lecture 4:-   Propositional   logic.
- System Consistency.
- Puzzles.
- Searching.

Query.

Pakistan and University.

Pakistan	University	
T	T	→ Google Page
T	F	X . Rank.
F	T	X
F	F	X .

P13 | Ex 18 :

A Says   "B is a Knight".

B Says "The two of us
         are of opposite type".

Person.

A   - Knights -
B.   - Knaves.
   Island.

What is A & B ?
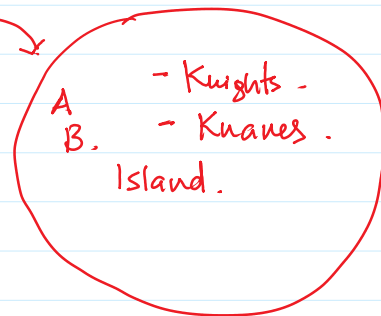
Let   p =   A is a Knight   ¬p = A is a Knave.
         q =   B is a Knight   ¬q = B is a Knave.

(A, B)
(Knight, Knight).   A =   q
(Knight, Knave).   B = $(p \land \neg q) \lor (q \land \neg p)$.
(Knave, Knight)
(Knave, Knave).

Let us   assume that "A is a Knight" and "B is a Knight".

① q   = T   p = T   ¬p = F
② $(p \land \neg q) \lor (\neg p \land q)$. = T   q = T   ¬q = F.

①⇒   T = T
②⇒ $(T \land F) \lor (F \land T)$ = T
         F ∨ F   = T
              F ≠ T.
                   this does not hold.

Let us assume that "A is a Knight" and "B is a Knave".

① q = T   P = T   ¬P = F
② (P ∧ ¬q) ∨ (¬p ∧ q) = F   q = F   ¬q = T

① F ≠ T   Case does not hold.

Let us assume that "A is a Knave." and "B is a Knight".

① q = F   P = F   ¬P = T
② (P ∧ ¬q) ∨ (¬p ∧ q) = T   q = T   ¬q = F

① T ≠ F   Case does not hold.

Let us assume that "A is a Knave" and "B is a Knave".

① q = F   P = F   ¬P = T
② (P ∧ ¬q) ∨ (¬p ∧ q) = F   q = F   ¬q = T

① F = F ✓
② (F ∧ T) ∨ (T ∧ F) = F.
   F ∨ F = F   CASE Hold.
       F = F

∴ A is a Knave & B is a Knave.

A says "Ⓘ ⓐⓜ a Knave or B is a Knight".
   A is a Knave or B is a Knight.

A Says "(I) (am) a knave or B is a knight".

A is a knave or B is a knight.

$$\neg p \vee q.$$

A Says " Atleast one of us is a knave".

A	B
Knight	Knight
Knight	Knave ✓
Knave	Knight ✓
Knave	Knave ✓

$$(p \wedge \neg q) \vee (\underset{\longleftarrow}{-} \wedge \underset{\longrightarrow}{-}) \vee \overset{\neg p \ \neg q}{(\underset{-\wedge-}{\quad})}$$

None of the cases holds.   (Inconclusive).
One case may hold.   (A = ?   B = ?). Fix.
more than one case may hold.

	A	B.
CASE 1	Knight	Knight.
CASE 2	Knight	Knave.
CASE 3	Knave	Knight.
CASE 4 .	Knave	Knave.

A = Knight -   B = ?

Quiz #2.   31- JAN- 2023.

A Says " ".   def p = A is a knight
B Says " I am not a knight".   q = B is a knight.

CASE 1   Knight   Knight.

___ = ?   p = ?   ¬p = ?   ¬p = A is a knave
___ = ?   q = ?   ¬q = ?   ¬q = B is a knave.

check .

cheek :

Knaves   always   Speaks   lies.
Knights   u   u   Troll