PHILOSOPHY 220

TRANSLATING NATURAL LANGUAGE TO SL

GUIDELINES

When translating natural language into *SL*, some guidelines will be useful. The text supplies a list of useful guidelines on p. 51. A lengthy example will be helpful here.

EXAMPLE

Either the maid or the butler committed the murder unless the cook did it. The cook committed the murder only if a knife was the murder weapon; moreover, if a knife was used, neither the butler nor the maid did it. The murder weapon was a knife, therefore the cook did it.

GUIDELINE 2 (IDENTIFY CONNECTIVES)

Either the maid or the butler committed the murder unless the cook did it. The cook committed the murder only if a knife was the murder weapon; moreover, if a knife was used,[then] neither the butler nor the maid did it. The murder weapon was a knife, therefore the cook did it.

GUIDELINES 3 AND 5 (REMOVE AMBIGUITY/STREAMLINE)

Either the maid or the butler committed the murder unless the cook did it. The cook committed the murder only if a knife was the murder weapon; moreover, if a knife was used,[then] neither the butler nor the maid did it. The murder weapon was a knife, therefore the cook did it.

GUIDELINES 3 AND 5 (REMOVE AMBIGUITY/STREAMLINE)

<u>Either</u> the maid committed the murder <u>or</u> the butler committed the murder <u>unless</u> the cook committed the murder. The cook committed the murder <u>only if</u> a knife was the murder weapon; moreover, <u>if</u> a knife was the murder weapon,[<u>then</u>] <u>neither</u> the butler committed the murder <u>nor</u> the maid committed the murder. A knife was the murder weapon, therefore the cook committed the murder.

GUIDELINE 4 (PLACE IN STANDARD FORM)

Either the maid committed the murder or the butler committed the murder unless the cook committed the murder. The cook committed the murder only if a knife was the murder weapon; moreover, if a knife was the murder weapon,[then] neither the butler committed the murder nor the maid committed the murder. A knife was the murder weapon, therefore the cook committed the murder.

GUIDELINE 4 (PLACE IN STANDARD FORM)

Either the maid committed the murder or the butler committed the murder unless the cook committed the murder. The cook committed the murder only if a knife was the murder weapon; moreover, if a knife was the murder weapon,[then] neither the butler committed the murder nor the maid committed the murder. A knife was the murder weapon.

The cook committed the murder.

GUIDELINE 4 (PLACE IN STANDARD FORM)

P1. <u>Either</u> the maid committed the murder <u>or</u> the butler committed the murder <u>unless</u> the cook committed the murder.

P2. The cook committed the murder <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,[<u>then</u>] <u>neither</u> the butler committed the murder <u>nor</u> the maid committed the murder.

P4. A knife was the murder weapon.

C. The cook committed the murder.

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> the maid committed the murder <u>or</u> the butler committed the murder <u>unless</u> the cook committed the murder.

P2. The cook committed the murder <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,[<u>then</u>] <u>neither</u> the butler committed the murder <u>nor</u> the maid committed the murder.

P4. A knife was the murder weapon.

C. The cook committed the murder.

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> M <u>or</u> the butler committed the murder <u>unless</u> the cook committed the murder.

P2. The cook committed the murder <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,[<u>then</u>] <u>neither</u> the butler committed the murder <u>nor</u> M.

P4. A knife was the murder weapon.

C. The cook committed the murder.

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> M <u>or</u> the butler committed the murder <u>unless</u> the cook committed the murder.

P2. The cook committed the murder <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,[<u>then</u>] <u>neither</u> the butler committed the murder <u>nor</u> M.

P4. A knife was the murder weapon.

C. The cook committed the murder.

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> M <u>or</u> B <u>unless</u> the cook committed the murder.

P2. The cook committed the murder <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,[<u>then</u>] <u>neither</u> B <u>nor</u> M.

P4. A knife was the murder weapon.

C. The cook committed the murder.

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> M <u>or</u> B <u>unless</u> the cook committed the murder.

P2. The cook committed the murder <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,[<u>then</u>] <u>neither</u> B <u>nor</u> M.

P4. A knife was the murder weapon.

C. The cook committed the murder.

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> M <u>or</u> B <u>unless</u> C.

P2. C <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,<u>[then]</u> <u>neither</u> B <u>nor</u> M.

P4. A knife was the murder weapon.

C. C

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> M <u>or</u> B <u>unless</u> C.

P2. C <u>only if</u> a knife was the murder weapon.

P3. <u>If</u> a knife was the murder weapon,<u>[then]</u> <u>neither</u> B <u>nor</u> M.

P4. A knife was the murder weapon.

