ASSIGNMENT NO 6

# Q1

1. “anything anyone eats is called food.”

∀x: ∀y: eats (x, y) → food(y)

⇒ ∀x: ∀y: ¬ eats (x, y) ∨ food(y)

⇒ ¬ eats (x, y) ∨ food(y) (1)

2. “Milka likes all kind of food”

∀y1: food(y1) → like (Milka, y1)

⇒ ∀y1: ¬ food(y1) ∨ like(Milka , y1)

⇒ ¬ food(y1) ∨ like(Milka , y1) (2)

3. “Bread is a food”

food(bread) (3)

4. “Mango is a food”

food(mango) (4)

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5. “Alka eats Pizza”

Eats (Alka, pizza) (5)

6. “Alka eats everything Milka eats”

∀x1: eats (Milka, x1) → eats (Alka, x1)

=> ∀x1: ¬ eats (Milka, x1) ∨ eats (Alka, x1)

=> ¬ eats (Milka, x1) ∨ eats (Alka, x1) (6)

**1.** To answer “Does Milka like pizza?”

Assume: “Milka does not like pizza”

¬like (Milka, pizza) (7)

¬like (Milka, pizza) ¬food (y1) V like (Milka, y1)

Pizza/y1

¬food (pizza)

Eats (x, y) V food(y) pizza/y

¬eats (x, pizza)

Eats (Alka, pizza) Alka/x

{ }

Since ¬like (Milka, pizza) is a contradiction, like (Milka, pizza) is true.

**2.** To answer what food Alka eats

Assume: Alka does not eat anything

¬ [∃x2: eats (Alka, x2)]

∀x2: ¬ eats (Alka, x2)

¬ eats (Alka, x2)

¬eats (Alka, x2) eats (Alka, pizza)

Pizza/x2

{ }

Therefore, Alka does not eat anything is false and Alka eats something is true. X2 stores pizza.

Therefore, Alka eats pizza.

# Q2

1. Every child loves Santa.

∀ x (CHILD(x) → LOVES (x, Santa))

1. Everyone who loves Santa loves any reindeer.

∀ x (LOVES (x, Santa) → ∀ y (REINDEER(y) → LOVES (x, y)))

1. Rudolph is a reindeer, and Rudolph has a red nose.

REINDEER(Rudolph) ∧ REDNOSE(Rudolph)

1. Anything which has a red nose is weird or is a clown.

∀ x (REDNOSE(x) → WEIRD(x) ∨ CLOWN(x))

1. No reindeer is a clown.

¬ ∃ x (REINDEER(x) ∧ CLOWN(x))

1. Scrooge does not love anything which is weird.

∀ x (WEIRD(x) → ¬ LOVES (Scrooge, x))

1. (Conclusion) Scrooge is not a child.

¬ CHILD(Scrooge)