$

B: prime number

$$\rightarrow \{2, 3, 5\}$$

$$\begin{aligned} A \cap B \cap C \\ = \emptyset \\ = \{\} \end{aligned}$$

Stop Sharing

C: NOT {2, 3, 4}

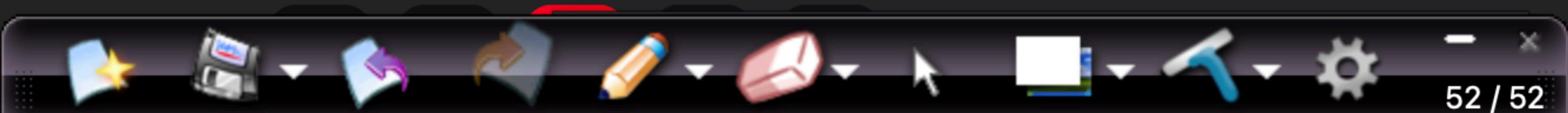
$$\rightarrow \{1, 5, 6\}$$

$$P(A \cap B \cap C) = ?$$

$$\frac{0}{6} = 0$$

Srikanth Varma Chekuri (You) (Screen)

01:26:51



52 / 52

Chat

Notify me about

Nothing

Pin a message

Karthik kumar To: Me 10:26 pm

all are mutually exclusive

Narendra Sharma To: Everyone 10:26 pm

{ } None in Python

Himachal Banik To: Everyone 10:26 pm

not - {1, 4, 6}

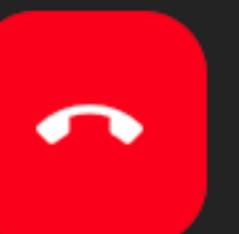
GEOMRTT  
Yes No 

To: Everyone

Enable/Disable Chat

Type message

Start Doubt Session



Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X +

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DSML Advanced : Probability and Statistics - 1 | Lecture

Q p( even or prime) = ?  $\frac{5}{6}$

You are sharing your screen now

Stop Sharing

{2, 4, 6}

{2, 3, 4, 5, 6}

GEOMRTT Srikanth Varma Chekuri (You) (Screen)

01:28:33

00:00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Dinesh Gaddam To: Everyone 10:28 pm

