Logic: An Invalid Approach

David Marans

St. Thomas University

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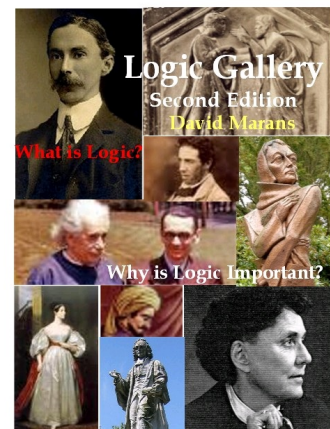
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ABORTION: Both Sides

Here are two logical arguments that relate to the Abortion issue.

Pro-Life argument

Murder is immoral.
And abortion is immoral.
Thus abortion is murder.

Pro-Choice Argument

Killing babies is murder.
But abortion isn't killing babies.
So abortion is not murder.

In your view, which one is logically correct?

Write a two paragraph answer,
and be prepared to present it in class.

UNIT ONE
IF THEN

Consider this logical argument. Is it logically valid? Or is it invalid?

DA VINCI

If Da Vinci painted *The Mona Lisa*, then he was a great artist.
But Leonardo Da Vinci was a great artist.
Therefore, Leonardo Da Vinci did paint *The Mona Lisa*.

The underline empirical content has to do with a famous artist and a famous painting. And it seems valid, since both of the premises and also the conclusion are true. Yet, beneath the content is a logical form which we can represent as:

FORM #1
$$\frac{\text{If P then Q}}{Q}$$
$$\therefore P$$

But from a logical point of view, this FORM #1 is simply unreliable, that is, "invalid.". Since Form #1 can easily lead from two true premises to a false conclusion. For example,

PICASSO

If Picasso painted the *Sistine Chapel*, then he was a great artist.
But Picasso was a great artist.
Therefore Picasso painted the *Sistine Chapel*.

So judged just by Form #1, we are forced to conclude that the DA VINCI argument is logically invalid.

Here are more examples: By the same reasoning, which of these three arguments shows that Form #1 is invalid?

ROME	HAVANA	MIAMI
If Rome is in Peru, then it is in Asia.	If Havana is in Spain, it is in Europe.	If Miami is in Texas, it is in the USA.
But Rome is in Asia.	But Havana is in Spain.	But Miami is in the USA.
Thus Rome is in Peru.	Hence Havana is in Europe.	So, Miami is in Texas.

So again, by showing that Form #1 can lead from truth into error, we have proved that it is logically invalid .Thus, in so far a it has this form, the DA VINCI argument is invalid.

Using the same approach, show which of the following arguments are logically invalid?

CANYON
If the Grand Canyon is Arizona, then it is China.
But the Grand Canyon is in Arizona.
Therefore, the Grand Canyon is in China.

SCARLET
If The *Scarlet Letter* is a novel, then it is a work literature.
But *The Scarlet Letter* is a work in literature.
Therefore, *The Scarlet Letter* is a novel.

FRANCINE
If Francine is a neuropteran, then Francine is an insect.
But Francine is a neuropteran.
So Francine is an insect.

NEWTON
If Isaac Newton was a physicist, then he was a scientist.
And he was as scientist.
It follows that Isaac Newton was a physicist.

HINDU
If the British Prime Minister is a Hindu, then he is a guru.
And the British Prime Minister is a guru
It follows that the British Prime Minister is a Hindu.

RUTH
If Babe Ruth was a NY Yankee, then he played baseball.
And of course Babe Ruth did play baseball.
Hence, Babe Ruth was a NY Yankee.

SUEZ
If the Suez Canal is in Egypt, then it is in Africa.
But it is in Africa.
Therefore, the Suez Canal is in Egypt.

EIFFEL TOWER
If the Eiffel Tower is in Paris, then it is in Europe
And it is in Paris
Therefore, the Eiffel Tower is in Europe

IF THEN + NOT

Consider this logical argument. Is it logically valid? Or is it invalid?

SPHINX
If the Sphinx is in Korea, then the Sphinx is in Asia
But the Sphinx is not in Korea.
Thus the Sphinx is not in Asia.

The underline empirical content has to do with the location of a famous monument. And it seems valid, since both of the premises and also the conclusion are true. But, beneath the content is a logical form which we can represent as:

	If P then Q
FORM #2	not-P
	∴ not-Q

But from a logical point of view, this FORM #2 is simply unreliable, that is, "invalid.". Since Form #2 can easily lead from two true premises to a false conclusion. For example,

RUSHMORE
If the Mount Rushmore is in Canada, then it is in North America.
But Mount Rushmore is not in Canada.
thus Mount Rushmore is not in North America

So So judged just by Form #2, we are can conclude that the SPHINX argument is logically invalid.

Here are more examples: By the same reasoning, which of these three arguments shows that Form #2 is invalid?

POPE	ISAAC NEWTON	PRINCESS DIANA
If the Pope is Jewish he's not Hindu.	If Newton is a Botanist, he is a scientist.	If Diana was French, she was a married.
But the Pope is not Jewish.	But Isaac Newton is not a botanist.	But Princess Diana was married.
Therefore the Pope is Hindu.	Hence Isaac Newton is not a scientist.	So, Prices Diana was not French.

So again, by showing that Form #2 can lead from truth into error, we conclude that it is logically invalid .Thus, again, in so far a it has this form, the SPHINX argument is invalid.

Using the same approach, show which of the following arguments are logically invalid?

LASSIE
If Lassie is a bird , then Lassie has wings.
But Lassie is not a bird.
Thus Lassie does not have wings.

EINSTEIN
If Einstein was a scientist, then he was from Brazil.
But Einstein was not from Brazil.
Hence, Einstein was not a scientist.

