ACTIVITY 4-5

Explore
the use of predicate logic as a way of representing knowledge by looking at a specific example.
Consider the following set of sentences:
1 .
Marcus was a man.
2.
Marcus was a Pompeian.
3.
All Pompeians were
Romans.
4.
Caesar was a ruler.
5.
All Romans were either loyal to Caesar or hated him.
6.
Everyone is loyal to someone.
7.
People only try to assassinate rulers they are not loyal to.

Aman Kalla
RA1911003010040
AI Assignment
Activity 4 and 5

1 The facts described by well performed formula:

a) Marcus was a man

Ans. man (Marcus)

b) Marcus was a pompeian

Ans Pompeian (Marcus)

c) All pompeian were romans

Ans $\forall x$: pompeians(x) $\rightarrow$ Roman (x)

d) Caesar was a ruler.

Ans ruler (caesar)

e) All romans were either loyal to caesar or hated him.

Ans. (i) inclusive (Or)

$\forall x$: Roman (x) $\rightarrow$ loyalto (x, caesar) $\wedge \rightarrow$ hate (x, caesar)) $\vee$ (¬ loyal to(x, caesar) $\wedge$ hate (x, caesar))

f) Everyone is loyal to someone

Ans $\forall x$: $\exists y$: loyalto (x,y)

g) People only try to assassinate rulers they are not loyal to.

Ans $\forall x : \forall xy$: person(x) $\wedge$ rulers (y) $\wedge$ tryanassinate (x,y) $\rightarrow$ ¬ loyal to (x,y)

h) Marcus tried to assassinate ceasar.

Ans try assassinate (Marcus, caesar.

2. Consistent vocablury used are:

- Agent (x): x is Agent
- Insured (x): x is insured
- Student (x): x is a student
- Person (x): x is a person.
- Takes (x, c, s): Student x takes course c in semesters.
- Passes (x, c, s): Student x passes course c in semester.
- ~~Passes~~ C.
- Score (x, c, s): Score obtained by student x in course c in semesters
- Shares (x, y): peoson x shares person y.
- policy (x): x is a policy
- Smart (x): x is smart.
- Expensive (x): x is expensive
- Sells (x, y, z): x sells y to z.
- Buys (x, y, z): x buys y from z.
- F denotes French & G denotes Greek.

Answers.

a) Some student took french in spring 2001.

Ans ∃x : Student (x) ∧ Takes (x, F, spring 2001)

b) Every student who takes French passes it.

Ans. ∀x,s : Student (x) ∧ Takes (x, F, s) → Passes (x, F, s)

c) Only one student took Greek in spring 2001.

Ans ∃x : Student (x) ∧ Takes (X, G, Spring 2001) ∧ ∀y y≠x ⇒ Takes (y, G, Spring 2001)

d) The best score in Greek is always higher than the best score in French.

Ans ∀s ∃x ∀y : Score (x, G, s) > Score (x, F, s)

e) Every person who buys a policy is smart.

Ans ∀x : Person (x) ∧ (∃y, z Policy(y) ∧ Buys (x, y, z)) => Smart (x)

f) No person buys an expensive policy.

Ans. $\forall x,y,z : person(x) \wedge policy(y) \wedge Expensive(y) \Rightarrow \neg Buys(x,y,z)$

g) There is an agent who sells policies only to people who are not insured.

Ans. $\exists x\ Agent(x) \wedge \forall y,z\ Policy(y) \wedge sells(x,y,z) \rightarrow (Person(z) \wedge \neg Insured(z))$.

h) There is a barber who shaves all men in town who do not shave themselves.

Ans. $\exists x : Barber(x) \wedge \forall y\ Man(y) \wedge \neg Shaves(y,y) \Rightarrow Shaves(x,y)$