Anil Kumar To: Everyone 10:28 pm

{2, 4, 6}/{1, 2, 3, 4, 5, 6} = 1/2

Vishal Razdan To: Everyone 10:28 pm

5/6

Anil Kumar To: Everyone 10:28 pm

or wrong

17 Yes No

To: Everyone Enable/Disable Chat

Type message

Start Doubt Session

69 People

Chat

4 Questions

53 / 53



Fair dice

$$\{2, 4, 6\}$$

A: even

$$\{2, 3, 5\}$$

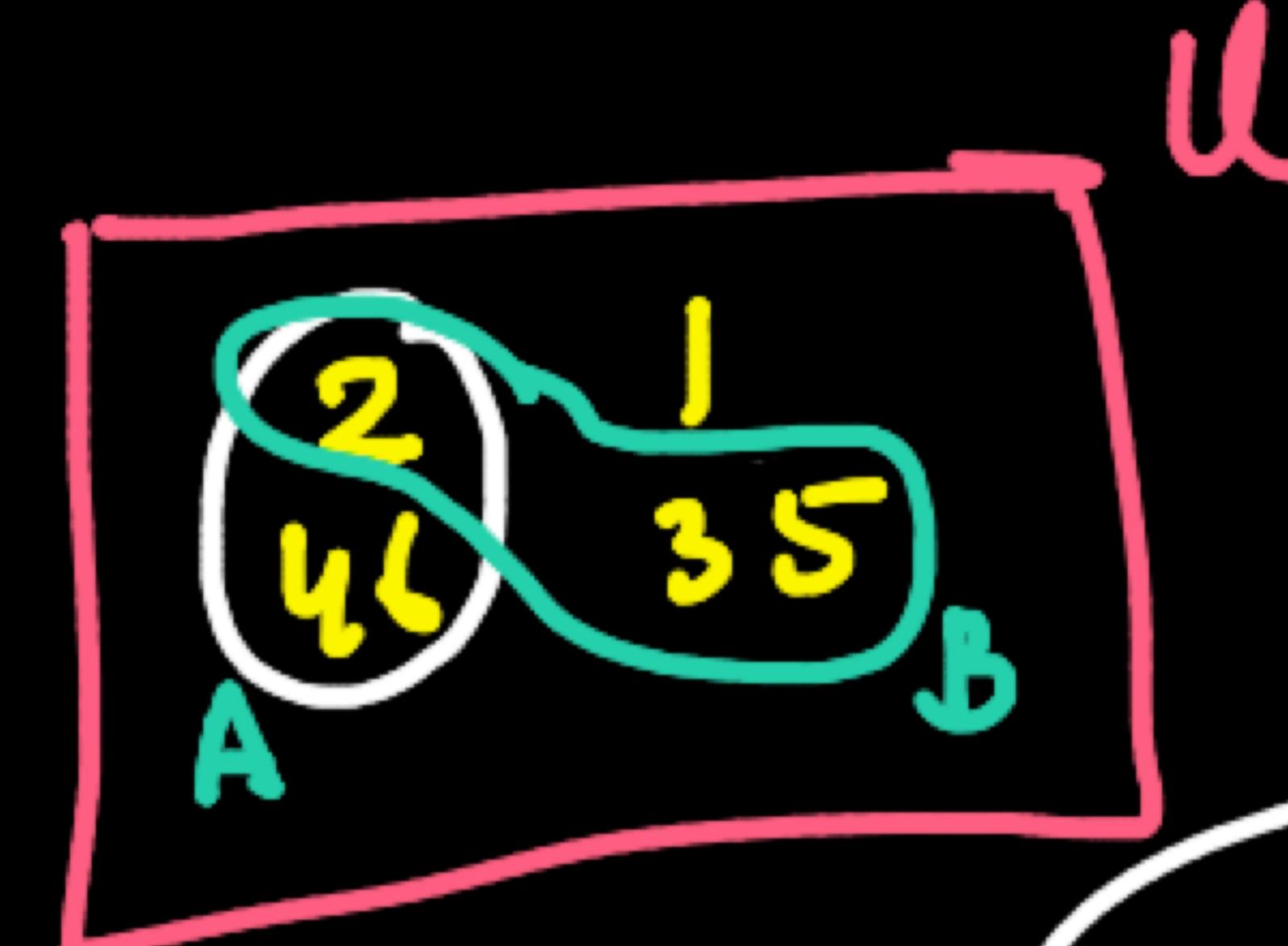
B: prime

$$P(A \text{ or } B) =$$

$$P(\underline{\underline{A \cup B}}) =$$

$$P(A) + P(B) - P(A \cap B)$$

$$\frac{|A \cup B|}{|U|}$$



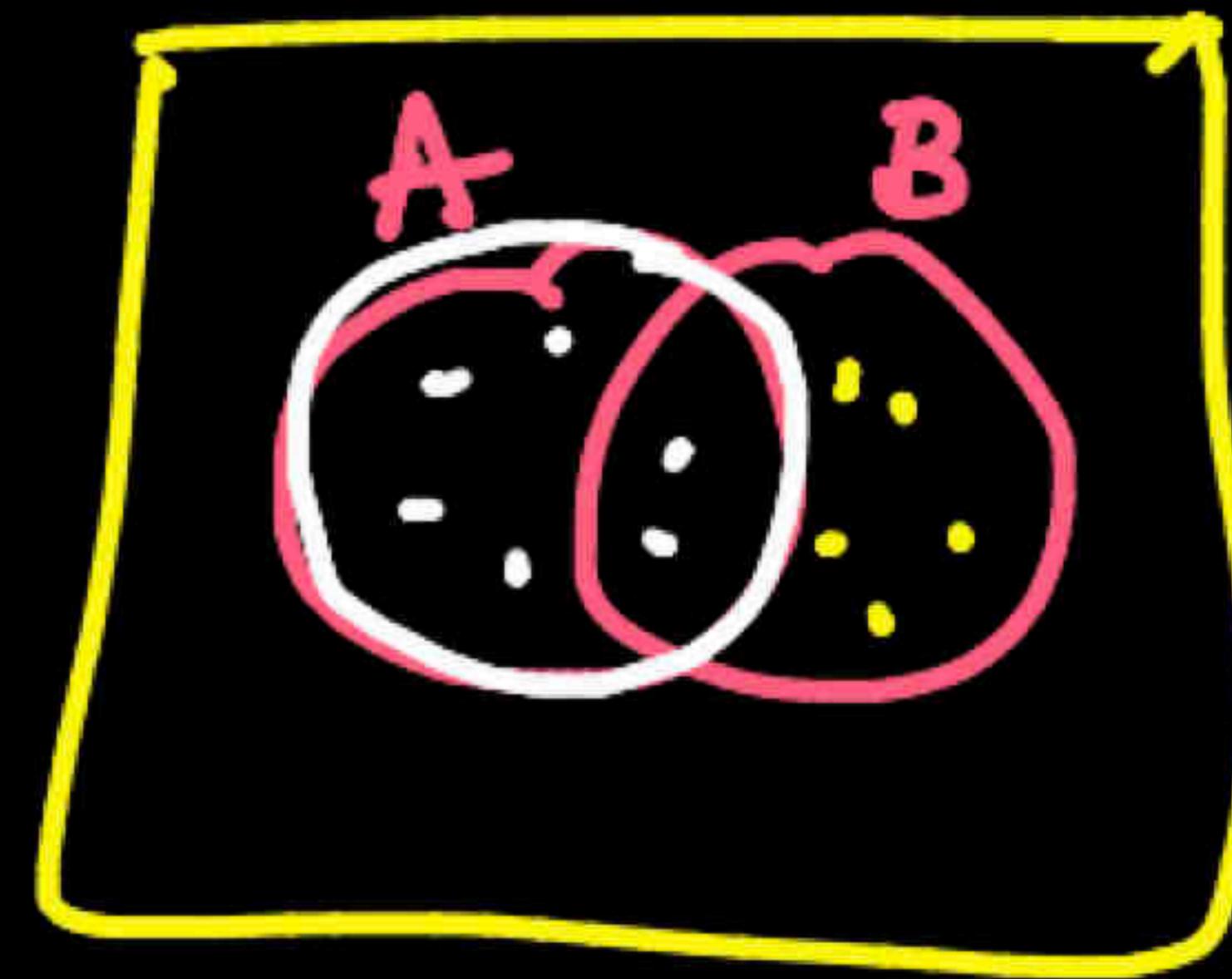
$$\frac{|A|}{|U|}$$

$$\rightarrow \frac{|B|}{|U|}$$

$$\rightarrow \frac{|B|}{|U|}$$

✓  $|A \cup B| = |A| + |B| - |A \cap B|$

6      7      2



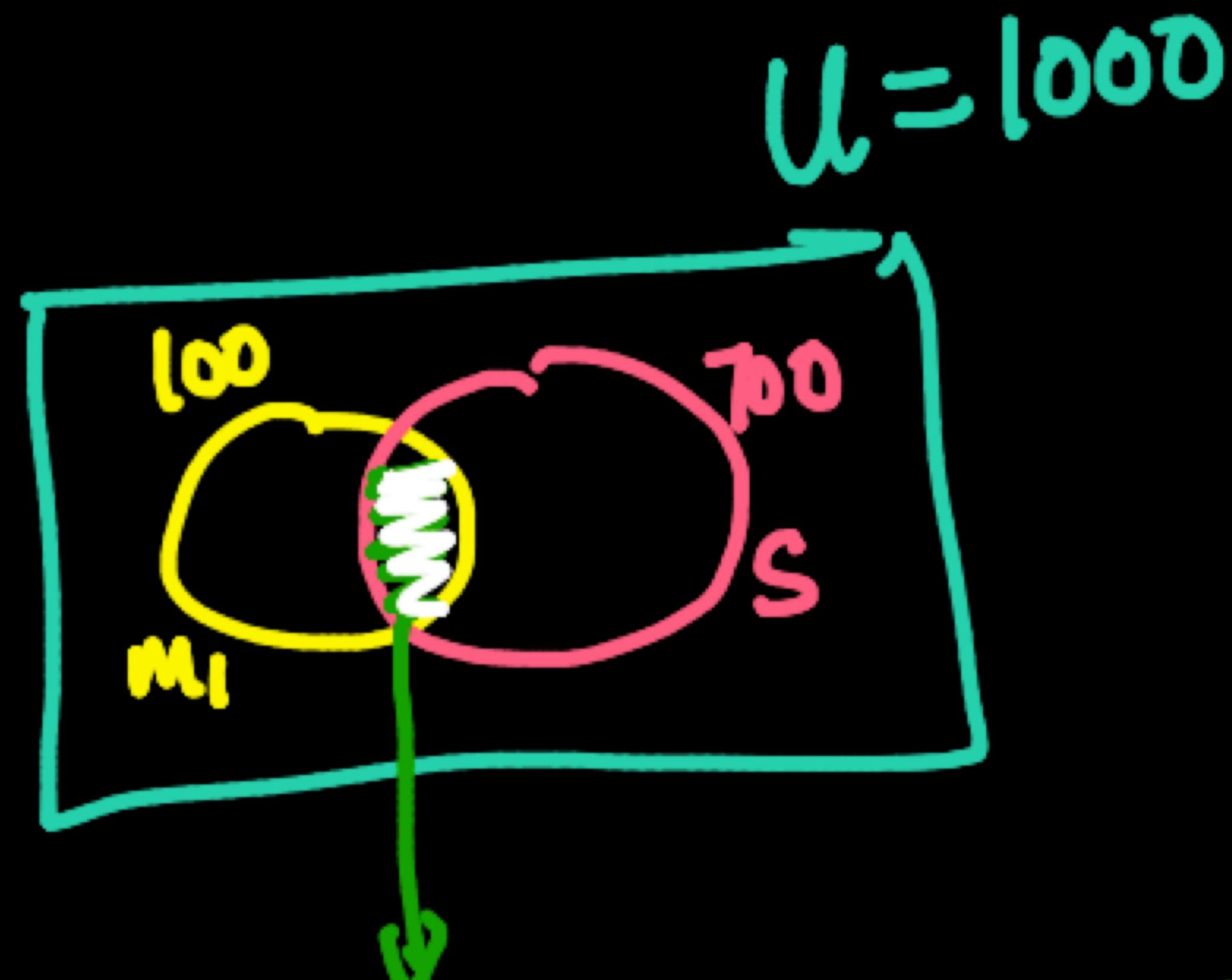
# Conditional-prob

$\sim$   $M_1$ : administered medicine  $M_1$