MAO
If Mao Tse Tung was a not Asian, then he was not a Japanese.
Yet Mao Tse Tung was Asian.
Accordingly, Mao Tse Tung was Japanese .

BAMBI
If Bambi is a tuna, then Bambi is a fish.
But Bambi is not a fish.
We conclude thus that Bambi is not a tuna.

ADDITION
If there are no more that 15 countries in the world then there are no more that 25.
However there are more 15.
It follows that there are more than 25 countries in the world.

MICHELANGELO
If Michelangelo was an astronaut, then was born after the year 1900.
But Michelangelo was not an astronaut.
This certainly proves that Michelangelo was not born afer the year 1900.

MADRID
If Madrid is in Brazil, then Madrid is South America .
And Madrid is not in South America..
Ergo, Madrid is not in Brazil

KING KONG
If King Kong is a shark, then he is an ocean animal.
However, King Kong is not a shark.
It follows that King Kong is not an ocean animal.

DUBLIN
If Dublin is not in Europe, then Dublin is not in Ireland.
However, Dublin is in Europe.
So, Dublin is in Ireland.

TOKYO
If Tokyo is in Italy, then Tokyo is in Norway.
But Tokyo is not in Italy.
Therefore, Tokyo is in not Norway

BABAR
If Babar is not a Tiger, then Babar is not a mammal.
Yet Babar is a tiger.
Consequently, Babar is mammal.

WASHINGTON
If George Washington was a general, then he was President.
However, he was not President.
Logically then, George Washington was not a general.

NOT BOTH

Consider this logical argument. Is it logically valid? Or is it invalid?

HENRY VIII
Henry VIII was not both a computer hacker and King of England.
But he was not a computer hacker
Hence Henry VIII was King of England

The empirical content of the argument is history. And it seems valid, since both of the premises and also the conclusion are true. However, beneath the content is a logical form which we can represent as:

	not both (P and Q)
FORM #3	not-P
	∴ Q

But from a logical point of view, this FORM #3 is simply unreliable, that is, "invalid.". Since Form #1 can easily lead from two true premises to a false conclusion. For example,

LOUIS XVI
Louis XVI was not both an NFL quarterback and a television comedian.
But he was not an NFL quarterback
Hence Louis XVI was a television comedian.

So judged just by Form #3, we conclude that the HENRY VIII argument is logically invalid.

More examples: By the same reasoning, which of these three arguments shows that Form #3 is invalid?

JOAN OF ARK	MOTHER TERESA	HOMER
Joan was not both Irish and a pacifist.	Teresa is not both Moslem and married.	Homer was not both German and a poet.
But Joan of Ark was not Irish.	But Mother Teresa is not married.	But Homer was German.
Hence, Joan of Ark was a pacifist.	Thus Mother Teresa is Moslem.	Therefore Homer was not a poet.

So again, by showing that Form #3 can lead from truth into error, we conclude that it is logically invalid .Thus, again, in so far a it has this form, the HENRY VIII argument is invalid.

Using the same approach, show which of the following arguments are logically invalid?

LAMA
The Dalai Lama is not both religious and Columbian.
But he is not Columbian.
So the Dalai Lama must be an religious.

M. L. KING
Martin Luther King was not both an activist and a US Senator.
But he was not an activist.
Thus, Martin Luther King was a US Senator.

MARILYN
Marilyn Monroe was not both a general and a movie star.
But Marilyn Monroe was not a general.
It follows that she was a movie star.

ELVIS
Elvis Presley was not both a musician and a Venezuelan.
Of course, Elvis Presley was a musician.
Consequently, he was not a Venezuelan.

GANDHI
Gandhi was not both a pacifist and a Christian.
But Gandhi certainly was not a Christian.
Therefore, Gandhi must not have been a pacifist.

GALILEO
Galileo was not both an airline pilot and the Tsar of Russia.
And surely Galileo was not the Tzar of Russia
We conclude that Galileo must been an air line pilot.

CAESAR
Julius Caesar was not both a Roman citizen and a slave.
And we know he was a Roman citizen.
Thus Julius Caesar was a not a slave.

SHAKESPEARE
William Shakespeare was not both oriental and a dramatist.
Yet he was not oriental.
Therefore, William Shakespeare was dramatist.

OR

IMPORTANT:
The "or" connective can mean "one or the other, <u>maybe both</u>". This is the INCLUSIVE "OR" .
But it can also mean "one or the other, <u>but not both</u>". This is the EXCLUSIVE "OR".
To avoid confusion, all of that follows assumes the INCLUSIVE "OR".

Consider this logical argument. Is it logically valid? Or is it invalid?

MARCO POLO
Marco Polo was Italian or traveled to the Moon.
Yet Marco Polo was Italian.
Therefore, Marco Polo did not travel to the Moon.

The <u>empirical content</u> of the argument is the age of exploration. And it seems valid, since both of the premises and also the conclusion are true. But beneath the content is a <u>logical form</u> that we can represent as:

FORM #4

$$\frac{\begin{array}{l} \text{P or Q} \\ \text{P} \end{array}}{\therefore \text{ not-Q}}$$

But from a logical point of view, this FORM #4 is simply unreliable, that is, "invalid.". Since Form #1 can easily lead from two true premises to a false conclusion. For example,

CORTEZ
Hernando Cortez was Spanish or conquered the Aztec empire.
Yet Hernando Cortez was Spanish
Therefore he did not conquer the Aztec empire.

So judged just by Form #4, we can conclude that the MARCO POLO argument is logically invalid.

Here are more: By the same reasoning, which of these three arguments shows that Form #4 is invalid?

