UNIT I: Terms and Propositions

Section 1: Categorical Propositions

In the Introduction I defined logic as the grammar of argumentation. Arguments are made up of propositions, and a proposition was defined as a unit of language in which two terms, the subject term and the predicate term, are brought together. Having defined logic in this way, it stands to reason that we will need to understand some of the grammar of sentences to understand logic. Fortunately, for present purposes, we only need the most basic elements of sentence grammar, and only for one type of sentence, namely the declarative sentence, that is, sentences that make an assertion. We will assume that all declarative sentences either *are* – or can be re-phrased (without loss of meaning) as – categorical propositions. A **categorical proposition** is a proposition that says something about the relation of two classes, or categories of objects, to each other. Specifically, a categorical proposition says whether, and to what extent, one class overlaps with another class.

The Ideal Basic Structure
        Categorical propositions have a very specific structure:

        Quantifier + Subject Term + Copula + [Negative Particle] + Predicate Term

        Syllogistic logic uses *only* categorical propositions. The syllogistic logic presented here uses only *some types* of categorical propositions. The following discussions explain which specific forms of categorical propositions may be used in this system.

The Subject Term and the Predicate Term
        The subject term and the predicate term must be words or phrases representing categories. Categories are *groups* or *sets*. In some cases a "group" may have only one member, or even no members, as would be the case with the group of animals called unicorns, or the set of people consisting of the present king of France. Any categories whatsoever are acceptable. We may have simple physical objects, such as balls, rocks, and digital computers. We may also include actions, activities, places, regions, moments of time, and spans of time. We may include compound entities, such as clubs and organizations, football teams, and other entities made up of component entities. We may include abstractions, such as 'peace' and 'justice'. (On Plato's view at least, abstract entities, such as 'peace' and 'justice' are categories having only a single member.) The essential feature of a category is that its members be discrete entities. It must make sense to ask, "How many?" even if the answer is, "infinitely many," "only one," or even "none."

The Copula
        Copulas are various forms of the verb 'to be'. Copulas may be singular or plural, may take various tenses, and may be in either indicative or subjunctive mood. This system uses only the plural, present tense, indicative copula: 'are'.[1]

The Negative Particle

In English, the negative particle is the word 'not'. The brackets in the above form indicate that the negative particle is optional. Hence, not every categorical proposition has a negative particle.

As explained below, some quantifiers also have negative meaning. Don't confuse negative quantifiers with the negative particle. A categorical proposition may have both. When this occurs, the result is a double negative.

Quantifiers

There are many quantifiers that may be included in a syllogistic logic. These quantifiers include cardinal numbers ('one', 'two', etc.), ordinal numbers ('the first', 'the second', etc.), and purposive quantifiers ('enough', 'too many', etc.), to give a few examples.[2] Some quantifiers, such as '10.34% of', 'Almost 15% of', 'More than 27% of', etc., express proportions. These may be called **proportional quantifiers**. The extreme ends of the proportional spectrum (the quantifiers 'all', 'none', and 'some') formed the basis of Aristotle's original system of syllogistic logic. Hence the quantifiers, 'all', 'none', and 'some', may be called the **classical quantifiers**. Proportional quantifiers that fall between these extreme ends of the spectrum are known as the **intermediate quantifiers**. Hence the set of classical quantifiers and the set of intermediate quantifiers together make up the set of proportional quantifiers.

This system of logic incorporates only proportional quantifiers. However, we will not start by attempting to comprehend the entire system of proportional quantifiers; nor will we limit ourselves only to the classical quantifiers. Rather, there is a sub-group of quantifiers that is interesting because these relatively concise words express nearly all the proportional quantifiers that are used in everyday speech and writing. I call these the **common speech quantifiers**. They fall far short of being able to express the infinitely many proportional quantifiers used in mathematics and statistics, but, as we will see in Section 4, they cover the needs of common speech remarkably well. In this system, we will recognize five quantifiers: no, few, most, many, and some.[3]

Interpretation of Quantifiers

Quantifiers can have two possible interpretations:

> A quantifier, Q, takes minimal interpretation if Q represents the smallest intended quantity. 'Q' means 'at least Q (possibly more)'.