$\sim$   $S$ : survived

prob. of surviving given that the patient has been administered  $M_1$

$$M_1 = \frac{95}{100}$$



$$P(M_1|S) = \frac{P(M_1 \cap S)}{P(S)}$$

95/100

→ conditioned on the fact

$$P(S|M_1) = \frac{95}{100}$$

Def:

$$\frac{P(M_1 \cap S)}{P(M_1)} ; P(M_1) \neq 0$$

gen:

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

if  $P(B) \neq 0$

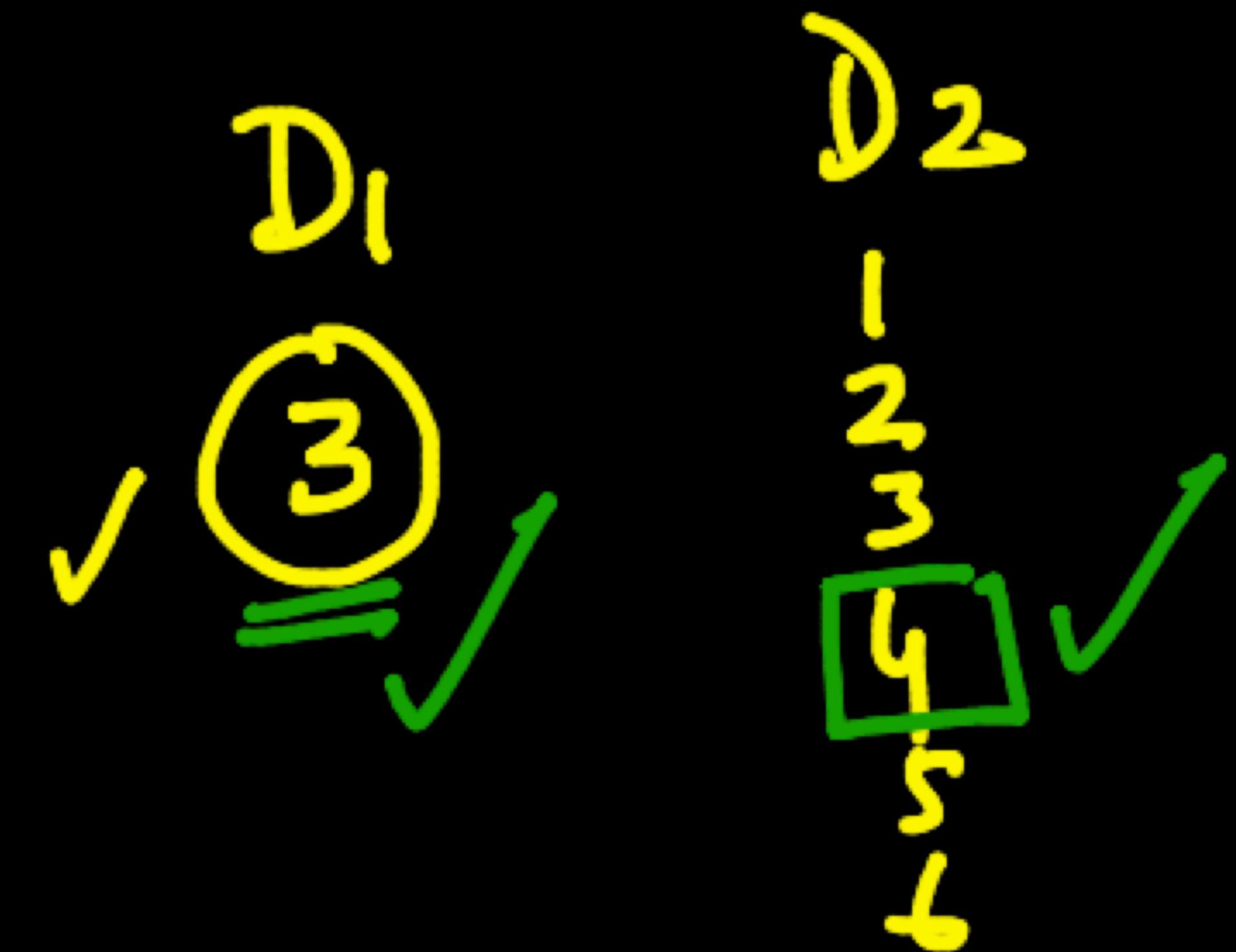


@

Fair  $D_1, D_2$  Simultaneously

past Sum of two dice equals 7

given that  $D_1$  has shown a value of  $\boxed{3}$



$$P(E|F) = \frac{P(\tilde{E} \cap F)}{P(F)} = \frac{1/36}{1/6} = \frac{1}{6}$$

$D_1, D_2$

$(1,1)$      $(2,1)$   
 $(1,2)$      $(2,2)$   
 $(1,3)$      $\vdots$   
 $\vdots$      $F: D_1 = 3$   
 $\cap E: D_1 + D_2 = 7$   
3    4

