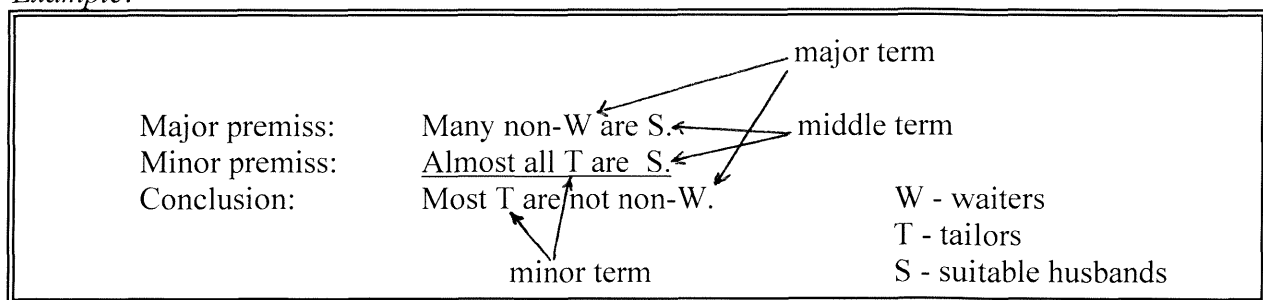# Section 3: Arguments in Syllogistic Form

An argument is not quite the same thing as an argument form, just as a building is not quite the same thing as a blueprint. So far we have been playing only with syllogistic forms, not with actual syllogisms. A syllogism is an argument, while a syllogistic form is an argument form. Syllogistic forms do not employ specific terms, such as 'dogs' or 'cows'. Syllogistic forms employ term variables. Syllogisms, on the other hand, employ terms—or, for convenience, term constants, accompanied by a key.

All of the vocabulary of the last chapter applies to term constants, just as it did to term variables.

Example:

Major premiss:	Many non-W are S.	major term / middle term
Minor premiss:	Almost all T are S.	
Conclusion:	Most T are not non-W.	W - waiters
		T - tailors
	minor term	S - suitable husbands

Notice that the letter 'S' occurs in this example, but that it is the middle term, not the minor term. The minor term in this example is 'T'. Remember that a term becomes the minor term simply by virtue of being the subject of the conclusion. A term becomes the major term simply by virtue of being the predicate of the conclusion. The term that is left over is the middle term. Also remember that the minor premiss is the premiss that contains the minor term and the major premiss is the premiss that contains the major term, no matter where those premisses occur in the argument. Knowing this, it is possible to identify the mood and figure of a syllogistic argument, even without the letters 'S', 'M', and 'P' to help.

Exercises:
A. Identify the mood and figure of each of the following syllogisms (which are not necessarily in standard form).

1. All M are B.
   Many B are C.
   Many M are C.

2. Few T are G.
   Many D are not G.
   Almost all D are T.

3. No H are I.
   All W are H.
   No I are W.

4. Most T are not L.
   Some non-A are L.
   Some non-A are not T.

5. Almost all U are C.
   Few U are non-A.
   Some non-A are not C.

6. Many V are not non-D.
   Almost all V are non-F.
   Some non-F are not non-D.

B. State whether the following syllogisms are valid or invalid. If they are invalid, state the rule or rules that they violate.

1.   Almost all A are B.
     No B are E.
     Most E are not A.

2.   All C are D.
     Most F are C.
     Most F are D.

3.   Most G are not H.
     Some K are G.
     Some K are H.

4.   Few M are J.
     Few L are J.
     All L are M.

5.   Most I are N.
     Most I are not O.
     Some O are not N.

6.   Many P are not Q.
     Many P are S.
     Almost all S are Q.

7.   Almost all R are U.
     Many R are non-T.
     Some non-T are not U.

8.   Few non-V are W.
     Many non-V are non-X.
     Some non-X are not W.

9.   All non-Y are non-Z.
     No A are non-Z.
     Most A are non-Y.

10. Almost all B are non-C.
     Almost all D are non-C.
     Almost all D are B.

11. All non-G are E.
     Most H are not E.
     Few H are non-G.

12. Most non-K are I.
     Some I are not L.
     Most L are not non-K.

Replacing Terms with Constants
     Before testing a passage to see if it contains a valid syllogism, it is usually convenient to identify the terms and state them as constants. Since every term occurs twice in a syllogism, replacing terms with term constants saves a lot of writing. Remember to use a key to indicate which letter is being used to represent which term.

Example:

Few fruits are foods that taste good with salt and pepper.
All tomatoes are foods that taste good with salt and pepper.
No tomatoes are fruits.

| *becomes...* | key |

     Few F are G.   F - fruits.
     All T are G.   G - foods that taste good with salt and pepper.
     No T are F.   T - tomatoes.

The syllogism is invalid, since it breaks Rule 3.

Exercises:
Put the following into standard syllogistic form. State whether or not they are valid. If they are valid, state the rule or rules that they violate. Remember to provide a key.

