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Panel :- 1

AI Problem Based Learning

Q 1. Convert the following English sentences into predicate logic

i) Some integers are even and some are odd
→ $\exists x\, E(x) \wedge \exists x\, O(x)$

$E(x)$ represents x is even
$O(x)$ represents x is odd

ii) No integer is even
→ $\forall x \neg E(x)$

$E(x)$ represents x is even
$O(x)$ represents x is odd

iii) If an integer is not even, then it is odd
→ $\forall x [\neg E(x) \rightarrow O(x)]$

$E(x)$ represents x is even
$O(x)$ represents y is odd

Q2 Want to prove likes (clyde, peanuts) From:

1. (elephant (clyde), giraffe (clyde))
2. (¬ elephant (clyde), likes (clyde, peanuts))
3. (¬ giraffe (clyde), likes (clyde, leaves))
4. ¬ likes (clyde, leaves)

⇒ Forward chaining Proof:

- 3 & 4 → ¬ giraffe (clyde) [5.]
- 5 & 1 → elephant (clyde) [6.]
- 6 & 2 → likes (clyde, peanuts) [7.] ✓

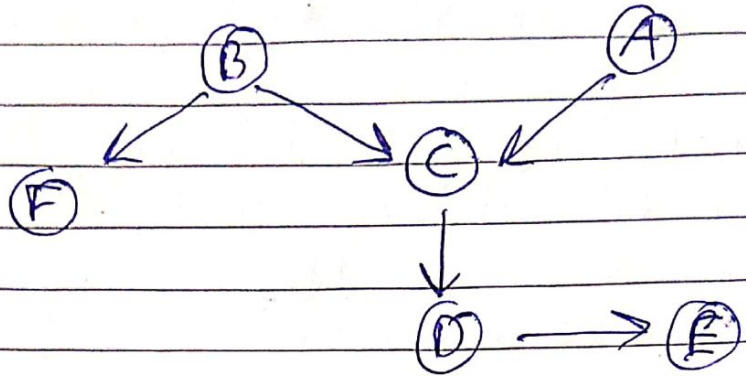
Q3

→ P (cancer) = 0.005
P (Test Positive | cancer) = 0.85
P (Test Neg | No cancer) = 0.925
P (cancer | Test Positive) = P (cancer) * P (Test Positive | (Cancer) / P (Test Positive)

$$= \frac{P(\text{cancer}) \times P(\text{Test Positive} \mid \text{cancer})}{P(\text{Test Positive})}$$

$$= \frac{0.005 \times 0.85}{(0.005 * 0.85 + 0.995 * 0.075)} = 0.054$$

Q4



∴ A is not conditionally independent of B.

A is not conditionally independent of D

D is not a conditionally independent of E

A is conditionally independent of F

∴ A and F are conditionally independent of each other.