19/11/24

First Order Logic

Statements:

1. Everyone who is a parent of Shyam is also a teacher.
2. There exists someone who is a child of Ram and is a student.
3. Everyone who is a teacher is a parent of some person.
4. Geeta has a parent.
5. Shyam has a sibling who is a student.
6. All siblings of Shyam has a parent.
7. Ram is a teacher & a parent of Shyam.

FOL:

1. $\forall x$ (Parent $(x,$ Shyam$) \rightarrow$ Teacher (x))
2. $\exists y$ (Parent (Ram, y) $\wedge$ Student(y))
3. $\forall x$ (Teacher $(x) \rightarrow \exists y$ Parent (x, y))
4. Parent $(x,$ Geeta)
5. $\exists x$ (Sibling $(x,$ Shyam$) \wedge$ Student (x))
6. $\forall x$ (sibling $(x,$ Shyam$) \rightarrow y$ Parent (y, x))
7. Teacher (Ram) $\wedge$ Parent (Ram, Shyam)

Unification:

1. $\forall x$ (Parent $(x, y) \rightarrow$ Teacher (x))
2. Parent (Ram, Shyam) $\rightarrow$ Teacher (Ram)

To unify Parent (x, y) and Parent (Ram, Shyam)

Substitution $\rightarrow$ x = Ram, y = Shyam

Substituting:

$\forall x$ (Parent (Ram, Shyam) $\rightarrow$ Teacher (Ram))

$\therefore$ The statement is true and x = Ram, y = Shyam.