$(D_1 = 3, D_2 = 4)$

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DO NOT be overwhelmed  
↓, revise

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Srikanth Varma Chekuri (You) (Screen)

01:56:34

GEOMRTT

62 / 62

OK 00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

Avijit Swain To: Everyone 10:54 pm Pin a message +

Adith Patel To: Everyone 10:55 pm

1/36

Amit Dube To: Everyone 10:55 pm

36 events 10:56 pm

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

63 People

Chat

Questions 6

# Independent Events

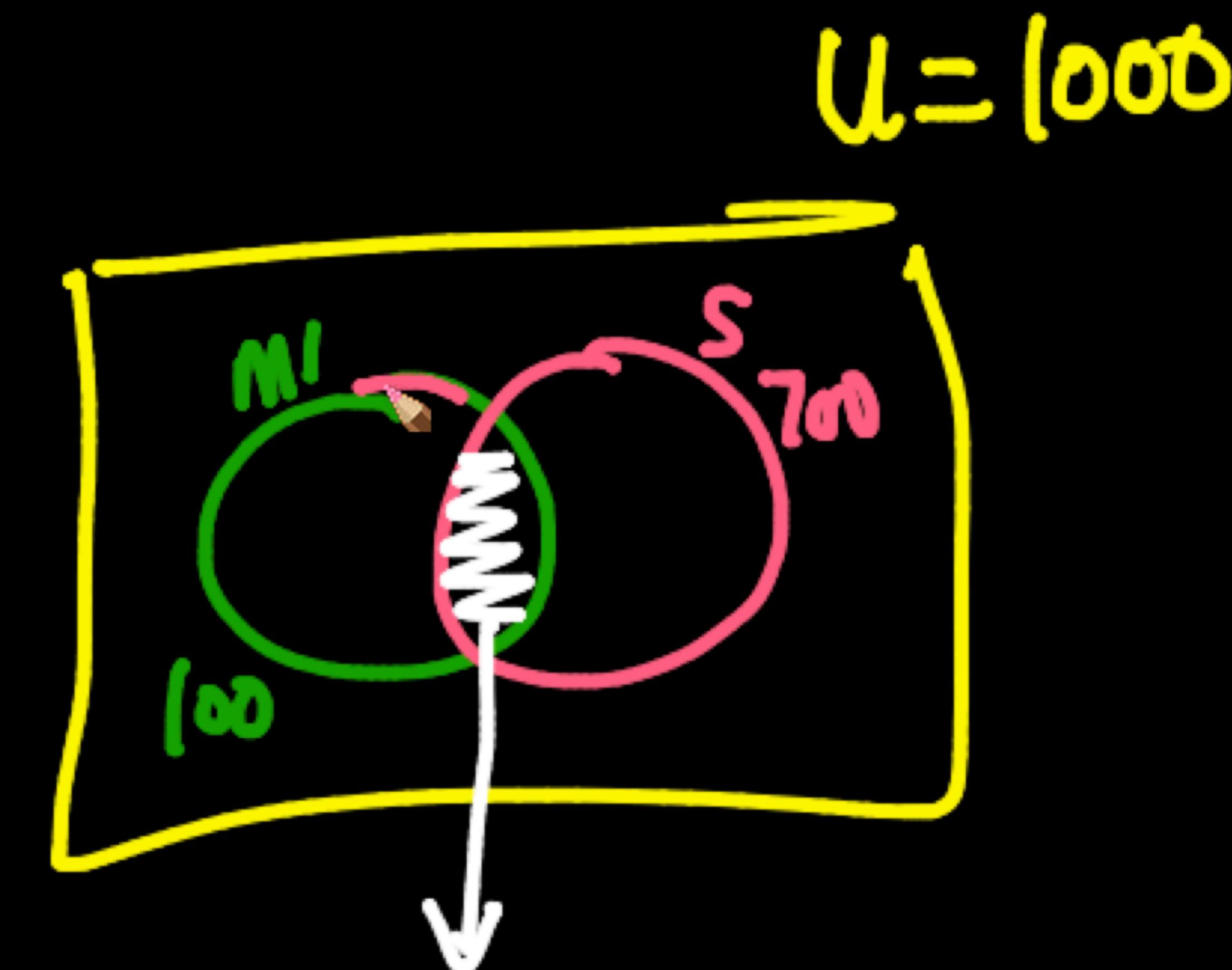
$S$ : Survived

$M_1$ : Medicine 1

$$\{ P(S|M_1) = 0.70 = \frac{70}{100} \}$$

$$\{ P(S) = \frac{700}{1000} = 0.70 \}$$

↳ prob. of survival was indep of  $M_1$



$$70 = M_1 \cap S$$

$$\text{If } P(A|B) = P(A)$$

Then A & B are indep events

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$\cup = 1000$

$|M_1 \cap S| = 70$

$\neq \emptyset$  (NOT a null set)

You are sharing your screen now

Stop Sharing

$P(S|M_1) = 0.70 = P(S)$

Srikanth Varma Chekuri (You) (Screen)

