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2020BTECS00089

08/10/2022
Saturday

Assignment No. 5

Q.1 a) i) If David comes to party then Bruno & Carlo come too.

$\Rightarrow A \rightarrow B \wedge C$

ii) Carlo comes to party only if Angela & Bruno do not come.

$\Rightarrow A \rightarrow \sim B \wedge \sim C$

iii) If David comes to party then if Carlo doesn't come then Angela comes

$\Rightarrow A \rightarrow (\sim B \rightarrow C)$ ~~$A \rightarrow (B \wedge \sim C)$~~ ~~$A \leftrightarrow (B \wedge \sim C)$~~ $A \rightarrow (\sim B \rightarrow C)$

iv) If David comes to party if Carlo comes & Angela doesn't come

$\Rightarrow A \leftrightarrow (B \wedge \sim C)$

v) Carlo comes to party provided that David doesn't come but if David comes then Bruno doesn't come

$\Rightarrow (\sim D \rightarrow C) \wedge (D \rightarrow \sim B)$

vi) A necessary condition for Angela coming to party is that if Bruno & Carlo aren't coming, David comes.

$\Rightarrow A \rightarrow ((\sim B \wedge \sim C) \rightarrow D)$

vii) Angela, Bruno, Carlo come to party if David doesn't come but if neither Angela nor Bruno come then David comes only if Carlo comes.

$\Rightarrow ((A \wedge B \wedge C) \leftrightarrow \sim D) \wedge ((\sim A \wedge \sim B) \rightarrow (D \leftrightarrow C))$

b) i) A = Carlo won match

B = Mario came second

C = Sergio came third

$\therefore$ $A \rightarrow B \vee C$

If $\sim B$ & $\sim C$ then A = False i.e. A does not win competition.

Hence, Statement is true.

ii) $A \rightarrow B \vee C$

$\Rightarrow$ If Mario doesn't come second then B = False

If Sonic doesn't come second then C = False

So A = False But

Carlo won the competition so A = True

$\therefore$ Statement is incorrect.

iii) $A \rightarrow B \wedge C$

$\Rightarrow$ If Mario didn't come second then B = False

then A = False

i.e. Carlo didn't win competition so statement is correct.

c) i) Bill has at least one sister

$\Rightarrow$ $\exists x$ sister $(x) \rightarrow$ Bill $(x,$ sister$)$

ii) Bill has no sister

$\Rightarrow$ $\forall x$ sister $(x) \rightarrow \sim$ Bill $(x,$ sister$)$

iii) Bill has at most one sister

$\Rightarrow \forall (x)$ [sister $(x) \rightarrow \sim$ Bill $(x,$ sister$)$] $\vee$ $\exists (x)$ [sister $(x) \rightarrow$ Bill $(x,$ sister$)$] $\wedge$ $\forall (y)$ [$\sim (x == y) \wedge$ sister $(y) \rightarrow \sim$ Bill $(x,$ sister$)$]

iv) Bill has exactly one sister

$\Rightarrow$ $\exists (x)$ [sister $(x) \rightarrow$ Bill $(x,$ sister$)$ $\wedge$ $\forall (y)$ [$\sim (x == y)$ $\wedge$ sister $(y) \rightarrow \sim$ Bill $(x,$ sister$)$]

v) Bill has at least two sisters

$\Rightarrow$ $\exists (x)$ [sister $(y) \rightarrow$ Bill $(x,$ sister$)$] $\wedge$ $\exists (y)$ [$\sim (x == y)$ & sister $(y) \rightarrow$ Bill $(y,$ sister$)$]

vi) Every student takes at least one course

$\Rightarrow$ $\forall (x)$ [student $(x) \rightarrow$ $\exists (y)$ [course $(y) \wedge$ Takes (x, y)]]

vii) Only one student Failed Geometry

$\Rightarrow \exists(x)[Student(x) \wedge Failed(x, Geometry) \wedge \forall y (Student(y) \wedge Failed(y, Geometry) \rightarrow x = y)]$

viii) No student Failed Geometry but at least one student failed Analysis

$\Rightarrow \sim \exists(x)[Student(x) \wedge Failed(x, Geometry)] \wedge \exists(x)[Student(x) \wedge Failed(x, Analysis)]$

ix) Every student who takes Analysis also takes Geometry.