Superman	R2D2	Babar
Superman is lawyer or from Krypton.	R2D2 is a robot or a space traveler.	Babar is an elephant or a monkey.
But he is a lawyer.	however R2D2 is a robot.	And Babar is not an elephant.
Hence Superman is not from Krypton.	Thus R2D2 is not a space traveler.	So Babar is a monkey.

So again, by showing that Form #4 can lead from truth into error, we conclude that it is logically invalid .Thus, again, in so far a it has this form, the MARCO POLO argument is invalid..

Using the same approach, show which of the following arguments are logically invalid?

DARWIN
Charles Darwin was English, or a computer scientist.
But Charles Darwin was English
Therefore, Charles Darwin was not a computer scientist.

EDISON
Thomas Edison invented the airplane or the light bulb.
Yet Edison did invent the light bulb.
So Edison must not have invented the airplane.

BACH
Either J. S. Bach was an Olympic athlete or a German composer.
And he was a not an Olympic athlete.
We conclude that J. S. Bach was a German composer.

ISLAND
Bali or Mali is an island.
However, we know that Bali isn't an island.
And it therefore follows that Mali is an island.

EGYPT
Egypt is in Africa or it is mostly Moslem.
Yet Egypt surely is mostly Moslem.
Hence Egypt is not in Africa.

JOAN
Joan of Arc was Nicaraguan or Vietnamese.
Certainly she was not Nicaraguan.
And thus Joan of Arc was Vietnamese.

DALLAS
Dallas is not in Australia or Dallas is in the USA.
Yet, as we all know, Dallas is in the USA.
And consequently, Dallas is not in Australia.

CAPITAL
Chicago or Boston is a USA state capital.
Yet Boston is a USA state capital.
So Chicago must not be USA state capital.

IF THEN CHAINS

Consider this logical argument. Is it logically valid? Or is it invalid?

ROME
If Henry is in Italy, then Henry is in Europe.
And if Henry is in Rome, then Henry is in Europe.
So if Henry is in Rome, then Henry is in Italy.

The empirical content of the argument is geography.. And it seems valid, since both of the premises and also the conclusion are true. But beneath the content is a logical form which we can represent as:

FORM #5
> If P then Q
> If R then Q
> ∴ If R then P

But from a logical point of view, this FORM #4 is simply unreliable, that is, "invalid.". Since Form #1 can easily lead from two true premises to a false conclusion. For example,

PARIS
If Sarah is in Austria , then Sarah is in Europe.
If Sarah is in Paris then Sarah is in Europe.
So if Sarah is in Paris, then Sarah is in Austria.

So judged just by Form #5, we are can conclude that the ROME argument is logically invalid.

More examples: By the same reasoning, which of these three arguments shows that Form #5 is invalid?

TONI	PAT	JOHN
If Toni is a tuna then she is an animal	If Pat is a eagle, Pat is a bird.	If John is feline then he is an insect.
If Toni is a tuna, then she is an fish.	If Pat is an robin the Pat is a bird.	If John is a lion the John is an insect.
So if Toni is an animal, Toni is a fish.	So if Pat is a robin then Pat is an eagle.	Hence if John is a lion. he is a feline.

So again, by showing that Form #5 can lead from truth into error, we conclude that it is logically invalid .Thus, again, in so far a it has this form, the ROME argument is invalid.

Moving on,, which of the following arguments are logically invalid ? WHY?
(For help with the geography, use this map site: http://www.bing.com/maps/)

HAVANA
If Betty lives in Havana, then Betty lives in the Carribean.
But if Betty lives in Havana, then Betty does not live in Beijing.
Accordingly, if Betty lives in Beijing, she does not live in the Carribean.

MADRID
If Juan is in not in Europe then Juan is not in Madrid.
But If Juan in Spain, then he is in Europe.
We conclude that if Juan is in Madrid, then Juan is in Spain.

BERLIN
If Jason lives in Berlin, then Jason lives in Germany.
If Jason lives in Berlin, then he does not live in Norway.
So if Jason lives in Norway, he does not live in Germany.

KYOTO
If Carla is in Japan, then Carla is in Asia
Also, If Carla is in Kyoto then Carla is in Asia.
It follows that if Carla is in Kyoto, then Carla is in Japan.

NAIROBI
If Carlos is in Texas, then Carlos is in South America.
If Carlos is in Nairobi, then he is Texas.
Hence if Carlos is in Nairobi, the he is in SouthAmerica.

WARSAW
If Igor is in the Poland, then Igor is in Europe.
If Igor is in Warsaw then Igor is in Europe.
Thus Igor is in Warsaw then he is in Poland.

MONTREAL
If Irene is in Montreal, then Irene is in Canada.
If Irene is in Montreal, then Irene is North America.
.Therefore, if Irene is in North America then she is Canada,

BOSTON
If Fran in Boston, then Fran in the USA.
If Fran is in Boston, the Fran in Massachusetts.
Hence, if Fran is in Massachusetts, then she is in the USA.

BOGOTA
If Stefan is in Colombia, then Stefan is south of Canada.
If Stefan is in Bogota , then Stefan is in Colombia.
Thus if Stefan is in Bogota, then Stefan is south of Canada.

ATLANTA
If Karen is in Atlanta, then Karen is north of California.
If Karen is in Atlanta, then Karen north of the USA.
Ergo, if Karen is in the USA, then Karen is in California..

IF+AND+OR+NOT

Consider this logical argument.

BIG BEN

Big Ben is in Europe or in China.
If Big Ben is in London, it is in Europe.
Thus, if Big Ben is in London, it is not in China.

