

Question 10. (Adapted from problem 8.28 in the book)

Consider a first order logic knowledge base that describes worlds containing people, songs, and albums. The vocabulary contains the following symbols:

$Sings(p,s,a)$: Album a includes a recording of a song s sung by a person p

$Wrote(p,s)$: Person p wrote song s

Express the following sentences in first order logic

- Either Gershwin or McCartney wrote "The Man I Love"

$$(wrote(G, "TMIL") \vee wrote(M, "TMIL")) \wedge \neg (wrote(G, "TMIL") \wedge wrote(M, "TMIL"))$$

- Gershwin never recorded (i.e. sang) "The Man I Love"

$$\forall a \neg sings(G, "TMIL", a)$$

- Gershwin did not write any of the songs on "Revolver"

$$\forall s, p \ sings(p, s, "Revolver") \Rightarrow \neg wrote(G, s)$$

- There is a single album containing every song that McCartney has written

$$\exists a (\forall s \ wrote(M, s) \Rightarrow \exists p \ sings(p, s, a))$$