02:03:19

65 / 65

OK 00 GEOMRTT Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing 11:03 pm

Karthik kumar To: Me 11:03 pm yeah

Vishal Razdan To: Everyone 11:03 pm is there a science behind this? 11:03 pm

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

60 People

Chat 6 Questions

Pin a message +

Yes No

Start Doubt Session

Enable/Disable Chat

Type message

OK 00 GEOMRTT Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing 11:03 pm

Karthik kumar To: Me 11:03 pm yeah

Vishal Razdan To: Everyone 11:03 pm is there a science behind this? 11:03 pm

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

60 People

Chat 6 Questions

Pin a message +

Yes No

Start Doubt Session

Enable/Disable Chat

Type message

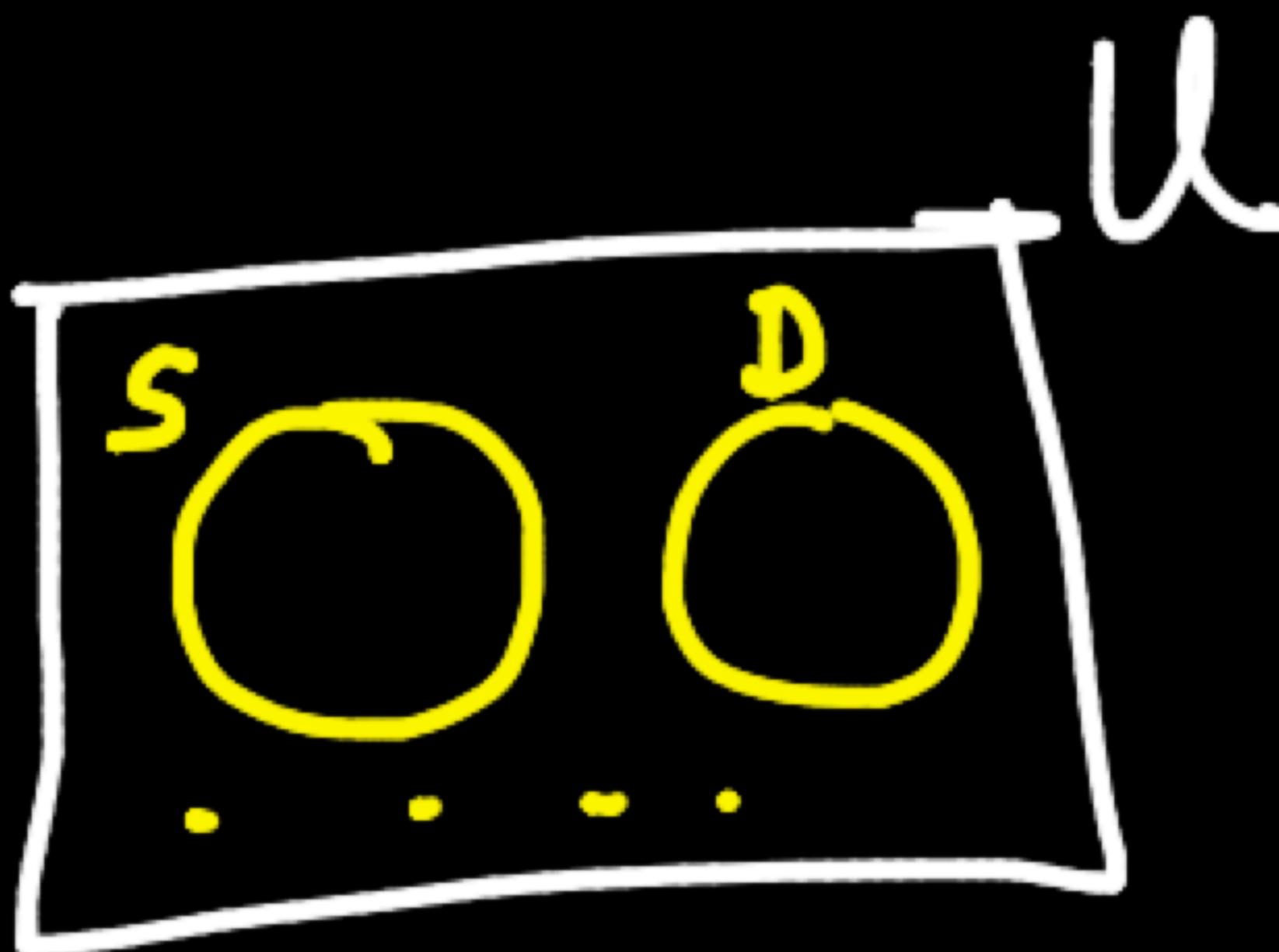


Mutually exclusive  
events

✓  $S$ : survived

✓  $D$ : died

$$S \cap D = \emptyset = \{\}$$



$$P(S \cap D) = 0$$

JOINT prob

# COMMON- MISCONCEPTION

↳ Indep. events

$$P(A|B) = P(A)$$

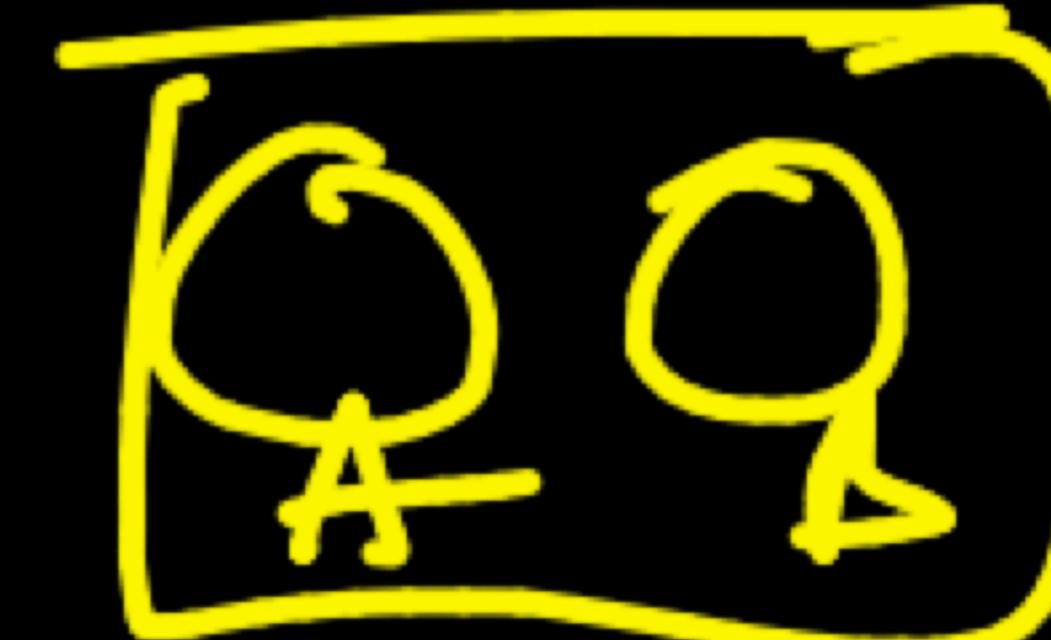
$$A \cap B \neq \emptyset$$



Mutually exclusive

$$A \cap B = \emptyset$$

$$P(A \cap B) = 0$$



If A & B are indep - events

$$P(A \mid \underline{B}) = \frac{P(A \cap B)}{P(\underline{B})} = P(\underline{A})$$

def

$$\Rightarrow \boxed{P(A \cap \underline{B}) = P(\underline{A}) P(\underline{B})}$$