The empirical content of the argument is famous landmarks. And it seems valid, since both of the premises and also the conclusion are true. But beneath the content is a logical form which we can represent as:

	P or Q
FORM #6	If R then P
	∴ If R then not-Q

But from a logical point of view, this FORM #6 is simply unreliable, that is, "invalid.". Since Form #6 can easily lead from two true premises to a false conclusion. For example,

LADY LIBERTY
The Statue of Liberty is in North America or in the USA.
If the Statue of Liberty is in New York, it is in North America.
Thus, if the Statue of Liberty is in New York, it is not in the USA.

So judged just by Form #5, we are can conclude that the BIG BEN argument is logically invalid.

More examples: By the same reasoning, which of these three arguments shows that Form #6 is invalid?

SPORTS	RELIGION	EUROPE
Babe Ruth was tennis or a baseball star.	The Pope is a theist, or the Pope is a Hindu.	Madrid is in Europe, or Rome is in Europe.
If Ruth was a tennis star was an athlete	If the Pope is Catholic, the Pope is a theist.	If Madrid is in Spain then Madrid is in Europe.
So if he was a baseball star he was no athlete.	So if the Pope is Catholic, he is not a Hindu.	So if Madrid is in Spain, Rome isn't in Europe.

So again, by showing that Form #6 can lead from truth into error, we conclude that it is logically invalid
.Thus,again, in so far a it has this form, the BIG BEN argument is invalid.

Moving on, are all of these eight arguments invalid? Why?

TOWER

If the Eiffel Tower is in India then it is in Australia.
However it is in Australia or not Canada.
Consequently, if the Eiffel Tower is in India, then it is in Canada.

COLISEUM

The Coliseum is in Europe or it is not in Paris.
And also, it is in Europe or it is not in Rome.
So the Coliseum is not both in Paris and in Rome.

LOUVRE

The Louvre is either in France or Iraq.
But if it is in Paris, then it is in France.
Therefore if the Louvre is in Paris, then it is not in Iraq.

PRESIDENT

The current USA President is a USA citizen or not a college graduate.
But he is a USA citizen or not at least 35 years old.
Hence the current USA President is not both a college graduate at least 35 yeas old.

CANYON

If the Grand Canyon in Florida then it is in the USA.
And it is in the USA or not in Mexico.
Ergo,If Grand Canyon is in Florida then it is in Mexico.

WALL

If the Great Wall is in China then it is in Asia.
But it is not both in Asia and North America.
It follows that if the Great Wall is in North America then it is not in China.

POPE

The Pope is Protestant or Catholic.
But if he is Methodist, then he is Protestant.
Thus if the Pope is a Methodist then he is not a Catholic.

SPHINX

If the Sphinx is in Berlin, then it is in Costa Rica.
Moreover. it in Costa Rica or not in Egypt.
Accordingly, if the Sphinx is in Berlin, then it is Egypt.

UNIT ONE REVIEW

(1) All of Philosophy (including Logic) tries to separate Reality from Appearances.
(2) Why might each of these logical arguments <u>appear</u> to be logically valid?
(3) Use the Method Of Logical Analogy to show that each <u>really</u> is logically invalid.

LASSIE
Lassie does not have four legs or does not have seven tails.
But obviously, Lassie doesn't have seven tails.
Hence, Lassie has four legs.

CHAUCER
If Geoffrey Chaucer wrote the Canterbury Tales, then he was not illiterate.
But of course Geoffrey Chaucer was not illiterate.
Thus Geoffrey Chaucer wrote the Canterbury Tales.

HARVARD
Harvard is not both a nursery school and a university.
And certainly it is not a nursery school.
Therefore, Harvard is a university.

PANAMA CANAL
Either the Panama Canal is not in Italy or it connects the Atlantic ocean to the Pacific ocean.
Ergo, if the Panama Canal is in Italy , then it does not connect the Atlantic ocean to the Pacific ocean.

FRANCE
If France is not larger than the Vatican, then France is smaller than Haiti.
However, France certainly is larger than the Vatican.
Hence France is not smaller than Haiti.

KING   (this one is more challenging)
Martin Luther King was not both a dentist and Baptist minister.
Also, he was not both pacifist and a dentist.
Yet he was not a dentist
So, Martin Luther King was either a pacifist or Baptist minister (maybe both).

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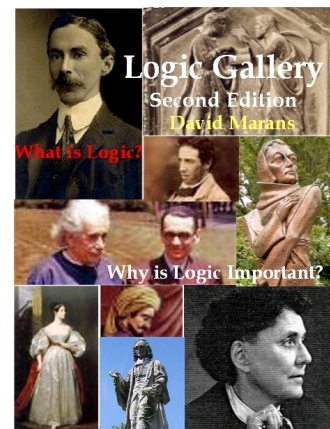Be you student or faculty, and consistent with your means, snail your contribution to:

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UNIT TWO

PRELIMINARY

From the "Candidates" at the bottom, find a counterexample for each of there general statements

01. No mammals are vegetarians. _____

02. All U.S. Presidents who died in office were assassinated. _____

03. Every kind of mammal lives on land. _____

04. In no Olympic sport do men and women compete against each other. _____

05. Metal are always solid at room temperature. _____

06. Not one nation occupies an entire continent.. _____

07. Positive integers less than seven are all prime numbers _____

08. No US Senators have been women. _____

09. Every city in Florida is on the Atlantic ocean. _____

10. Gay marriage is not legal in any South American countries. _____

11. Fruits. without exception, are sphere-shaped. _____

12. Every other European capital is north of Paris. _____

13. Any bird can fly. _____

14. There isn't a planet farther from the Sun than Jupiter. _____

15. Every country in South America borders an ocean. _____

CANDIDATES

Oranges	M. L. King	Four	Papayas	Palm Beach	Copenhagen	Venus	Rankin
Greenland	Chad	Einstein	Eagles	Diving	F. Roosevelt	Five	Orlando
Sharks	Fishing	Pakistan	Equestrian	Spain	Ostriches	Cairo	Celery
Lisbon	Brazil	Judaism	Porpoises	Bats	Obama	Atlantis	Water
Costa Rica	Rome	Iron	Peru	Surfboard	Bolivia	Columbus	Tokyo
Spiders	Minus-six	Giraffes	Netherlands	Eleven	Parrots	Antarctica	Iguanas
Mercury	Rome	Australia	Peas	China	Tigers	Guyana	Argentina
Catholicism	Sagittarius	Neptune	Garfield	Mexico	Plastic	Islam	Chemistry

ALL

Consider this logical argument.

