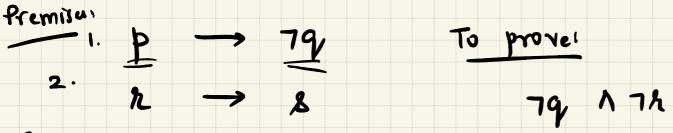


Example 1: Four siblings go shopping with their father.

- If Abhay gets shoes, then Asha does not get a necklau.
- If Arun gets a T-shirt, then Aditi gets bangles.
- If Abhay does not get shoes or Aditi gets bangles, the mother will be happy.
 - Mother is not happy.
 - Prove that Asha did not get a necklau and Arun did not get a T-shirt.



Example	2 1:	Four	sibl	ings go	shopping	with th	eir father		"p ".	Аврау д	ets shoe
-	If ,	Abhay	gek	shoes,	then Asha	does no	st get a r	necklau.		J J J	
					t, then				9 , `	Asha gen	necklace
– It	Abhay	y does	not	get show	or Aditi	gek bang	gles, the n	10ther will			
							be l	парру.	Υ :	Arun ges	T-shirt
				happy.							
Prove	that	Asha	did	not get	a neckla			not	& :	Adihi geb	banglus
						get a	T-shirt.				
Proveita									' m :	mo Ker	is happy.
Premisu.	Þ		->	79		To	provei				
2.											
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2. 3. 7f	Y	& ·		m							
4 .											
Proof:	Fm	m	3 (and 4	we	can	înter		(7pv	s)	
			<u> </u>		1				<u> </u>	-	
									ÞN	75	
F	A			and				70			
	rom	<u>1</u>	<i>r</i>	ariv	۲'	we	yet	19			
Fr	OM	2		and	78,	we	get	78			
							U				



- 3. 7p y s -> m
- 4. TM

Proof: From 3 and 4, we can inter 7 (7p v s)

0

From 1, and 'p' we get 79 From 2 and 78, we get 7n

•

Example 2: Five friends A, B, C, D, E have access to a

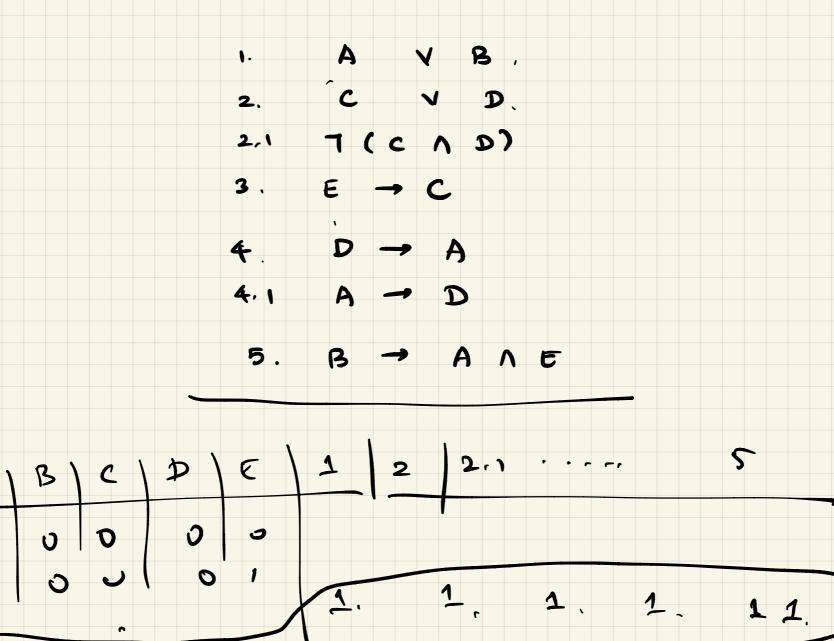
- chat room. Is it possible to determine who is chalting if the following information is known.²
- Either A or B, or both are chatting.
- Either C or D, but not both, are chalting.
- If E is chatting, then c is also chatting.
- D and A are either both chatting or neither is.
- If B is chatting, then so are A and E.