> A quantifier, Q, takes maximal interpretation if Q represents the greatest intended quantity. 'Q' means 'at most Q (possibly less)'.

Quantifiers that receive minimal interpretation are affirmative in meaning, while quantifiers that receive maximal interpretation are negative in meaning. Of the quantifiers in this system, 'no' and 'few' receive maximal interpretation and are therefore negative in meaning. The quantifiers 'most', 'many', and 'some' receive minimal interpretation, and are therefore affirmative in meaning.

The Ten Categorical Propositions of the Common Speech System

Five quantifiers, with or without the optional negative particle, yields ten logically possible forms that a categorical proposition may take (in this system):

No S are P.   No S are not P.

Few S are P.   Few S are not P.

Most S are P.   Most S are not P.

Many S are P.   Many S are not P.

Some S are P.   Some S are not P.

Some of the sentences on this list have both a negative particle (the word 'not') and a negative quantifier. Such double negatives can be confusing. Therefore, since double negatives cancel in any case, let us adopt the following abbreviations:

All S are P   =df   No S are not P.

Almost all S are P   =df   Few S are not P.

Labeling the Categorical Propositions

The **quality** of a categorical proposition refers to whether it is affirmative or negative. The **quantity** of a categorical proposition refers to how much of the subject class is being discussed. There are five levels of quantity (in this system), and two types of quality:

Q u a l i t y

		Affirmative	*Negative*
Q	*Universal*	A: All S are P.	E: No S are P.
u			
a	*Predominant*	P: Almost all S are P.	B: Few S are P.
n			
t	*Majority*	T: Most S are P.	D: Most S are not P.
i			
t	*Common*	K: Many S are P.	G: Many S are not P.
y	*Particular*	I: Some S are P.	O: Some S are not P.

The Universal and Particular categorical propositions are called the 'classical' categorical propositions, since they have been studied since the time of Aristotle. The letters A, E, I, and O, as names for the four classical categorical propositions, were taken from the four vowels of the

Latin alphabet, which also happen to occur in the Latin words 'affirmo' and 'nego'. The affirmative propositions were named after the first two vowels of 'affirmo', while the negative propositions were named after the first two vowels of 'nego':

A - affirmo   E - nego

I - affirmo   O - nego

The remaining categorical propositions are named after the consonant stops, i.e. the consonants that are made by stopping the flow of air through the mouth. Consonant stops may be either 'voiced' or 'unvoiced', depending upon whether the vocal cords are used in forming the sound. Affirmative intermediate propositions are named after the unvoiced stops, while negative intermediate propositions are named after the voiced stops. The unvoiced stops also occur in the word that identifies the quantity:

Predominant	P - unvoiced labial	B - voiced labial
Majority	T - unvoiced dental	D - voiced dental
Kommon	K - unvoiced palatal	G - unvoiced palatal

Correct Categorical Form

Most English sentences are not categorical propositions. Any sentence in categorical form must begin with a quantifier, and contain two distinctly stated terms, one in the subject and one in the predicate. In a categorical proposition, *both* terms must refer to categories of objects, though there need not necessarily be any objects in the category referred to. For example, the sentence 'All unicorns are white animals', expresses a categorical proposition, even though there are no unicorns. The word 'unicorns' refers to a class of objects, even though there are no existing members in that class.

It should be obvious that many sentences are simply not in categorical form. For example, the sentence 'Some fences are red', does not express a categorical proposition, since 'red' is a quality, not a category of objects. Sentences with active verbs, such as 'John gave the ball to Mary', are even more problematic. Nevertheless, the assumption of syllogistic logic is that all sentences that are not already in categorical form may be *forced* into categorical form, with a little effort.