POVERTY
Any public assistance program increases poverty.
Every public assistance program redistributes wealth.
Thus redistribution of wealth always promotes poverty.

This argument is highly controversial. Each part of it is fraught with social, political, and economic debate. But still, beneath the content of the argument is a logical form:

Form #7

All A are B
All A are C
∴ All C are B

But certainly this FORM is simply unreliable, that is, "invalid.". Since this form can easily lead from two true premises to a false conclusion. For example,

TUNA
All tunas are fish.
All tunas are ocean animals.
Thus all ocean animals are fish.

So judged just by Form #7, we are can conclude that the POVERTY argument is logically invalid.

More examples: By the same reasoning, which of these three arguments also shows that Form #7 is invalid?

BIRDS	TOMATOES	PHYSICISTS
All falcons are birds of prey.	All tomatoes are green.	All physicist are scientists.
All owls are birds of prey.	All tomatoes are vegetables.	All physicist are college graduates.
Consequently, all owls are falcons.	Thus all vegetables are green.	So all college graduated are scientists.

So again, showing that Form #7 can lead from truth into error, we conclude that it is logically invalid . Thus, in so far a it has this form, the POVERTY argument is invalid.

Using the same approach, show which of the following arguments are logically invalid?

COW
All cows are brown.
All farm animals are cows.
Consequently every farm animal is brown.

SPARROW
All sparrows are animals.
All sparrows are birds.
It follows that all birds are animals.

HORSE
All horses are mammals.
All whales are mammals.
Hence, all whales are horses.

SNAKE
All snakes are constrictors.
All constrictors are poisonous animals.
Thus all poisonous animals are snakes.

GORILLA
All gorillas are primates.
All gorillas are females.
It logically follows that all females are primates.

LOBSTER
All mammals are warm-blooded.
All lobsters are warm-blooded.
Therefore all lobsters are mammals.

SPIDER
All insects are spiders.
All spiders are 6-legged.
Hence, all 6-legged animals are insects.

BEAGLE
All beagles are mammals.
Every beagle is a dog.
Conclusion: all dogs are mammals.

LION
Every feline is 4-legged.
All lions are 4-legged.
We conclude: all lions are felines.

TUNA
All fish are salt-water animals.
All tuna are fish.
Ergo, all tuna are salt-water animals.

CARNIVORES
All carnivores are mammals.
All mammals are land animals.
Accordingly, all land animals are carnivores

HUMAN
All canines are primates.
All humans are canines.
Therefore, all humans are primates.

By the way, which of these 12 arguments shows that the Pro-Life argument on page 1 is logically invalid?

WORK SHEET–ALPHA

Using Logical Analogy, show which these are logically invalid.

ANIMALS

All felines are mammals. It follows that all tigers are felines, because every tiger is a mammal.

EDUCATION

Every teacher is a college graduates, and therefore all college graduates are women. Since all teachers are women.

.

SOME

Consider this logical argument.

SENATE
Every US Senator is a politician.
But some women are politicians.
Thus, there are some women who are US Senators.

This argument may seem correct.But beneath the surface is a this logical form:

Form #8
$$\frac{\begin{array}{l}\text{All A are B}\\ \text{Some C are B}\end{array}}{\therefore \text{ Some C are A}}$$

But from a logical point of view, this form is simply unreliable, that is, "invalid.", since this form can easily lead from two true premises to a false conclusion. For example,

MEDICINE
All neurosurgeons are high school graduates.
Some teenagers are high school graduates
Thus some teenagers are neurosurgeons.

So judged just by Form #8, we are can conclude that the SENATE argument is logically invalid.

More examples: By the same reasoning, which of these three arguments shows that Form #8 is invalid?

ROSES	TULIPS	VIOLETS
All roses are flowers.	All Tulips are flowers.	All violets are plants
Some water plants are flowers.	Some plants are flowers.	Some plants are trees.
Ergo, some water plants are roses.	Thus some plants are tulips	So some trees are violets.

So again, by showing that Form #8 can lead from truth into error, we conclude that it is logically invalid . Thus, in so far a it has this form, the SENATE argument is invalid.

Which of these arguments are invalid?
Are any valid? That is, do any have a form that cannot lead from truth to error?

APPLES
All apples are fruits.
 Some foods packed in lunch boxes are fruits.
Thus, some foods packed in lunch boxes are apples

PEPPERS
Each and every pepper is vegetable.
Some vegetables are yellow
Ergo, some yellow things are peppers.

CHERRIES
Some plants are cherries.
All fruits are plants.
Consequently some fruits and cherries.

BANANAS
All bananas are plants.
Some plants are foods.
Hence, some foods are bananas.

TOMATOES-
All tomatoes are fruits.
Some salad ingredients are tomatoes.
So, some salad ingredients are fruits.

POTATOES
Every potato is blue.
Some fruits are blue.
Thus, some fruits are potatoes.

