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FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

MODULE 1: KRe EXERCISE

GIVEN RULES

1) StayHomeAsMuch(Person)
2) WorkHome(Person)

limitcontact(Person)

KeepDistance(Person)

LeaveHome(Person)

AnyoneInHouseSymptoms(Person)

WashHandsRegularly(Person)

PossiblyInfected(Person)

MightDie(Person)

PossWorkHome(Person)

Person1 Person2

Cdialit(x, y)

HaveSymptoms(Person)

$$\forall x.\ (\text{stayHomeAsMuch}(x) \wedge \text{limitContact}(x) \wedge \text{KeepDistance}(x) \wedge \text{WashHandsRegularly}(x) \wedge (\text{PossWorkHome}(x) \rightarrow \text{WorkHome}(x)) \wedge (\text{HaveSymptoms}(x) \vee \exists y.\ (\text{cdialit}(x,y) \wedge \text{HaveSymptoms}(y)) \Rightarrow \neg \text{LeaveHome}(x)))$$

$$\Downarrow$$

$$\text{Safe}(x)$$

$\forall x.\ \neg\text{safe}(x) \rightarrow \text{unsafe}(x)$

$\forall x.\ \text{unsafe}(x) \rightarrow \text{possiblyInfected}(x)$

$\forall x.\ \text{possiblyInfected}(x) \rightarrow \text{MightDie}(x) \wedge (\forall y.\ (\text{Unsafe}(y) \rightarrow \text{CanTransmitVirus}(x,y))$

I've chosen FOL, because we don't have to express relations or predicates that change in time so FOL suits best to express predicates like these.

3) Person (John)

Person (Mary)

StayHomeAsMuch(John)

WorkHome(John), PossWorkHome(John)

LimitContact(John)

KeepDistance(John)

LeaveHome(John)

$\neg\exists y.(Collide(John, y) \wedge HaveSymptoms(y)), \neg HaveSymptoms(John)$

WashHandsRegularly(John)

StayHomeAsMuch(Mary)

$\neg$ WorkHome(Mary), $\neg$ PossWorkHome(Mary)

$\neg$ LimitContact(Mary), $\neg$ KeepDistance(Mary)

$\neg$ LeaveHome(Mary)

WashHandsRegularly(Mary)

4) CanTrasmitVirus(John)?

↓

PossiblyInfected(John)?

↓

unsafe(John)?

↓

$\neg$safe(John)? → FALSE because safe(John) holds.

↙

StayHomeAsMuch(John)?, PossWorkHome(J) → WorkHome(J)?,

LimitContact(J)?, KeepDistance(J)?,

HaveSymptoms(J) ∨ ∃y.(Collide(J,y),

HaveSymptoms(y)

↙

$\neg$LeaveHome(J)?