To put sentences into categorical form we must (a) see that the predicate is expressed as a noun phrase, and (b) see that the subject is preceded by a recognized quantifier. In this system of syllogistic logic we must also be sure that only the plural copula 'are' is used. However, this problem usually takes care of itself provided the other two are handled correctly.

Locating Subjects and Predicates

All declarative sentences can be divided into a subject portion and a predicate portion. The first step in forcing sentences with irregular predicates into correct categorical form is to find the subject/predicate break, i.e. the point in the sentence that separates the subject portion of the sentence from the predicate portion of the sentence. The subject portion of a sentence is

(usually) the first part of the sentence up to, but not including, the main verb. The predicate portion of the sentence is the main verb plus (usually) everything after the main verb. There is no magic formula for finding the main verb. The only way to find the main verb is to read the sentence with at least some degree of comprehension.

Remember that terms may be of any size. It follows that the subject portion of the sentence and the predicate portion need not necessarily be the same size.

Examples:

All of the astronauts aboard the first flight of the Atlantis / were scientists.
The Queen of Hearts / baked some tarts, all on a summer's day.

While most normal, well-written sentences keep the subject portion of the sentence all in one place, some sentences divide the subject into two sections, and place part of the subject at the end of the sentence. This can occur when the subject portion of the sentence includes a relative clause (i.e. a clause beginning with 'who', 'which', or 'that'). It can also occur when the sentence has an exceptive quantifier (see Section 4) that has been split apart (e.g. 'No...but' and 'No...unless'). In such cases, the concluding portion of the sentence is a clause that modifies the subject. Hence that clause is part of the subject for logical purposes, despite its location in the sentence. By the way, subject splitting is generally a poor idea. While you may find instances of it in other people's writing, I recommend that you avoid it in your own writing.

Examples:

All children / are delightful [that are well behaved].
No sentences / are difficult to understand [except those that have relative clauses].

Exercises:
In each of the following propositions, draw a line to indicate where the break between subject and predicate occurs. Indicate if any subject splitting occurs in the sentence.

1. Little Red Riding Hood took a great big basket of goodies through the dark lonely woods to Grandmother's house.

2. Goldilocks, who should have known better than to be breaking into strange houses in the first place, was frightened.

3. Most little girls who carry baskets of goodies to their grandmothers are not persons who deserve to be eaten by wolves.

4. All little girls deserve to be frightened who break into strange houses owned by bears.

13

5.   No little girls are burglars unless they have been badly brought up.

6.   Many little girls are delicious, at least to big bad wolves.

7.   Big bad wolves think that little girls are delicious.

8.   Bears who are hungry and expect to eat a hearty breakfast shouldn't leave their food unattended while they go for a walk.

Putting the Predicate into Categorical Form

Once the subject/predicate break has been located, the second step in forcing sentences into categorical form is to build a proper predicate term by adding three simple words:

1.   At the subject/predicate break, insert the copula 'are'.

2.   Follow the copula with a dummy word. By a dummy word I mean an extremely general word, such as 'persons', 'beings', 'things', 'objects', 'creatures', 'animals', 'activities', 'events', etc.

3,   Follow the dummy word with an appropriate relative pronoun, such as 'who', 'which', or 'that'.

The newly added copula is a connector word, so it does not fall into either the subject term or the predicate term. The predicate term begins with the dummy word. Assuming there are no other complications, the rest of the sentence, from the dummy word up to (but not including) the period, will be included in the predicate term.

When the addition of a dummy word is required to force a proposition into categorical form, the dummy word added will always name the same general group to which the *subject* term belongs. This general group is known as the **parameter** of the proposition. Sometimes the parameter is also called the "universe of discourse."

Examples:

'No cows eat French fries'. *becomes...* 'No [cows] *are* [*animals that* eat French fries.
'Most cows are larger than most dogs'. *becomes...* 'Most [cows] *are* [*animals that* are larger than most dogs]'.