BEANS
All beans are fruits.
Some carrots are beans.
Accordingly, some carrots are fruits.

ONIONS
Every onion is a plant.
Some plants are fruits.
Therefore, some fruits are onions.

APRICOTS
All apricots are fruits.
Some plants are fruits.
We conclude that some plants are apricots.

BROCCOLI
Some plants are broccoli.
All vegetables are plants.
It follows logically that some vegetables are broccoli.

WORK SHEET --- GAMMA

Which of these arguments are invalid?

—1—
Some Japanese are wealthy.
Some millionaires are Japanese.
Therefore, all millionaires are wealthy.

—2—
All teachers are inspirational.
Some inspirational persons are open minded.
So some open minded people are teachers.

— 3 —
All cardiologists are physicians.
All cardiologists are college graduates
Ergo, some college graduates are physicians

—4—
Some lawyers are in the pursuit of justice.
Some lawyers are highly moral
Thus some who are highly moral are in the pursuit of justice.

—5—
All cities in Spain are north of the equator.
All cities in Europe are north of the equator.
Hence some cities in Europe are cities in Spain.

NO

Consider this argument

PIGS
Anything created in God's image has a right to life.
But pigs are not created in God's image.
So pigs do not have a right to life.

There are debatable religious and ethical issues throughout this argument. But just for now, let us assume that all three sentences are true. Still, beneath content is this logical form:

	All A are B
Form #9	No C are A
	∴ No C are B

But from a logical point of view, this FORM is simply unreliable, that is, "invalid.", since it can easily lead from two true premises to a false conclusion. For example,

LIONS
All Lions are mammals.
No horses are lions.
So no horses are mammals.

So judged just by Form#9,, we conclude that the PIGS argument is invalid.

Mexamples: By the same reasoning, which of these three arguments shows that Form #9 is invalid.

BANANAS	PICKLES	POODLES
All fruits are red.	All pickles are vegetables	No poodles are poisonous
No bananas are fruits.	No carrots are pickles	No poodles are snakes
Thus no bananas are red.	So no carrots are vegetables.	So no snakes are poisonous.

So again, by showing that Form #9 can lead from truth into error, we conclude that the form it is logically invalid .Thus, in so far a it has this form, the PIGS argument is invalid..

By the way, does LIONS show that the Pro-Choice argument on page 1 is logically invalid?

Which of these arguments are invalid?
Are any valid? That is, do any have a form that cannot lead from truth to error?

LUTHERANS
All Lutherans are Christians.
No Lutherans are Confucians.
Hence, no Confucians are Christians.

BAPTISTS
No Baptists are polytheists.
All Hindus are polytheists
So no Hindus are Baptists

MOSLEMS
All Shiites are Moslems.
And no Shiites are Baptists
Consequently, no Baptists are Moslems.

CATHOLICS
No Shintos are Christians.
Yet all Catholics are Christians.
Therefore, no Catholics are Shintos.

QUAKERS
No Protestants. are Christians.
Yet Christians are Quakers
Conclusion: no Quakers are Protestants.

PRESBYTERIANS
No Moslems are Presbyterians.
Moreover, all Christians are Presbyterians.
Thus, no Christians are Moslems.

HINDUS
No Hindus are Lutherans.
But all Lutherans are Christians
Accordingly, no Christians are Hindus.

JEWS
All rabbis are Jews.
Of course no rabbis are Shintos .
Ergo, no Shintos are Jews.

BUDDHISTS
No Baptists are Buddhists.
But all Buddhist is a Chinese.
It follows that no Christians are Baptists.

UNITARIAN
All Unitarians are theists.
Plus, no Unitarians are Baptists.
For sure then, no Baptists are theists

WORKSHEET – DELTA

For each of these arguments,
show that its logical form can lead from truth into error
and that the argument is therefore invalid.

(1)
No lawyers are on welfare.
No lawyers are persons below minimum wage.
So some who are below minimum wage are on welfare.

(2)
No cities in Africa are North of Iceland.
No cities in Costa Rica are North of Iceland.
Hence no cities in Costa Rica are cities in Africa.

(3)
All NBA players are teenagers.
Some grandfathers are NBA players .
Thus some teenagers are grandfathers.

(4)
No Jews are Catholic priests.
Also, no Catholic priests are Rabbis.
Consequently all Rabbis are Jews.

(5)
No fashion models are Sumo wrestlers.
Some fashion models are Japanese
Ergo, some Japanese are Sumo wrestlers.

(6)
No physicians are illiterates.
But some lawyers are physicians.
Accordingly, no lawyers are illiterates.

PRACTICE SHEET

Complete each pair of sentences so that <u>the first is true</u>, and <u>the second is false</u>.

Some BIOLOGISTS are and some are not _____.
Some CHEMISTS are not _____.

Some NUMBERS >10 are and some are not _____.
Some NUMBERS <20 are not _____.

Some SONYS are and some are not _____.
Some TOSHIBAS are not _____.

Some CITIES IN JAPAN are and some are not _____.
Some CITIES IN BRAZIL are not _____.

Some UNCLES are and some are not _____.
Some AUNTS are not _____.

Some US SENATORS are and some are not _____.
Some SUPREME COURT JUSTICES are not ____.

Some CATHOLICS are and some are not _____.
Some BAPTISTS are not _____.

Some NBA PLAYERS are and some are not _____..
Some NFL PLAYERS are not _____..

Some SURGEONS are and some are not _____.
Some ONCOLOGISTS are not _____.

Some APPLES are and some are not _____.
Some PEARS are not _____.

Some GUITARS are and some are not _____.
Some TRUMPETS are not _____.

Some RIVERS are and some are not _____.
Some OCEANS are not _____.