$P(\underline{B}) \neq 0$

~~Algebraic~~

✓ mutually excl events

$$S \cap D = \emptyset$$

$$P(S \cap D) = 0$$

independent

$$P(S|D) = \frac{P(S \cap D)}{P(D)}$$

$$= 0$$

$$\neq P(S)$$

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A medium shot of Srikanth Varma Chekuri, a man with dark hair and a beard, wearing a light-colored t-shirt. He is smiling and looking towards the camera. The background shows an indoor setting with a yellow wall and a door frame. In the top left corner, there is a digital timer displaying "00:00". In the bottom right corner, there is a white rectangular label with the text "GEOMR" partially visible.

## Chat

## Notify me about

Nothing ▾

## Pin a message

aveen Kumar 10. Everyone 11.11 DII

but in this case intersection is zero

● **Harpreet Singh** To: Everyone 11:11 pm

Let us say that  $A \cap B = \emptyset$  and  $P(A|B) = P(A)$  then A is independent and A & B are mutually exclusive.

- **Hrishabh Amrodia** To: Everyone 11:11  
↓ 2 New Messages

To: Everyone ▾

## Enable/Disable Chat

Type message

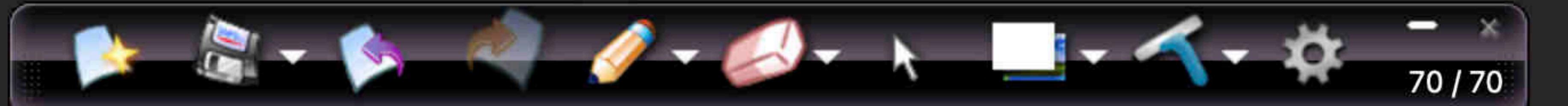


Start  
Doubt  
Session

Start  
Doubt  
Session

 Srikanth Varma Chekuri (You) (Screen)

02:15:27



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GEOMRTT

gf A and B are indep

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

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$= P(A) \cdot P(B)$

Srikanth Varma Chekuri (You) (Screen)

02:17:00

71 / 71

OK 00

Srikanth Varma Chekuri (You)

Chat

Notify me about Nothing

if event A is null set

Pin a message +

11:11 pm

1

Venu Gopal To: Me 11:12 pm

can you explain  $p(a)*p(b)$

vikas To: Everyone 11:13 pm

by definition mutually excl. 2 New Messages

Start Doubt Session

To: Everyone Enable/Disable Chat

Type message

Yes No

58 People

Chat 6 Questions

Red circular button with a red arrow pointing right



$$S \cup D \cup C = U$$

$S$  : survived

$D$  : dead

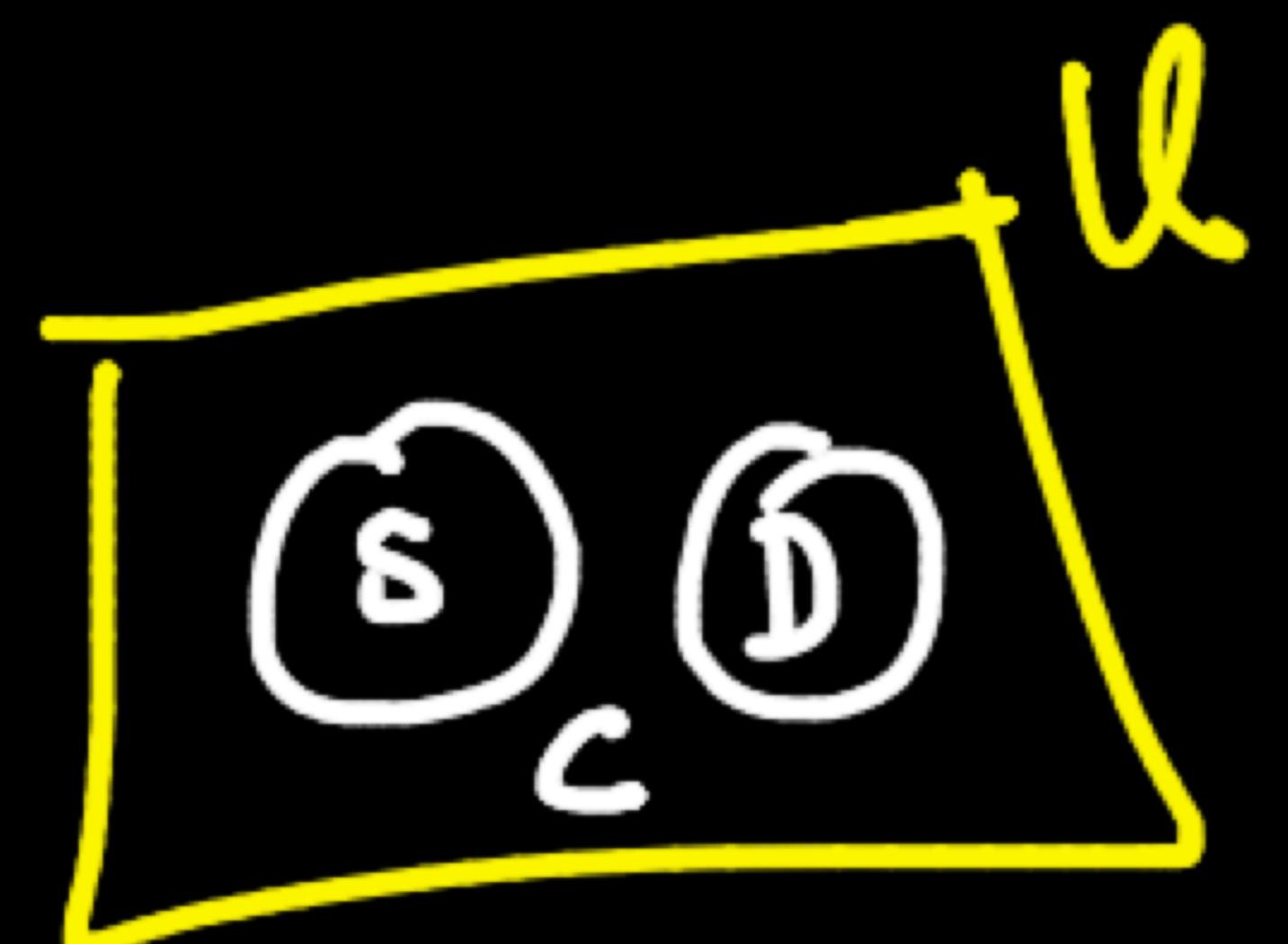
$C$  : medical case

mutually exclusive  
& exhaustive

$$S \cap D = \emptyset$$

$$S \cap C = \emptyset$$

$$D \cap C = \emptyset$$



Live | DSML Advanced : Pro X | Probability Theory-1.ipynb - Co X | random — Generate pseudo-ra X | Think Stats: Probability and Sta X | +

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DSML Advanced : Probability and Statistics - 1 | Lecture

1 54 People

1 Chat

2 Questions

You are sharing your screen now

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Srikanth Varma Chekuri (You)

Questions

Live (2) Answered (5)

Recently asked

B)/P(B) with P(B)!=0. what will happen for P(B|A)?

Already Answered Answer Now

Asked 110 seconds ago 0

Shankar Kantharaj

How can we differentiate between asking for P(A)+P(B) and asking for P(AUB)? GEOMRTT

Already Answered Answer Now

Asked 45 minutes ago 0

Start Doubt Session

02:25:51

73 / 73

The image shows a live video conference interface. On the left, a large whiteboard area displays handwritten mathematical formulas. The formula  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$  is written, with the term  $P(A \cap B)$  underlined in red. To the left of this, another formula  $P(A \cup B)$  is written with the word "OR" above it. Below the whiteboard, a message says "You are sharing your screen now" with a blue "Stop Sharing" button. At the bottom of the whiteboard area, there are several small icons for navigating the video player. On the right side of the screen, there is a video feed of Srikanth Varma Chekuri, who is speaking. Below the video, a text box shows his name and status as "(You)". To the right of the video, there is a sidebar with various metrics: "People" (54), "Chat" (1), and "Questions" (2). The "Questions" section is expanded, showing a list of questions. The first question is "B)/P(B) with P(B)!=0. what will happen for P(B|A)?". It has two buttons: "Already Answered" and "Answer Now". Below this, it says "Asked 110 seconds ago" and has a thumbs-up icon with a value of 0. The second question from "Shankar Kantharaj" asks how to differentiate between  $P(A)+P(B)$  and  $P(A \cup B)$ . It also has "Already Answered" and "Answer Now" buttons, was asked 45 minutes ago, and has a thumbs-up icon with a value of 0. At the very bottom right, there is a red button with a white question mark icon. The top of the screen shows the browser's tab bar with several open tabs, and the system tray at the top right shows various icons for battery, signal, and time.

Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X Think Stats: Probability and Sta X +

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DSML Advanced : Probability and Statistics - 1 | Lecture

A & B are indep

P(A|B)

You are sharing your screen now

Stop Sharing

Srikanth Varma Chekuri (You) (Screen)

02:26:48

74 / 74

Srikanth Varma Chekuri (You)

00

Questions

Live (2) Answered (6)

Recently asked

can you explain once

Already Answered Answer Now

Asked 23 seconds ago 0

Hrishabh Amrodia

can you explain, if A and B are independent then  $P(A|B) = P(A \text{ and } B)/P(B)$  with  $P(B) \neq 0$ . what will happen for  $P(B|A)$ ?

GEOMRTT

Already Answered Answer Now

Asked 3 minutes ago 0

Start Doubt Session

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scaler.com/meetings/i/dsml-advanced-probability-and-statistics-1-3/live

DSML Advanced : Probability and Statistics - 1 | Lecture

$P(A) = P(A|B) = \frac{P(A \cap B)}{P(B)}$   $P(B \neq 0)$

You are sharing your screen now

Stop Sharing

GEOMRTT

Srikanth Varma Chekuri (You) (Screen)

02:28:33

50 People

1 Chat

3 Questions

Doubt Session Ongoing

Hrishabh Amrodia

People

Search

Srikanth Varma Chekuri (Host, You)

Hrishabh Amrodia Raised hand

Abdul Ahad

AM Abhilash M

AC Abhishek Chopra

AG Abhishek Goyal

AP Adith Patel

75 / 75

Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X Think Stats: Probability and Sta X +

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DSML Advanced : Probability and Statistics - 1 | Lecture

GEOMRTT

A & B are indep

$P(A|B) = P(A)$

You are sharing your screen now

Stop Sharing

$\{ P(B|A) = \frac{P(B \cap A)}{P(A)} = P(B)$

Srikanth Varma Chekuri (You) (Screen)

02:30:06

00 00

Hrishabh Amrodia

People

Search

Srikanth Varma Chekuri (Host, You)

Hrishabh Amrodia

Abdul Ahad

AM Abhilash M

AC Abhishek Chopra

AG Abhishek Goyal

AD Amit Dube

1 Chat

3 Questions

Doubt Session Ongoing

Live | DSML Advanced : Proc X | Probability Theory-1.ipynb - Co X | random — Generate pseudo-ra X | Think Stats: Probability and Sta X | +

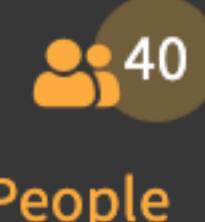
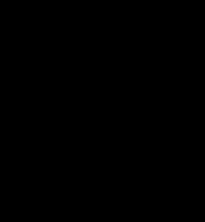
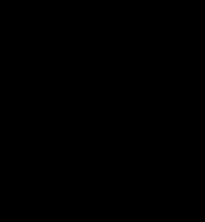
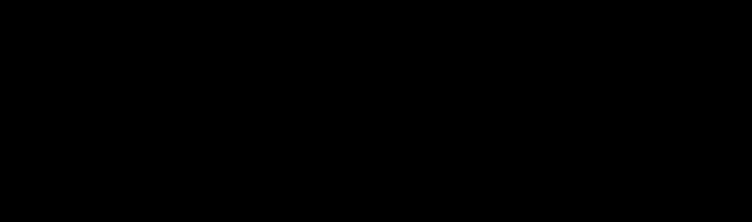
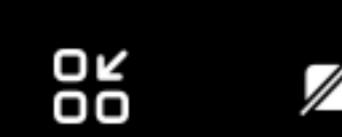
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Update :