14

While this method will work on virtually all problematic sentences, it sometimes creates sentences that are more convoluted than necessary. For example, 'Most night students are willing to do extra work', could be made into 'Most [night students] are [students who are willing to do extra work]', but dropping the words 'who are' doesn't change the meaning, and actually creates a smoother sentence. Why not simply say 'Most [night students] are [students willing to do extra work]'? There is nothing wrong with such alternative solutions. Indeed, where they exist they are undoubtedly preferable. The method of inserting 'are things that' has the virtue that it is highly general. It solves a large class of problems with a single rule. But it should not be treated as the *only* solution, or even as the best solution in all cases. All that really matters is that problematic sentences be forced into categorical form without significantly altering their meaning.

Example:

> 'Most cows are brown'.
>
> *becomes...*
>
> 'Most [cows] are [brown *animals*]'.

Exercises:
A. The following are phrases that might appear in the predicate of an English sentence. Identify which of them are already proper categorical terms and which are not. If they are not, add language that will make them into categorical terms.

1. larger than a bread box.

2. ran as fast as he could.

3. home runs scored in the second inning.

4. unimportant, given the present situation.

5. places we visited while we were in Paris.

B. Force each of the following sentences into categorical form, without changing the meaning of the original sentence.

1. Few baseball players hit home runs.

2. Many hockey players are sufficiently proficient at tennis to beat many chess players.

3. All sentences can be forced into categorical form.

4. All sentences that are not in categorical form should be forced into categorical form.

5. Some sentences that are extremely difficult to force into categorical form are not coherent.

6. Most American businessmen who've hit it rich playing the stock market are greedy.

7. Many American businessmen are not greedy.

8. No American businessmen should be greedy.

9. All human beings have certain rights, including among others the right not to be killed.

10. Almost all fetuses will eventually turn into human beings, provided that no one interferes with their development.

C. Make up seven sentences of your own on any subject you like. Each sentence must begin with one of the standard common speech quantifiers, but should otherwise be a normal sentence. Use all seven of the standard quantifiers. Then, make each sentence into a categorical proposition without changing the meaning of your original sentence.

Replacing Terms with Constants

It is usually convenient to replace each of the terms in a categorical proposition with a term constant. Term constants are different than the term variables, S and P, which we used earlier to represent the general form of categorical propositions. As in mathematics, a variable has no specific value. It can stand for any value whatsoever. Likewise, **term variables** do not represent specific terms. They represent "any term whatsoever," provided, of course, that they consistently stand for the same term. By contrast **term constants** stand for a specific term. The meaning of the constant is specified by means of a **key**. When you create a key there is no reason to use one letter rather than another. What the letter means is entirely defined by the key that *you create*. I prefer to use letters that "sound like" the terms they stand for, but many students prefer what I call the 'A, B, C method', which is to assign A to the first term, B to the second term, C to the third term, and so on. In this section we only need to create two-letter keys, but later – when we get to arguments – we may need longer keys, and the A, B, C method has some advantages when creating longer keys.

Once the key is created, we can re-write the categorical proposition using the letters from the key in place of the full term. This makes it much easier to see and understand the structure of the proposition. I call the shortened formula a "propositional schema." To be correct, a propositional schema *must match* one of the ten propositional forms listed on page 11.

Example:

Many [astronauts who are afraid of heights] are not [people who get dizzy in weightless conditions].	
schema:	key:
Many A are not D.	A - astronauts who are afraid of heights. D - people who get dizzy in weightless conditions.

16

Exercises:
A. In the following categorical propositions, create a key assigning a letter to each of its terms. Use a new key for each exercise, but you may re-use letters! Write out the propositional schema for each proposition, replacing terms with the term constants defined by your key.