$\Rightarrow \forall(x)[Student(x) \wedge Takes(x, Analysis) \rightarrow Takes(x, Geometry)]$

Q.2 i) Tom is a cat

ii) Tom is owned by John

iii) Tom is coloured ginger.

iv) Tom caught bird.

v) Cat sat on Mat.

vi) Cat is a mammal.

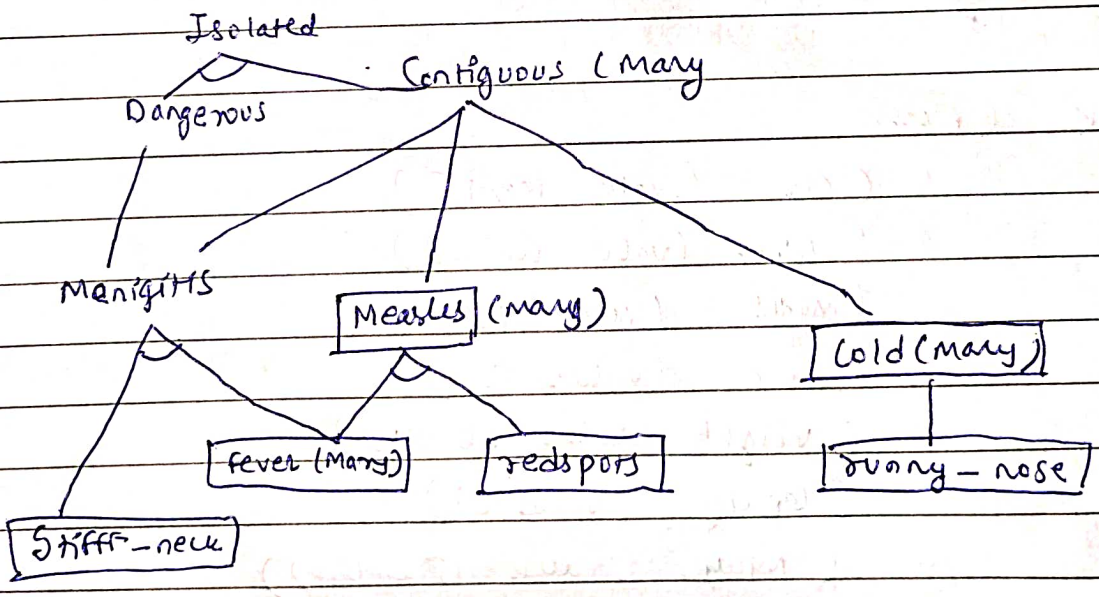
vii) Cat like cream.

viii) Bird is a animal

ix) Mammal has Fur

x) Mammal is a animal

Q.3



∴ Mary has continuous disease & John should be isolated.

1) If Mary has runny nose she has cold. If she has cold then she has contiguous disease

If Mary has red-spots & fever she has measles then she has contiguous disease.

2) If John has stiff neck & fever then he has meningitis. If he has menigitis it is contiguous & dangerous. Then John should be isolated.

Q.3 a) (Ram
(Profession (value Doctor))
(Age (value 40))
(Wife (value Sita))
(Children (value Baby Gita))
(Address
(Street (value 100 kps))
(City (value Delhi))
(Country (value India))
(Zip (value 756005))
)
)

b) (Akash
(Car (value Maruti))
(Colour (value White))
(Model (value LX-400))
(Door (value 5))
(Weight (value 225 kg))
(Capacity (value 8))
(Milage (value 15 km/lit))
)