

## Problem-Set 1.4: Symbolization

**Sentences** Give a symbolization key and symbolize the following sentences in SL.

1. Alice and Bob are both spies.
2. If either Alice or Bob is a spy, then the code has been broken.
3. Being a spy is a necessary condition for code breaking.
4. If neither Alice nor Bob is a spy, then the code remains unbroken.
5. The German embassy will be in an uproar, unless someone has broken the code.
6. Either the code has been broken or it has not, but the German embassy will be in an uproar regardless.
7. Either Alice or Bob is a spy, but Alice cannot break the code without being a spy.

**Arguments** For each argument, write a symbolization key and translate the argument as well as possible into SL.

1. If Dorothy plays the piano in the morning, then Roger wakes up cranky. Dorothy plays piano in the morning unless she is distracted. So if Roger does not wake up cranky, then Dorothy must be distracted.
2. It will either rain or snow on Tuesday. If it rains, Neville will be sad. If it snows, Neville will be cold. Therefore, Neville will either be sad or cold on Tuesday.
3. If Zoog remembered to do his chores, then things are clean but not neat. If he forgot, then things are neat but not clean. Therefore, things are either neat or clean—but not both.