1. Many mammals are carnivores.
   Most carnivores are ferocious creatures.
   Some mammals are ferocious creatures.

2. Few poor people are happy people.
   No poor people are BMW owners.
   All BMW owners are happy people.

3. No whiskey drinkers are reliable witnesses.
   Most innocent bystanders are reliable witnesses.
   Most innocent bystanders are not whiskey drinkers.

4. Many apathetic citizens are not voters.
   All politicians are voters.
   Few politicians are apathetic citizens.

5. Most men are not taxi drivers.
   No taxi drivers are marriage councilors.
   Most marriage councilors are not men.

Putting Passages into Standard Form

In the exercises above, the premisses and the conclusion are listed in standard form, with a line drawn to indicate the conclusion. In common speech, of course, this will not be the case. You must identify the premisses and the conclusion by using flag words, premiss connectives, and (as always) a certain amount of common sense.

Example:

conclusion
'It stands to reason that [all computers are machines that can think.] All computers are machines capable of doing high speed calculations, (and) most machines capable of doing high speed calculations are machines that can think'.
premiss connective

becomes...	key
Most P are T.	C - computers.
All C are P.	T - machines that can think.
All C are T.	P - machines capable of doing high speed calculations.

Notice that the conclusion does not come last! The conclusion is actually stated in the FIRST sentence. The syllogism is invalid, since it breaks Rule 1.

Exercises:
Put the following into standard syllogistic form. Circle and label premiss flags, conclusion flags, and premiss connectives. Cross out throw away words. Identify and label conclusions. Finally, state whether or not the passage is valid. If it is invalid, state the rule or rules that it violates.

1. All hand guns are dangerous weapons. On the other hand, few hand guns are weapons that are effective against criminals. Hence some dangerous weapons are not weapons that are effective against criminals.

2. Many women are political activists, and many nuclear physicists are political activists. It follows that some women are not nuclear physicists.

3. All dairy products are foods that are high in cholesterol. Therefore many foods that are bad for people with heart conditions are dairy products, since all foods that are high in cholesterol are foods that are bad for people with heart conditions.

4. Few Denverites are happy people, because most Denverites are Broncos fans, and, of course, few Broncos fans are happy people.

5. It is perfectly clear that all alien beings are creatures that are capable of doing differential equations in their heads. And as everyone knows, most creatures that are capable of doing differential equations in their heads are superior life forms. Thus, some superior life forms are not alien beings.

Using Immediate Inferences

Some argument forms can be shown to be valid or invalid, even though they are not standard form syllogisms. When a term and its complement both appear in a passage, the passage will probably have too many terms to be a syllogism. But the extra term can sometimes be eliminated by using conversion, obversion, and contraposition.

Example:

No A are B.
Many non-A are C.
Many non-C are B.

Since this passage has five terms, it is not a syllogism, and the Rules of Validity cannot be applied to it. But it can be made into a syllogism, using conversion and obversion:

No A are B. —*conversion*→ No B are A. *obversion*→ All B are non-A.
Many non-A are C. ————*obversion*————→ Many non-A are not non-C.
Many non-C are B.   Many non-C are B.

Now it is a syllogism, and may be tested for validity. In fact it is invalid, since the middle term, 'non-A', has a combined distribution value of only 3. Also the conclusion is affirmative while the minor premiss is negative. As a syllogism, it breaks Rules 1 and 4.

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Once the number of terms has been reduced to exactly three, we may apply the Rules of Validity to determine whether the passage contains a valid argument. *But the Rules of Validity never apply to an argument that has more than three terms.* Don't even bother with the Rules of Validity until the passage has been put into syllogistic form.

Sometimes there is more than one way to reduce a passage to syllogistic form. However, if the passage is invalid, then any reduction will produce a syllogistic form that breaks at least one rule. If the passage contains a valid argument, then any reduction will produce a valid syllogism. Valid Immediate Inferences can never make a valid syllogism invalid, or an invalid syllogism valid.

Examples:

The syllogism on the left is invalid. It breaks Rule 1 since the middle term, 'B', has a combined distribution value of only 2. The syllogism on the right is also invalid, but it breaks Rule 3 and Rule 4 instead of Rule 1.

Both the syllogism on the left and the syllogism on the right are valid, even though they have been derived from the syllogism in the middle in different ways.

Exercises:

A. Put the following into standard syllogistic form. State whether or not they are valid. If they are invalid, state the rule or rules that they break (given your rendering of the problem). Remember that the solution to each problem often may be arrived at in more than one way.

1. No C are D.
    Some non-C are F.
    Some non-D are not non-F.

2. All A are B.
    Few E are non-A.
    Almost all E are B.

3. All non-G are non-H.
    Some J are G.
    Some J are H.

4. Most I are K.
    Few L are I.
    Some L are non-K.

5. Few M are O.
    Many M are not non-P.
    Some P are non-O.

6. Most non-N are non-Q.
    Most non-N are not R.
    Some non-R are Q.

7. Many S are not T.
   Many U are S.
   Most U are non-T.

8. Few V are X.
   Many X are Z.
   Many Z are non-V.

9. All W are Y.
   All non-W are non-C.
   No C are non-Y.

10. All A are B.
    Most non-B are D.
    Most D are not A.

11. Almost all Q are R.
    Most non-X are Q.
    Some R are X.

12. Few V are non-W.
    Most Y are W._____
    Many Y are not non-V.

B. Put the following into standard syllogistic form. State whether or not they are valid. If they are invalid, state the rule or rules that they break.