Explain your reasoning.

cample 2: Five friends A, B, C, D, E have access to a	A: A is chatting
chat room. Is it possible to determine who is chalting	· · · · · · · · · · · · · · · · · · ·
if the following information is known.?	•
- Either A or B, or both are chalting.	E: E is chatting.
- Either C or D, but not both, are chatting.	
- If E is chatting, then c is also chatting.	
- D and A are either both chalting or neither is.	I. A V B,
- If B is challing, then so are A and E.	2. C V D.
Explain your reasoning.	2,1 T (C A D)
	3. E → C
	4. D → A
	4.1 A - D
	5. B - A A E

$(D \land A) \lor (TD \land TA)$ D (- A)

۱.	AV	B ,	Assume	A = 1	Assume A=0
2. 2,1	́с \ Т (с		=)	D = 1 (4.1)	=> D=0(4)
3、	E → (C	=)	. C=0 (2.1)	=> C = 1(2)
4.	Ď →	Α	=>	E=0(3)	=> B=0 (5)
4, 1	A -	D	=7	, B=0 (S)	=> B=1 (due
5.	B →	ΑΛΕ	l		to 1 and
					A=0)
					- a contradiction
Final	answer:	A and D	are	~ ~	My assumption
					A=0 is not
		chatting.			possible -



A

0

J

1

0

.

1

1

0

U

Example 3: Smullyon puzzle.

There is an island that has two kinds of inhabitants

- knight who always tell the truth
- knaves who always lie.

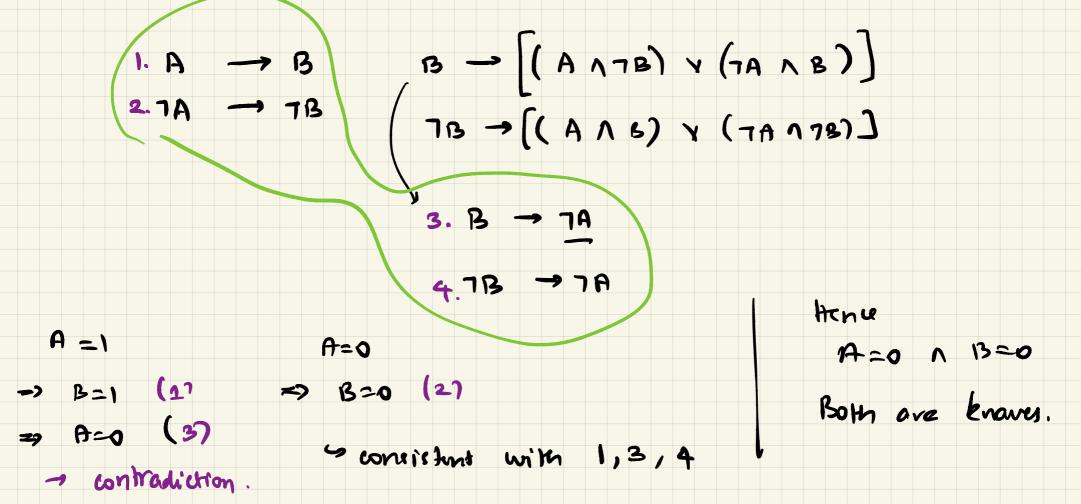
You encounter two people A and B. What are A and B if:

A says "B is a benight" and

B rays "The two of us are opposite types".

Example 3: Smullyon puzzle.

There is an island that has two kinds of inhabitants A: A is knight - knight who always tell the truth - knaves who always lie. You encounter two people A and B. What are A and B if A says "B is a bright" and B says "The two of us are opposite types".



Example 4: There is an island that has two kinds of inhabitants

- knight who always tell the truth
- knaves who always lie.
- You encounter two people A and B. What are A and B if:
- 4.1. A says "At least one of us is a knave" and B says nothing.
- 4.2. A says "The two of us are both knights" and B says "A is a knowe"
- 4.3. A says "I am a knowe or B is a knight" and B says nothing.
- 4.4. Both A and B say "I am a knight".

4.5. A says "We are both knaves" and B says nothing.

4.1. A says "At least one of us is a knave" and B says nothing.

А — ТВ

TA -> ANB (controdiction)

A knight, B knave

4.2. A says "The two of us are both knights" and B says "A is a knowe"

Assume A=0 $A = | \Rightarrow B^{-1}(1)$ Assume B=0) Assume B=1 = A = 0 (3)

=) A=1(4) contradiction contradiction

A knave, B knight.

4.3. A says "I am a knowe or B is a knight" and B says nothing

A

A → 7AYB

A -> B TA -> A N 73 (contradiction)

A = 1, B=1

Bom A, B are knight.

4.4. Both A and B say "I am a knight".

All are possible

4.5. A says "We are both knaves" and B says nothing.

A -> 7A A 7B) (contradiction) =

TA -> B

A knave, 13 knight