1. All apples are fruit.

2. No apples are vegetables.

3. Most apples are red-colored fruit.

4. Some apples are not red-colored fruit.

5. Many red-colored fruit are not apples.

6. No red-colored fruit are green-colored fruit.

7. Some red-colored vegetables are not things that people eat.

8. Few people who cook are people who believe tomatoes to be fruit.

9. Some people who cook are botanists.

10. Almost all botanists are people who believe tomatoes to be fruit.

11. Most people who cook are not botanists.

12. Few people who believe that tomatoes are vegetables are people who believe that tomatoes are fruit.

B. State the "letter name" of the propositional form that matches your schema.

The Complement of a Class
    Within a given parameter, or universe of discourse, a term has the effect of dividing that universe into two parts: objects that are members of the class to which the term refers, and objects that are not. For example, the term 'citizens of Albania' draws our attention toward people who *are* citizens of Albania, and away from people who are *not*. The term creates a partition within the universe of people. (Notice, however, that the term has little or no effect on the universe of colors.) Thus, for any class of objects, there is an opposite class within the same universe of discourse. These two classes are said to be complementary, or it is said that each one is the complement of the other. The **complement** of a class is the class that includes nothing that is a member of that class, and everything that is not.
    When using term constants, the complement of any class, C, may be expressed 'non-C'. The complement of a class may occur in a categorical proposition, but when it does it has no effect upon the type of categorical proposition involved. For example, 'Most R are non-D', is a T proposition. It has the form 'Most S are P', even though the predicate term is 'non-D'.

In common speech, using the particle 'non-' may not be the best way to express the complement of a class. Consider for example, a class such as 'students who are adept at logic'. What is the complement of this class? The phrase 'non-students who are adept at logic' sounds somewhat peculiar. It suggests that perhaps we are talking about milkmen and grocers (or perhaps even tables and chairs!) who are adept at logic. But presumably our universe of discourse is limited to students. Hence it would be better to express the complement of the class in one of these ways:

(a) 'students who are un-adept at logic'   (using a prefix such as 'un-' or 'in-')

(b) 'students not adept at logic'   (using the word 'not' *inside* the predicate, rather than following the copula)

(c) 'students who are poor at logic'   (using an antonym)

When creating a key for a term with a negative meaning, it is best practice *not* to include the negative in the key. It is easy to lose track of negatives unless we can clearly see them. Rather than creating a key in which 'U' is used to represent 'students who are un-adept a logic', create a key in which 'A' is used to represent 'students who are adept at logic. Then 'non-A' will appear in the propositional schema representing 'students who are un-adept at logic'. The particle 'non-' does not affect parameter words.

Example:

Most [chimpanzees] are [animals that don't have access to the Internet].	
schema:	key:
Most C are non-H.	C - chimpanzees H – animals that *do* have access to the Internet

Exercises:
A. For each of the following propositional schemas, state the letter name.

1. Few A are non-B.

2. Most non-C are not D.

3. All non-E are non-F.

4. Some G are not H.

5. Many non-I are not non-J.

6. Some K are non-L.

7. Many non-M are N.

8. No O are non-P.

9. Almost all non-Q are R.

10. Most non-S are non-T

B. For each of the following categorical propositions, create a key assigning a letter to each of its (affirmatively stated) terms. Write out the propositional schema for each proposition, replacing terms with the term constants defined by your key. Use 'non-' to express negative (or complementary) terms. State the "letter name" of the resulting schema.

1. Some politicians are unpatriotic citizens.

2. Most politicians are not unpatriotic citizens.

3. No non-politicians are dishonest people.

4. Many honest people are non-politicians.

5. Almost all dishonest people are people who are not patriotic.

C. Force each of the following sentences into categorical form. Then replace the (affirmatively stated) terms with appropriate letters and provide a key assigning that letter to the phrase it represents. Write out the propositional schema for each proposition. As necessary, use "non-" to express negative (or complementary) terms. State the "letter name" of the resulting schema.