## DSML Advanced : Probability and Statistics - 1 | Lecture



00



40

People



2



3

GEOMRTT



Hrishabh Amrodia

## People

Search



Srikanth Varma Chekuri (Host, You)



Hrishabh Amrodia



Abdul Ahad



Abhilash M



Abhishek Chopra



Abhishek Goyal



Amit Dube

Doubt  
Session  
Ongoing

S: survived  
MI: Myocardial Infarction

prob that patient survived given MI

$P(S|MI) = P(S)$

$P(MI|S)$   
 $= P(MI)$

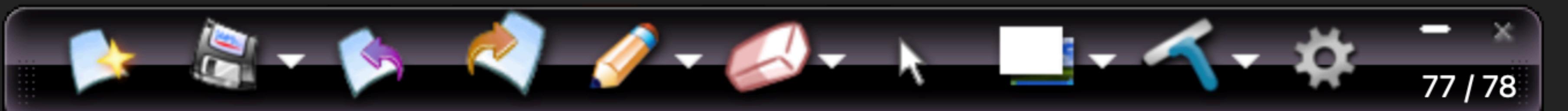
prob MI given survival

You are sharing your screen now

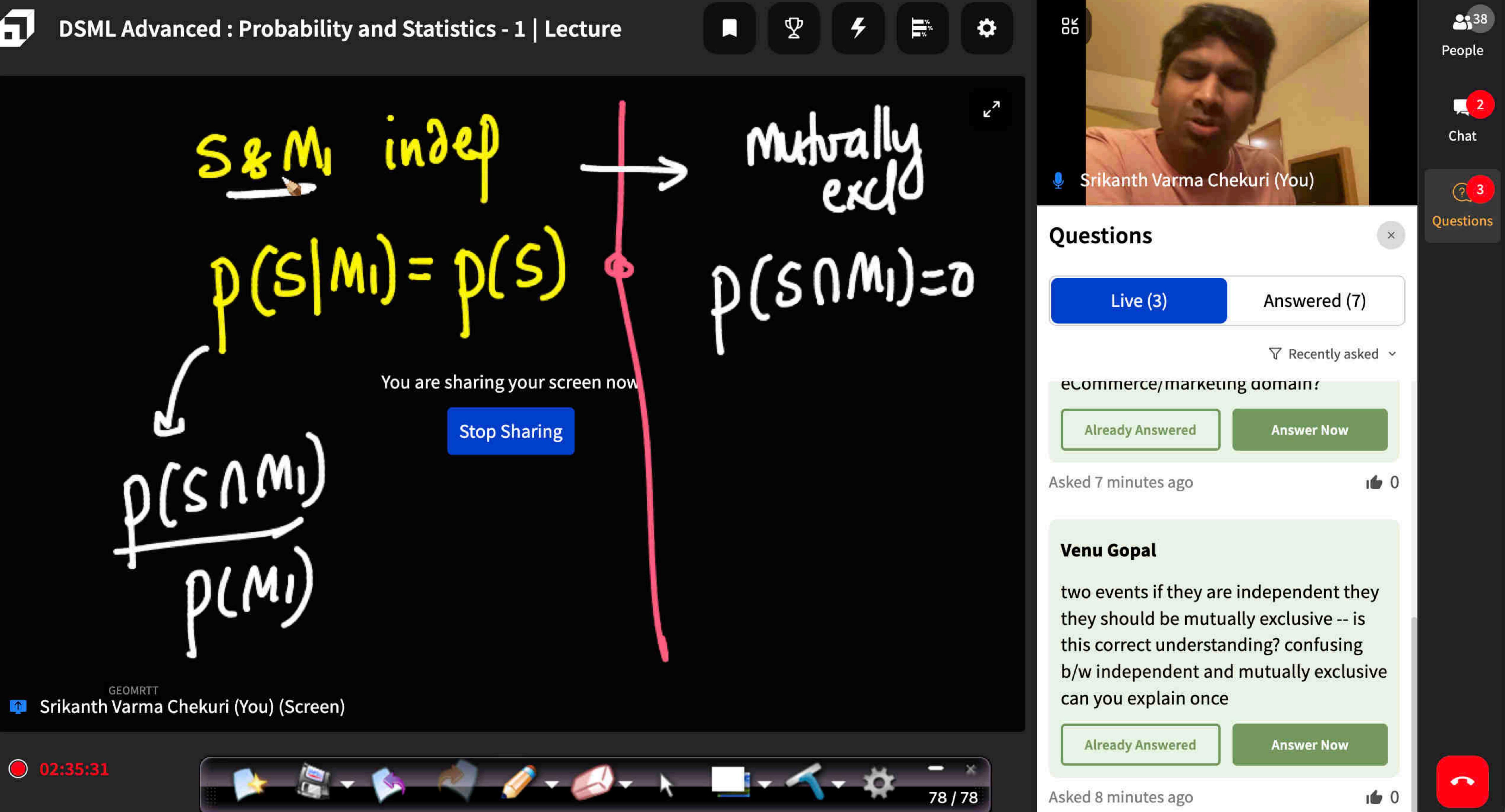
Stop Sharing

Srikanth Varma Chekuri (You) (Screen)

02:33:22



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Live | DSML Advanced : Pro X Probability Theory-1.ipynb - Co X random — Generate pseudo-ra X Think Stats: Probability and Sta X +

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DSML Advanced : Probability and Statistics - 1 | Lecture

GEOMRTT

$p(A|B) = p(A) \neq p(B)$

You are sharing your screen now

Stop Sharing

$p(B|A) = p(B)$

Srikanth Varma Chekuri (You) (Screen)

02:36:13

11:36 pm

To: Everyone

Type message

Enable/Disable Chat

Yes No

Doubt Session Ongoing

People 36

Chat

Questions 4

Pin a message

Ram Panda

Can you please suggest any probability statistics books specifically for data science with hands on approach

Already Answered Answer Now

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# You have left the meeting

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1

### Scan the QR code with your iPad

Scanner should be present in the top menu on your iPad

2

### Upload Notes on the generated link

All notes uploaded will be visible in the saved version of this session



OR

Drag and drop files or [click here to upload](#)

Files Uploaded from your computer appear here