_____

  C. C

GUIDELINE 1 (IDENTIFY ATOMIC SENTENCES)

P1. <u>Either</u> M <u>or</u> B <u>unless</u> C.

P2. C <u>only if</u> K.

P3. <u>If</u> K, [<u>then</u>] <u>neither</u> B <u>nor</u> M.

P4. K

C. C

GUIDELINE 3 (ORGANIZE)

P1. (<u>Either</u> M <u>or</u> B) <u>unless</u> C.

P2. C <u>only if</u> K.

P3. <u>If</u> K, [<u>then</u>] (<u>neither</u> B <u>nor</u> M).

P4. K

 C. C

GUIDELINE ? (TRANSLATE CONNECTIVES)

P1. (Either M or B) unless C.

P2. C only if K.

P3. If K, [then] (neither B nor M).

P4. K

 C. C

GUIDELINE ? (TRANSLATE CONNECTIVES)

P1. (M v B) <u>unless</u> C.

P2. C <u>only if</u> K.

P3. <u>If</u> K, [<u>then</u>] (<u>neither</u> B <u>nor</u> M).

P4. K

C. C

GUIDELINE ? (TRANSLATE CONNECTIVES)

P1. (M v B) v C.

P2. C <u>only if</u> K.

P3. <u>If</u> K, [<u>then</u>] (<u>neither</u> B <u>nor</u> M).

P4. K

  C. C

GUIDELINE ? (TRANSLATE CONNECTIVES)

P1. (M v B) v C.

P2. C only if K.

P3. If K, [then] (neither B nor M).

P4. K
_____

C. C

GUIDELINE ? (TRANSLATE CONNECTIVES)

P1. (M v B) v C.

P2. C ⊃ K

P3. <u>If</u> K, [<u>then</u>] (<u>neither</u> B <u>nor</u> M).

P4. K

C. C

GUIDELINE ? (TRANSLATE CONNECTIVES)

P1. (M v B) v C.

P2. C ⊃ K

P3. If K, [then] (~B & ~M).

P4. K

C. C

DONE

P1. (M v B) v C

P2. C ⊃ K

P3. K ⊃ (~B & ~M)

P4. K

_____

C. C

COMMON CONNECTIVE PHRASES

See the table on p. 47 for an excellent listing of common truth-functional connective phrases in English and how those connective phrases are best translated into *SL*.

Pay close attention to:

- The difference between either…or (P v Q) and neither…nor (~P & ~Q)

- The difference between 'P if Q' (Q ⊃ P), 'P only if Q' (P ⊃ Q), and 'P if and only if Q' (P ≡ Q)

AT LEAST ONE OF (A, B, OR C):

(A v B) v C

Or

A v (B v C)

The grouping in this case is arbitrary, but still necessary.

EXACTLY ONE OF (A, B, OR C):

[A & (~B & ~C)] v [B & (~A & ~C)] v [C & (~B & ~A)]

AT LEAST TWO OF (A, B, OR C):

(A & B) v [(B & C) v (A & C)]

Again, the brackets here are arbitrary but necessary

EXACTLY TWO OF (A, B, AND C)

[(A & B) & ~C] v {[(B & C) & ~A] v [(A & C) & ~B]}

Note that this is different than the book's symbolization, but the alert student will be able to check to see that the two symbolizations are logically equivalent.

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(L [AND] The Products transacted through the Service are <u>not</u> sold to You) <u>OR</u> [<u>IF</u> (a Product is accompanied by a separate license agreement <u>AND</u> You accept that separate license agreement prior to accepting this one) <u>THEN</u> the terms of that separate license agreement will govern.]

EXAMPLE (FROM ITUNES EULA)

(L [AND] [IT IS NOT THE CASE THAT] S) <u>OR</u> [<u>IF</u> (a Product is accompanied by a separate license agreement <u>AND</u> You accept that separate license agreement prior to accepting this one) <u>THEN</u> the terms of that separate license agreement will govern.]

EXAMPLE (FROM ITUNES EULA)

(L AND [IT IS NOT THE CASE THAT] S) <u>OR</u> [<u>IF</u> (A <u>AND</u> You accept that separate license agreement prior to accepting this one) <u>THEN</u> the terms of that separate license agreement will govern.]

EXAMPLE (FROM ITUNES EULA)

(L AND [IT IS NOT THE CASE THAT] S) <u>OR</u> [<u>IF</u> (A <u>AND</u> P) <u>THEN</u> the terms of that separate license agreement will govern.]

EXAMPLE (FROM ITUNES EULA)

(L AND [IT IS NOT THE CASE THAT] S) OR [IF (A AND P) THEN G]

EXAMPLE (FROM ITUNES EULA)

(L & ~S) v [(A & P) ⊃ G]