1. No chess players are impatient.

2. Most baseball players are not patient.

3. Some hockey players are not very good at tennis.

4. Some scientists are unfriendly.

5. Many scientists can't even balance their own checkbooks.

6. Most non-scientists don't understand the theory of relativity.

7. Few non-scientists eat cold French fries for breakfast.

8. No scientists don't occasionally eat cold French fried for breakfast.

9. Some sentences cannot be forced into categorical form.

10. Many greedy American businessmen have not hit it rich playing the stock market.

11. All people who believe that tomatoes are vegetables are people who have never studied botany.

12. Most people who have never studied botany are people who don't really care whether tomatoes are vegetables or whether they are fruit.

D. Make up five sentences of your own on any subject or subjects you like. Each sentence must begin with one of the permitted common speech quantifiers, but should otherwise be a normal sentence of the kind you might use in a conversation. Be sure to use at least one negative or complementary term in each sentence. Replace the (affirmatively stated) terms with appropriate letters and provide a key assigning that letter to the phrase it represents. Write out the propositional schema for each proposition. As necessary, use "non-" to express negative (or complementary) terms. State the "letter name" of the resulting schema.

Quantifier Problems

Sentences in English usually don't begin with a quantifier, and nearly all of them do not begin with one of the standard quantifiers permitted within this system of categorical propositions. Indeed, there are so many ways to express quantification that we will set most of those problems aside for now. However, one quantifier problem is so common and important that it must be dealt with right away. That is the case in which the quantifier is missing altogether. Often this is because the subject of the sentence is an individual. For example, the sentence, "Plato is a philosopher," seems to express a categorical proposition. It asserts that the entity 'Plato' is a member of the class 'philosophers'. But, is 'Plato' a categorical term? That is, can we consider 'Plato' to be a countable category? The answer is yes. 'Plato' is a category of objects that includes only a single member.

Unfortunately, our form permits only the plural copula. So grammatical correctness requires that the subject term must be made into 'Platos', or 'persons identical to Plato', or 'persons who are Plato'. We can then make the copula into 'are', and make the predicate plural as well. An alternative solution would be to ignore the rules of grammar and allow "Plato are philosophers" to be good enough for our purposes. The result will be ugly no matter what we do.

But what about the quantifier? What proportion of the class 'Plato' are we talking about? Well, there is only one member in the class, so to talk about that one member is to talk about *every* member. Hence the categorical proposition is Universal. We can reword "Plato is a philosopher" as "All persons who are Plato are philosophers," or as "All Plato are philosophers." It is important to understand that this does not mean all persons who are *named* Plato. It means all persons who are identical to the one and only Plato that we are talking about. Even such a sentence as "Smith is a philosopher" can be reworded as "All persons who are Smith are philosophers," since in this case we mean all persons who are identical to the particular Smith referred to in the proposition (of which, of course, there is only one).

Propositions Not Expressed as Declarative Sentences

All categorical propositions take the form of what grammarians call a "declarative sentence." However, there are other types of grammatical constructions: imperative sentences (including commands, instructions, and requests), interrogative utterances (questions), and exclamatory utterances (e.g. 'Wow!' and 'Oh, my!'). Of these, imperatives also express a proposition and interrogatives *can* be used to express a proposition. (Exclamations only express attitude, and, for our purposes, may be ignored.)

1. Imperatives – Any command may be restated as a declarative sentence, usually by adding the words 'You should...' or 'Everyone should...' to the front of the sentence.

Example:

'Listen to me!' *becomes...* 'All [you] are [people who should listen to me]'.

All Y are L.   Y – you
                      L – people who should listen to me

(Bear in mind that 'you' are an individual, as in the previous section.)

---

2. Rhetorical Questions – Some questions are just questions: they honestly request information that the questioner needs and does not have. Sometimes, however, a question is asked, not to obtain information, but to elicit a specific reply. That is, the "questioner" wants a specific answer, and knows in advance what he expects to hear. This is known as a 'rhetorical question'. Like imperatives, all rhetorical questions are really propositions in disguise. They can be restated as declarative sentences, and then forced into categorical form in the usual way.

