SOLUTIONS

QL: Grammar and Translations

1. Wffs (Well Formed Formulae)

Are these formulae well formed, i.e. grammatical in QL? If not, suggest corrections. (When finished, feel free to turn left and/or right to compare your results.)

(a) Fa *wff*

(b) bG Gb

(c) $\supset Fa$ Fa or $Fa \supset Fb$

(d) $Fa \supset (Ga \vee Fb)$ *wff*

(e) $Fa \vee G \vee a$ $Fa \vee Ga$

(f) Fxx *borderline, better* Rxx

(g) $\exists x$ $\exists x \phi x$, *where* ϕ *is any predicate*

(h) $\forall xFx$ *wff*

(i) $\exists aFa$ $\exists xFx$

(j) $x\forall Fx \vee Gx$ $\forall xFx \vee Gx$

(k) $\exists xFx \supset \forall y(Gy \,\&\, Rxy)$ *wff*

(l) $Gz\forall a \,\&\, \exists bFx$ $\forall zGz \,\&\, \exists xFx$

Think about. Are the ungrammatical formulae easy to identify? Why are the ungrammatical ones are ill formed? Are there any problematic cases that we need to discuss? Do all wffs actually mean anything?

2. Translating into, and from, QL

Lexicon

Monadic Predicates	F = is a boy	G = is a girl	H = is a dog
Polyadic Predicates	L = (…) loves (…)	R = (…) prefers (…) to (…)	
Individuals	a = Romeo	b = Juliet	c = Fido

(a) Romeo is a boy and Juliet is a girl.

$Fa \,\&\, Gb$

(b) $\sim Ha \,\&\, \sim Gc \,\&\, \sim Fb$

Romeo is not a dog, Fido is not a girl, and Juliet is not a boy.

(c) If Fido is a dog then either Romeo is a boy or a girl.

$Hc \supset (Fa \vee Ga)$

(d) Juliet loves Romeo and Romeo loves Fido.

$Lba \,\&\, Lac$

(e) $Lab \,\&\, {\sim}Lca$

Romeo loves Juliet but Fido does not love Romeo.

(f) $Rabc$

Romeo prefers Juliet to Fido.

(g) $Rbca$

Juliet prefers Fido to Romeo.

(h) $Hx \,\&\, Fy \,\&\, Gz$

A dog, a boy, and a girl.

(i) Whoever loves Fido prefers Fido to Juliet.

$\forall x((Lxc \supset Rxcb)$

(j) Every girl loves Romeo.

$\forall x(Gx \supset Lxa)$

(k) Every girl who loves Romeo loves Fido.

$\forall x((Gx \,\&\, Lxa) \supset Lxc)$

(l) $\forall x((Gx \,\&\, Lxc) \supset Lax)$

Every girl who loves Fido is loved by Romeo.

(m) $\exists x((Gx \,\&\, Lxc) \,\&\, Lax)$

Some girl loves Fido and is loved by Romeo.

(n) Romeo loves himself.

Laa

(o) There is nobody who does not love Fido.

${\sim}\exists x{\sim}Lxc$

(p) Someone loves Juliet and prefers dogs to boys.

$\exists x\forall y\forall z(Hy \,\&\, Fz \,\&\, Lxb \,\&\, Rxyz)$

(q) If a dog loves a girl then a dog prefers girls to boys.

$\exists x\exists y(((Hx \,\&\, Gy) \,\&\, Lxy) \supset \forall y\forall z(Fz \,\&\, Rxyz))$

(r) $\exists x\forall yLxy$

Somebody loves everybody.

(s) $\forall x\exists yLyx$

Everybody is loved by somebody.