Solutions to Workbook Exercises

Unit 14:

Singular and Quantified Propositions

Exercise "Simple Singular Propositions"

Symbolize the following opinions about U.S. politicians using the symbolization key provided:

U.D.: U.S. politicians b: Bill Clinton Ax: x is ambitious
                          c: Condoleeza Rice Ix: x is intelligent
                          g: George W. Bush Px: x is pretentious
                          h: Hillary Clinton Wx: x is warm

(a)	Bill Clinton is a warm man.	Wb
(b)	Hillary Clinton is also very warm.	Wh
(c)	Condoleeza Rice is ambitious.	Ac
(d)	George W. Bush is also very ambitious.	Ag
(e)	George W. Bush, however, is primarily intelligent.	Ig
(f)	Bill Clinton is ambitious.	Ab
(g)	Hillary Clinton is likewise ambitious.	Ah
(h)	Bill Clinton is a pretentious person.	Pb
(i)	Hillary Clinton is the quintessence of pretentiousness.	Ph
(j)	Condoleeza Rice is intelligent.	Ic
(k)	Condoleeza Rice is warm.	Wc
(l)	George W. Bush is warm too.	Wg

Exercise "Simple Quantified Propositions - 1"

Symbolize the following propositions:

U.D.: people   *Bx*: *x* is beautiful   *Lx*: *x* is a liar
              Gx: *x* is good   *Vx*: *x* is evil
              Ix: *x* is intelligent *Ux*: *x* is ugly

(a)	Everyone is beautiful.	∀*x Bx*
(b)	Everyone is intelligent.	∀*x Ix*
(c)	Somebody is intelligent.	∃*x Ix*
(d)	There are intelligent people.	∃*x Ix*
(e)	There is a person who is intelligent.	∃*x Ix*
(f)	There is a person who is a liar.	∃*x Lx*
(g)	All people are good.	∀*x Gx*
(h)	All people are evil.	∀*x Vx*
(i)	Someone is ugly.	∃*x Ux*
(j)	Everybody is ugly.	∀*x Ux*
(k)	There are ugly people.	∃*x Ux*

Exercise "Simple Quantified Propositions - 2"

Symbolize the following opinions about politicians as quantified sentences using the symbolization key provided. Note that sometimes it is impossible to fully adequately capture the content of the opinions. The point of the exercise is to capture them as simple quantified sentences. You should mark the English expressions that correspond to the quantifiers.

U.D.: politicians   *Hx*: *x* is honest   *Lx*: *x* is a liar
                           Ix: *x* is intelligent   *Rx*: *x* is articulate

(a)	All politicians are liars.	$\forall x\ Lx$
(b)	Politicians are a bunch of liars.	$\forall x\ Lx$
(c)	There are honest politicians.	$\exists x\ Hx$
(d)	Some politicians are liars.	$\exists x\ Lx$
(e)	Any given politician is a liar.	$\forall x\ Lx$
(f)	Politicians are intelligent without exception.	$\forall x\ Ix$
(g)	Intelligent politicians do happen.	$\exists x\ Ix$
(h)	Every politician is articulate.	$\forall x\ Rx$
(i)	Rarely does one meet an honest person among politicians.	$\exists x\ Hx$
(j)	At least one politician is intelligent.	$\exists x\ Ix$
(k)	Many politicians are articulate.	$\exists x\ Rx$
(l)	Most politicians are articulate.	$\exists x\ Rx$

Exercise "Complex Singular Propositions"

U.D.: U.S. politicians   *b*: Bill Clinton   *Hx*: *x* is honest
                                c: Condoleeza Rice   *Ix*: *x* is intelligent
                                  g: George W. Bush   *Lx*: *x* is a liar
                                  h: Hillary Clinton   *Rx*: *x* is articulate

(a)	Bill Clinton is articulate and intelligent.	$Rb \bullet Ib$
(b)	Bill Clinton is articulate but not intelligent.	$Rb \bullet \sim Ib$
(c)	If Hillary Clinton is intelligent then so is Bill Clinton.	$Ih \rightarrow Ib$
(d)	Hillary Clinton is a liar just in case she is not honest.	$Lh \equiv \sim Hh$
(e)	Neither George W. Bush nor Condoleeza Rice are liars.	$\sim Lg \bullet \sim Lc$ $\sim(Lg \vee Lc)$
(f)	George W. Bush and Condoleeza Rice are not both honest.	$\sim(Hg \bullet Hc)$ $\sim Hg \vee \sim Hc$
(g)	If neither Bill Clinton nor Hillary Clinton are liars and George W. Bush is honest, then Condoleeza Rice is the liar.	$((\sim Lb \bullet \sim Lh) \bullet Hg) \rightarrow Lc$
(h)	Hillary Clinton is either honest or an extra-ordinarily articulate and intelligent liar.	$Hh \vee ((Rh \bullet Ih) \bullet Lh)$
(i)	All four (Bill Clinton, Condoleeza Rice, George W. Bush, Hillary Clinton) are intelligent.	$(Ib \bullet Ic) \bullet (Ig \bullet Ih)$
(j)	At least one of the four is a liar.	$(Lb \vee Lc) \vee (Lg \vee Lh)$

Exercise "Externally Complex Quantified Propositions - 1"

What English propositions are symbolized by the following logical formulas?

U.D.: people   Lx: x goes to hell   Vx: x goes to heaven

(a)	$\exists x\ Vx \rightarrow \forall x\ Vx$	If somebody goes to heaven then everybody will go to heaven.
(b)	$\forall x\ Vx \lor \forall x\ Lx$	Either everybody will go to heaven or everybody will go to hell.
(c)	$\exists x\ Vx \bullet \exists x\ Lx$	Somebody will go to heaven and somebody will go hell.
(d)	$\forall x\ Lx \equiv \forall x\ Vx$	Everybody will go to hell if and only if everybody will go to heaven.

Exercise "Externally Complex Quantified Propositions - 2"

Symbolize the following propositions:

U.D.: people   Lx: x goes to hell   Vx: x goes to heaven

(a)	Everybody will go to heaven.	$\forall x\ Vx$
(b)	Not everybody will go to heaven.	$\sim\forall x\ Vx$
(c)	Somebody will go to hell.	$\exists x\ Lx$
(d)	Nobody will go to hell.	$\sim\exists x\ Lx$
(e)	Not everybody will go to hell.	$\sim\forall x\ Lx$
(f)	No person will go to heaven.	$\sim\exists x\ Vx$
(g)	If somebody goes to hell then not everybody goes to heaven.	$\exists x\ Lx \rightarrow \sim\forall x\ Vx$
(h)	If not everybody goes to hell then somebody goes to heaven .	$\sim\forall x\ Lx \rightarrow \exists x\ Vx$
(i)	Somebody goes to heaven and somebody goes to hell.	$\exists x\ Vx \bullet \exists x\ Lx$
(j)	Nobody goes to heaven and nobody goes to hell.	$\sim\exists x\ Vx \bullet \sim\exists x\ Lx$
(j)	Either not everybody goes to heaven or not everybody goes to hell.	$\sim\forall x\ Vx \lor \sim\forall x\ Lx$
(k)	Nobody goes to heaven just in case nobody goes to hell.	$\sim\exists x\ Vx \equiv \sim\exists x\ Lx$