To restate a rhetorical question as a declarative sentence, it is important to know what reply the rhetorical question expects. Typically the expected reply to a rhetorical question is negative when the question is affirmative, and affirmative when the question is negative.

Example:

'Should we listen to him?'   expects the reply   'No!'

'Shouldn't we listen to him?'   expects the reply   'Yes!'

Hence, when restating these questions as declarative sentences,

'Should we listen to him?'   *becomes...* 'We shouldn't listen to him.'

'Shouldn't we listen to him?' *becomes...* 'We should listen to him.'

Rhetorical questions may be used to make your writing style more dramatic and flamboyant. While it is naturally desirable to make your writing more interesting, students tend to overuse rhetorical questions. Frequently rhetorical questions strike a reader as manipulative and offensive. Rhetorical questions become especially offensive when they are used in place of reasoning. Sometimes an author tries to escape from the need to back up his position by stating it as a rhetorical question—as if his position were too obvious to need explicit support! Most writing teachers recommend avoiding rhetorical questions altogether.

Exercises:
Force each of the following imperative and interrogative sentences into categorical form.

1. Vote to re-elect Senator Slugfest!

2. How can you expect those poor little children to understand calculus?

3. Wouldn't you rather be in Hawaii?

4. Attach the faceplate to the frame using ¼ inch machine screws, as shown in the diagram above.

5. Act only on that maxim whereby thou canst at the same time will it to be a universal law.
                                                                    —Immanuel Kant

Times and Places
        'Times' and 'places' are frequently used parameters. It may be especially helpful to use these parameters in rendering propositions that include adverbs of time and adverbs of place.

COMMON ADVERBS OF TIME			COMMON ADVERBS OF PLACE	
when	today	frequently	where	there
now	yesterday	occasionally	wherever	everywhere
then	always	sometimes	here	nowhere
never		whenever		

Examples:

'It don't rain in Indianapolis in the summertime'.

becomes...

'No times that are summertime are times that it rains in Indianapolis'.

No S are R.	S - times that are summertime.
	R - times that it rains in Indianapolis.

'Wherever there's smoke there's fire'.

becomes...

'All places where there's smoke are places where there's fire'.

All S are F.	S - places where there's smoke.
	F - places where there's fire.

22

Exercises:
Force the following sentences into categorical form. In each case use either 'times' or 'places' as the parameter.

1. When the going gets tough, the tough get going.

2. Today is the first day of the rest of your life.

3. Sometimes you just have to make the best of a bad situation.

4. Whenever you need me, I'll be there.

5. Home is where the heart is.

6. Frequently life just isn't fair.

7. Never say never.

8. When in Rome, do as the Romans do.

9. The grass is always greener in someone else's yard.

10. Whenever it rains, it pours.

Notes

[1]Some logicians prefer to use the singular copula 'is'. There is not, so far as I know, any very good reason for preferring one over the other; but I notice that logicians who accept the Boolean position on existence claims (see the discussion of the problem of existence in Section 3) tend to prefer the singular copula. For some reason the singular formulation makes the Boolean interpretation of categorical propositions seem more natural. My use of the plural copula indicates my preference (explained and defended in Section 3) for the Aristotelian interpretation of categorical propositions, instead of the Boolean interpretation.

[2]See Mark Brown, "Generalized quantifiers and the square of opposition," *The Notre Dame Journal of Formal Logic*, Vol. 25, No. 4 (Oct, 1984), pp. 303-322.

[3]Another (non-pedagogical) reason for introducing the five-tiered system first is that these quantifiers were the first to be incorporated into syllogistic logic. See Philip L. Peterson, "On the logic of 'few', 'many', and 'most'," *The Notre Dame Journal of Formal Logic*, Vol. 20, No. 1 (Jan, 1979), pp. 155-179, and Bruce E. R. Thompson, "Syllogisms using 'few', 'many', and 'most'," *The Notre Dame Journal of Formal Logic*, Vol. 27, No. 1 (Jan, 1982), pp. 75-84.