Some SNAKES are and some are not _____.
Some SHARKS are not _____ .

Some COFFEES are and some are not _____.
Some WHISKIES are not _____.

SOME NOT

Consider this argument

NUCLEAR

Of course, all uses nuclear energy is dangerous, But some methods of generating electricity do not use nuclear energy. Thus, some methods of generating electricity that not dangerous.

There are debatable scientific and health issues in this argument. But just for now, let us assume that all three sentences are true. Still, beneath content is this logical form:

Form #10	All A are B
	Some C are not A
	∴ Some C are not B

Yet from a logical point of view, this FORM is simply unreliable, that is, "invalid.", since it can easily lead from two true premises to a false conclusion. For example

CAFES
All cafes in Paris are in Europe.
Some cafes in France are not in Paris.
Therefore some cafes in France are not in Europe.

So again, by showing that Form 10 can lead from truth into error, we conclude that it is logically invalid . And by extension, the NUCLEAR argument is deemed invalid.

Mexamples: By the same reasoning, which of these arguments shows that Form #10 is invalid?

ATHLETES	PETS	ORANGES
All athletes are men.	Some pets are mammals.	All oranges are plants.
Some NFL players are not athletes.	No rhinos are pets.	Some fruits are not oranges.
Thus, some NFL players are not men.	So, some rhinos are not mammals.	Therefore , some fruits are not plants.

So again, by showing that Form #10 can lead from truth into error, we conclude that the form it is logically invalid .Thus, in so far a it has this form, the NUCLEAR argument is invalid.

Which of these arguments are invalid?
Are any valid? That is, do any have a form that cannot lead from truth to error?

COLLEGE
Some NBA players are college graduates.
No NBA players are women.
Thus some women are not college graduates.

PANTHERS
All panthers are cats.
Some carnivores are not panthers.
Surely then, some carnivores are not cats.

FELINES
No felines are cold-blooded.
Some felines are house pets.
Hence, some house pets are not cold-blooded.

FISH
All fish are cold-blooded.
Some ocean animals are not fish.
Conclusion: some ocean animals are not cold-blooded..

REDWOODS
Some trees are not Redwoods.
All Redwoods are plants.
Consequently, some plants are not trees.

TEXAS
Some cities in the Texas are not in North America.
All cities in North America are in the USA.
So some cites in the USA are not in Texas..

CHRISTIANS
No men are Christians.
Some men are Catholic nuns
Ergo, some Catholic nuns are not Christians.

CHEMISTS
Some chemists are psychotic.
No chemists are illiterate.
It follows that some illiterates are not psychotic.

APPLES
All apples are fruits.
Some red things are not apples.
Thus, some red things are not fruits.

BIRDS
Some birds are vegetarians.
No birds are cows.
Therefore, some cows are not vegetarians.

Logical Analogy–Do It Yourself

Below there are six pairs of arguments. In each pair, one **or both** of the arguments are invalid. You challenge is to use the Method of Counterexample to find the invalid ones.

BUT DON'T BE FOOLED BY APPEARANCES!.............As you read each pair of arguments, you will observe that every sentence in each of the 12 arguments is FALSE. This fact can create the <u>appearance</u> that all twelve arguments are logically invalid. But as a student of LOGIC, you must look beyond appearances. From a logical point of view, the reality is the underlying form structure of an argument. And the challenge is to show by example that a form can lead from truth into error is invalid.

(Suggestion: In each of theses 12 arguments, since the conclusion is already false, try to replace the term the two premises have in common so that both premises are then true!)

A1
Some birds are tunas.
<u>All lions are tunas.</u>
Accordingly, some lions are birds

A2
All Turtles are spiders.
<u>Some spiders are mammals</u>.
Consequently some mammals are Turtles.

B1
Some Dallas streets are not Texas streets.
<u>All Houston streets are Dallas streets.</u>
Hence Some Houston streets are not Texas streets.

B2
All USA residents are Georgia residents.
<u>Some Atlanta residents are not Georgia residents,</u>
So some Atlanta residents are not USA residents.

C1
No trucks are Toyotas.
<u>All Camrys are trucks ,</u>
It follows that some Camrys are not Toyotas

C2
.Some Toyotas are not 4-wheeled vehicles.
<u>No 4-wheeled vehicles are Corolas.</u>
So some Corolas are not Toyotas.

D1
No US Presidents are Christians.
<u>No teenagers are Christians.</u>
Ergo some teenagers areUS Presidents.

D2
No US Presidents are athletic.
<u>Some NFL player are not athletic.</u>
Consequently some NFL players are US Presidents.

E1
.No oranges are fruits.
<u>All oranges are apples.</u>
Thus some apples are not fruits.

E2
All vegetables are apples.
<u>No carrots are apples.</u>
Therefore some carrots are not vegetables.

F1
No golf balls are round.
<u>All round things are fruits.</u>
Therefore all fruits are golf balls.

F2
No round things are inflated.
<u>Some golf balls are inflated.</u>
Hence some golf balls are not round.

UNIT TWO REVIEW
Just one of these fifteen arguments is logically valid. Which is it?

(1) SOME LAWBREAKERS ARE NOT ILLEGAL IMMIGRANTS. BECAUSE EVERY UNDOCUMENTED WORKER IS AN ILLEGAL IMMIGRANT , AND SINCE SOME UNDOCUMENTED WORKERS ARE NOT LAWBREAKERS.

(2) SOMETIMES TEXT MESSAGES CAUSE TRAFFIC FATALITIES, AND SOME CAUSES OF TRAFFIC FATALITIES ARE COMPUTER RELATED. HENCE, ALL TEXT MESSAGES IS COMPUTER RELATED.

