

## 1 More practice

(Ask for extra paper if you need some!)

1. Using  $\forall$  and  $\exists$  where appropriate, write logical forms for the sentences below.

(a) Jones cleaned and framed every painting that Brice found in the cellar

$\forall x[[\text{PAINTING}(x) \ \& \ [\text{FIND}(b, x) \ \& \ \text{IN}(x, c)]] \rightarrow [\text{CLEAN}(j, x) \ \& \ \text{FRAME}(j, x)]]$

(b) Chairman Miaou is heavier and meaner than any spaniel

$\forall x[\text{SPANIEL}(x) \rightarrow [\text{HEAVIER}(m, x) \ \& \ \text{MEANER}(m, x)]]$

(c) Clive gave every child either a biscuit or a Batman comic (This means ‘not both’)

$\forall x[\text{CHILD}(x) \rightarrow \exists y[\text{COOKIE}(y) \ \& \ [\text{GIVE}(c, y, x) \vee \exists z[\text{BATMANCOMIC}(z) \ \& \ [\text{GIVE}(c, y, x) \ \& \ \neg[\text{GIVE}(c, y, x) \ \& \ \text{GIVE}(c, z, x)]]]]]]]$

(d) Zoe read all the death notices but nothing else

$\forall x[\text{READ}(z, x) \leftrightarrow \text{DEATHNOTICE}(x)]$

(e) If everyone leaves the room then the room will be empty

$\forall x[\text{PERSON}(x) \rightarrow \text{LEAVE}(x, r)] \rightarrow \text{EMPTY}(r)$

(f) If someone leaves the cab then Jones will put the luggage in the cab (It doesn’t matter who leaves to make more space)

$\exists x[\text{PERSON}(x) \ \& \ \text{LEAVE}(x, c)] \rightarrow \text{PUT}(j, l, \text{in } c)$

2. Using  $\forall$  and  $\exists$  where appropriate, write logical forms for the sentences below.

(a) Not everyone likes Bob

Solution to be given in class

(b) Bob doesn’t like anyone

Solution to be given in class

3. The sentences below are scopally ambiguous. Give a clear unambiguous paraphrase for each reading and match it with its formula.

(a) Every prize was won by some kid

Solution to be given in class

(b) Someone had scribbled on every wall

Solution to be given in class