1. All criminals are persons detrimental to society.
   Many unemployed people are criminals.
   Some unemployed people are not persons detrimental to society.

2. Few expert bridge players are poor poker players.
   Some firemen are expert bridge players.
   Many firemen are good poker players.

3. No creatures with low intelligence are tool users.
   Some apes are not creatures with high intelligence.
   Some apes are not tool users.

4. All residents of New Jersey are people with a great sense of humor.
   No foreign correspondents are residents of New Jersey.
   Many foreign correspondents are people with a lousy sense of humor.

5. Many pleasant pastimes are illegal activities.
   No unpleasant pastimes are enjoyable ways to amuse yourself.
   Few enjoyable ways to amuse yourself are legal activities.

C. Put the following into standard syllogistic form. State whether or not they are valid. If they are invalid, state the rule or rules that they break.

1. Naturally few merchants are persons who are pleased to see their fortunes dwindle. Therefore no swindlers are persons who are pleased to see their fortunes dwindle, since of course, no swindlers are non-merchants.

2. It is clear that many members of the central committee are persons with political ambitions. Of course since almost all members of the central committee are soviet leaders, it follows that few soviet leaders are persons without political ambitions.

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3. No spies are persons protected by diplomatic immunity, since no diplomats are spies, but all non-diplomats are persons unprotected by diplomatic immunity.

4. Most politicians are not members of the ACLU. Furthermore, as everyone knows few members of the ACLU are conservatives. Hence some liberals are not politicians.

5. Isn't it apparent, my fellow townsmen, that many women who plant herb gardens are witches? Just consider the evidence! First observe that many women who plant herb gardens are not person who attend church regularly. But of course it goes without saying that almost all witches are persons who don't attend church regularly!

Forcing Ordinary Language into Syllogistic Form

Remember that many sentences do not express categorical propositions. In such cases, it is necessary to force these sentences into categorical form.

Example:

'Many people who play polo are compassionate. (Therefore,) Lord Willoughby
is compassionate, (since) Lord Willoughby plays polo'. └ *conclusion flag*
conclusion ──┘   └ *premiss flag*

becomes...   key

Many P are C.   P – people who play polo.
All W are P.   C – compassionate people.
All W are C.   W – Lord Willoughby.

The passage is invalid, since it breaks Rule 1.

Exercises:
Force the following into standard syllogistic form. State whether or not they are valid. If they are invalid, state the rule or rules that they break.

1. Hippies are dirty. Clyde is a hippy, so Clyde is dirty.

2. No one who is sincere is protected under the law, since no members of the mafia are sincere, and only members of the mafia are protected under the law.

3. Justice is a noble ideal, but few of the principles by which society is actually governed are noble ideals. Therefore justice is not one of the principles by which society is actually governed.

4. Most rednecks suffer from paranoid delusions, since most rednecks are afraid of a communist takeover, and anyone who is afraid of a communist takeover suffers from paranoid delusions.

5. Not all logicians believe that human emotions are useless. But most people who believe that human emotions are useless never study psychology. So, of course, some people who study psychology are logicians.

6. Almost every American is worried about inflation, and many Americans believe that the government is unable to handle the problem. Therefore, few people who are worried about inflation believe that the government is able to handle the problem.

7. Only sparkling wines from France may properly be designated champagne. Obviously, California wines are never sparkling wines from France, so, of course, no California wines may properly be designated champagne.

8. A few lower life-forms are capable of withstanding extreme pain. Human beings are also frequently capable of withstanding extreme pain. Therefore, many human beings are lower life-forms.

9. Bureaucrats are usually not concerned with the problems of individual citizens. Furthermore, only a few bureaucrats are respected by the people with whom they deal. It follows that anyone who is respected by the people with whom he deals is concerned with the problems of individual citizens.

10. Anything that is made of wood will not sink when thrown in water. Hence it follows that witches will not sink when thrown in water; for, as every scholar in these matters can tell you, witches are made of wood.

11. A few people who are able to understand philosophical concepts are driven insane by the effort. However, many people are unable to understand philosophical concepts at all. So few people are driven insane by the effort.

12. Whenever Froggie wears his mackintosh it is sure to rain. Froggie is wearing his mackintosh today, so it is sure to rain today.

13. Buckingham Palace is one place that every visitor to London is certain to see. But most of the most interesting sites of London are never seen by tourists. Therefore Buckingham Palace is not one of the most interesting sites of London.

14. Hardly any American diplomats genuinely understand the Chinese way of thinking. Therefore, American diplomats are rarely inexperienced in European politics, since diplomats who genuinely understand the Chinese way of thinking are frequently experienced in European politics.

15. Some types of fish that live in the tropics are dangerous. On the other hand, goldfish are seldom dangerous, so it follows that goldfish don't live in the tropics.