(3) SO, SOME POLLUTANTS ARE MICROSCOPIC. GIVEN THAT SOME THINGS THAT ARE MICROSCOPIC ARE NOT CARBON BASED, WHILE SOME POLLUTANTS ARE CARBON BASED.

(4) SINCE NOTHING HARMFUL IS POLITICALLY CORRECT, AT LEAST SOME USE OF MARIJUANA MUST BE HARMFUL. FOR NO USE OF MARIJUANA IS POLITICALLY CORRECT.

(5) ALL OBESE PERSONS ARE SELF-INDULGENT. AND SOME WHO ARE POORLY INFORMED ARE OBESE. THEREFORE SOME POORLY INFORMED PERSONS ARE NOT SELF-INDULGENT.

(6) ALL HEMOPHILIACS ARE EPILEPTIC. HENCE THERE ARE RH-NEGATIVE PERSONS WHO NOT ARE EPILEPTICS, SINCE RH-NEGATIVE PERSONS ARE NEVER HEMOPHILIACS.

(7) DELUSIONAL PEOPLE ARE SOMETIMES NOT ALCOHOLICS. DUE TO THE FACT THAT ALTHOUGH SOME ALCOHOLICS ARE LAWYERS, NOBODY WHO IS DELUSIONAL IS LAWYER.

(8) ALL HEALTHFUL HUMAN FOODS ARE GOD'S CREATION. THEREFORE SOME HEALTHFUL HUMAN FOODS ARE NOT COMMON CHICKENS. FOR ALL COMMON CHICKENS ARE GOD'S CREATION.

(9) SOME PNEUMONIA PATIENTS ARE NOT TERMINAL. BUT NO CANCER PATIENTS ARE PNEUMONIA PATIENTS, AND SO SOME CANCER PATIENTS ARE TERMINAL..

(10) SOME TOXIC WASTE IS NOT HOSPITAL GARBAGE. THUS ALL NARCOTIC SYRINGES ARE TOXIC WASTE, SINCE SOME NARCOTIC SYRINGES ARE NOT HOSPITAL GARBAGE.

(11) IT FOLLOWS THAT THERE ARE SOME SUICIDE BOMBERS WHO ARE NOT RELIGIOUS FANATICS, BECAUSE NO ATHEISTS ARE RELIGIOUS FANATICS, AND SINCE SUICIDE BOMBERS ARE ATHEISTS.

(12) GAY MARRIAGES ARE OF COURSE LOVING UNIONS, AND A GAY MARRIAGE IS NEVER AN IMMORAL RELATIONSHIP. THUS NO IMMORAL RELATIONSHIP CAN BE A LOVING UNION.

(13) SINCE SOME BANKS SELL MORTGAGES, IT FOLLOWS THAT SOME BANKS ARE "SAVINGS AND LOAN". FOR EVERY "SAVINGS AND LOAN" ALSO SELLS MORTGAGES.

(14) NOBODY WHO LIVES BY THE "GOLDEN RULE" A IS PUBLIC THREAT. BUT NOT ONE SERIAL KILLER LIVES BY THE "GOLDEN RULE.". ERGO, EVERY SERIAL KILLER IS A PUBLIC THREAT.

(15) SOME HOMELESS PEOPLE ARE CERTAINLY INTELLIGENT. WE KNOW THIS BECAUSE SOME INTELLIGENT PEOPLE ARE CEO'S, AND SINCE NO CEO'S ARE HOMELESS.

Appendix

We admit that our approach to formal logic via Invalidity has attempted to avoid it, but a serious fundamental matter must be considered:

There are Logical Forms some instantiations of which have none but true premises and a false conclusion. Such Forms are thus unreliable and are said to be invalid. And there are other Logical Forms for which there are NO instantiations having none but true premises and a false conclusion. Such forms are reliable and are said to be valid. And every natural language argument can be parsed into instantiation of several different Logical Forms. But if even just one of its Logical Forms is valid, then the natural language argument is valid.....But if NONE its parsings arer into a valid forms, then the natural language argument is invalid. That is, it is invalid if and only if it has no valid form.

As a result, we are faced with a two question for which there are no clear knockdown answers

:
(1) On what basis do we know that a logical form IS valid? That is, for example, how do we come to know that the form

>   If P the Q
>   P
>   Thus Q

CANNOT EVER have two true premises and a false conclusion?

(2) On what basis do we know that an argument is invalid? That is, for example, how do we come to know that

>   All tuna are animals
>   All tuna are fish
>   Thus All fish are animals

IS NOT an instantiation of some valid form? (We do know it is an instance of an invalid form, but that is NOT the question.)

It is our view that attempts to answer these questions by appealing to such as truth-vale analysis, formal proof, rules of the syllogism, or Venn diagrams simple beg the questions. And we are inclined in the direction so well expressed by two prominent logician/philosophers.

"It is not easy to make clear exactly in what sense of "necessary", logical principles are necessary. It is simple enough to assert that their truth is self-evident, and that a self-evident truth must be necessarily true. But self-evidence is a dangerous notion; it seems to combine obviousness and logical priority. What is obvious to one person is not to another; it depends in part upon keenness of mental vision and in part upon familiarity. Unfortunately, we have learnt that a proposition which has long been regarded by competent thinkers as self-evident turns out to be false. What is indubitable is not necessarily true; our capacity to doubt depends upon our previous knowledge and our mental agility."
>   Susan Stebbing

"Traditional and contemporary logic express the last result of discriminative analysis employed in the search for dependable inference. Improve the means of experimentation and that result may be replaced tomorrow by new apprehensions."
>   John Dewey

＊＊＊＊＊＊＊＊＊

And lastly........

Here at the conclusion,
we should again think about the evolving format of textbooks:

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