Assignments

1. By showing each step, convert the left-hand side and right-hand side of the main implication of the following sentence into CNF [Ex-7.18(b) (Soft copy)]:

[(Food → Party) ∨ (Drinks → Party)] → [(Food ∧ Drinks) → Party]

1. Consider a vocabulary with the following symbols: [Ex-8.10(Soft copy)]

<https://www.coursehero.com/file/p41n46m/Consider-a-vocabulary-with-the-following-symbols-Occupationpo-A-predicate-that/>

<https://mail.google.com/mail/u/0/#inbox/FMfcgxwKkRChHjGJxXSQcdjwmlJFVTTh>

1. Translate the **first-order loagic** the sentence “**Everyone’s DNA is unique and is derived from their parent’s DNA.” You must specify the precise intended meaning of your vocabulary terms.** (Hint: Do not use the predicate *Unique*(x), since uniqueness is not really a property of an object in itself!) [Ex-8.24 (Book)]

1. Conjunctive normal form (page : 253)

1. By showing each step, convert the left-hand side and right-hand side of the main implication of the following sentence into CNF Ex-7.18(b) (Soft copy)]:

[(Food → Party) v (Drinks → Party)] → [(Food A Drinks) → Party]

Ans: Convert the left-hand and right hand sides of the main implication into CNF, showing each step, and explatin how the results confirt your anstswer to (a).

For the left hand side we have :

(Food Party) (Drinks Party)

(¬ Food Party) (¬ Drinks Party)

(Food Party Drinks Party)

( Food Drinks Party )

And for the right-hand side we have

(Food Drinks) => Party

(Food Drinks) => Party

(Food Drinks) Party

(Food Drinks Party)

The two sides are identical in CNF, and hence the original is of the form P=>P, which is valid for any P.

2

Consider a vocabulary with the following symbols:

Occupation (p, o): Predicate. Person p has occupation o.

Customer (p1, p2): Predicate. Person p1 is a customer of person p2.

Boss (p1, p2): Predicate. Person p1 is a boss of person p2.

Doctor, Surgeon, Lawyer, Actor: Constants denoting occupations.

Emily, Joe: Constants denoting people

a)

**Assertion:**Emily is either a surgeon or a lawyer.

**First order logic:***Occupation (Emily, Surgeon)  Occupation (Emily, Lawyer)*

b)

Assertion: Joe is an actor, but he also holds another job.

First order logic:

c)

Assertion: All surgeons are doctors.

First order logic:

d)

Assertion: Joe does not have a lawyer (i.e., is not a customer of any Lawyer) First order logic

e)

Assertion: Emily has a boss who is a lawyer.

First order logic:

f)

Assertion: There exists a lawyer all of whose customers are doctors.

First order logic:

g)

Assertion: Every surgeon has a lawyer.

First order logic: