Logic and Critical Thinking

Course Code: LOCT 1011

Lecture Notes

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What is the course of Logic and Critical Thinking?

- this course aimed at making students capable of constructing their own good arguments, evaluating the arguments of others and critically examine assumptions, hypotheses and theories in their interaction with others
- It helps students to think critically and make genuine decisions in issues that need human rational intervention

Course Content

- Chapter One: The Nature Philosophy
- Chapter Two: Basic Concepts of Logic
- Chapter Three: Language: Meaning and Definition
- Chapter Four: Basic concepts of Critical Thinking
- Chapter Five: Logical Reasoning and Fallacies
- Chapter Six: Categorical Proposition

Chapter One: The Nature of Philosophy

Objectives of the chapter:

- Understand the meaning, nature and features of philosophy;
- Recognize the major fields of philosophy; and
- Understand why it is so important to learn logic and philosophy.

- **Philosophy:** is the study of general and fundamental problems concerning matters such as existence, knowledge, truth, beauty, law, justice, validity, mind, and language.

1.1. Meaning and Nature of Philosophy

- **Etymologically:** from two Greek words: ‘philia’ and ‘sophia’ which means Love and wisdom respectively!
- Hence, it means love of wisdom! It is an excessive, inherent and endless desire (tendency and inclination) towards knowledge; wisdom means understanding and grasping the totality of something; theoretical, practical and normative (*ethics*) knowledge
- Philosophical questions:
  - What is …?
  - How can we Know? What does it mean to know?
  - What should we do?

1.1. Meaning and Nature of Philosophy

- It is an attempt to understand the nature of the universe, particular things in the universe and the nature of the relationship between things in the universe
- It is critical reflection and examination on the meaning of life, conventions, assumptions, hypotheses and worldviews, legal and institutional frameworks.
- It is the development of critical habits, the continuous search for truth, and the questioning of the apparent.
- **Philosophy begins from wonder!**
  - *"Wonder is the feeling of a philosopher, and philosophy begins in wonder" (Aristotle)*

- Philosophy deals with **questioning the apparent**; to **go beyond the common understanding**, and to speculate about things that other people accept with no doubt.
- The **philosophical enterprise**: is "*an active imaginative process of formulating proper questions and resolving them by rigorous, persistent analysis*". (Vincent Barry).
- Therefore, philosophy is a rational and critical enterprise that tries to formulate and answer fundamental questions through an intensive application of reason.

Philosophy is a rational attempt to look at the world as a whole.

Philosophy is the logical analysis of language and the clarification of the meaning of words and concepts.

Philosophy is a group of perennial problems that interest people and for which philosophers always have sought answers

- Philosophy is an activity of the mind
- Its is knowledge of practical, theoretical and normative aspects of things
- To be a Philosopher is doing and living philosophy; living a rational life
- It is a Contemplative, speculative activity
- As a broader subject that touches every aspect of life, it has its own basic branches
- It is a bird’s eye view of the world using an eagle’s eyes.

1.2. Fields of Philosophy

1.2.1. Metaphysics: “what is …?” ontology

the question of “being qua being”

- studies the ultimate nature of reality or existence.
  - *Does God exist, and if so, can we prove it?*
  - *Are human actions free, or predetermined by a supernatural force?*
- It is evident that the question of reality is not as simplistic as it appears.
- Example: What is exactly the nature of the floor upon which you stand?
  - It is obviously flat, solid, and smooth; it has a particular color; it is composed of an identifiable material, such as wood or concrete

- **Metaphysical questions** can be divided in to four aspects:
- **Cosmological**: study of theories about the origin, nature, and development of the universe as an orderly system.
- For example for Leibniz, there is a “pre-established harmony of things”
  - E.g. how the world comes? By design or accident
- **Theological**: religious theory that deals with God; immortality of the soul; the nature of relation between the natural and supernatural worlds; spirit and matter.
  - E.g. If God is both all good and all powerful, why does evil exist?

- **Anthropological**: deals with the study of human beings.
  - What is relationship between mind and body?
  - Is mind more fundamental than body?
  - Are people born good, evil, or morally neutral?
  - Do we have free will or predetermined?
  - What is the meaning, purpose, and destiny of human life (what is the good life)?
- **Ontological**: the study of the nature of existence, primordial matter of the universe?

1.2.2. Epistemology: Study about knowledge, studying about the nature, source, extents and scope of human knowledge

- What is true?" and "How do we know?"
- *Skepticism and agnosticism???*
- ***Sources of Knowledge:***
  - ***Empiricism:*** knowledge obtained through the senses/experience. (John Locke, David Hume and George Berkeley)
  - *Mind is tabula rassa (white paper nothing written on it).*
  - ***Rationalism:*** claims that humans are capable of arriving at irrefutable knowledge independently of sensory experience. Knowledge is based on reason. (Rene Descartes, Spinoza, Leibniz); there are innate ideas, *a priori* knowledge
  - Synthetic *a Priori* knowledge (Immanuel Kant)
  - *Intuition: immediate cognition;* ***knowledge which is immediately evident without experience****.*
  - ***Revelation:*** *religious knowledge as a source of knowledge. (St. Augustine, St. Thomas Aquinas, Anselem)*

1.2.3. Axiology

- From two Greek words: *Axios* (worth, value) and *logy* (study)
- "What should we do?"
- Axiology is the philosophical study of value, which originally meant the worth of something.
- It includes the studies of moral values, aesthetic values, as well as political and social values.
- Deals with: **aesthetics, ethics, and social/political philosophy.**

- **Aesthetics:** study of beauty; ontology of beauty
- **Ethics**: study of **morality/action of right of wrong.**
  - **Meta-ethics: investigation of the meaning of good or bad.**
  - **Sources of moral standards (religion, law, culture, nature)**
  - **Normative ethics: studies moral principles of conducts.**
    - **Can be consequential, deontological, virtue.**
  - **Applied ethics:** explain, justify, apply moral rules, principles to pressing practical problems that entail ethical dilemmas

it is philosophical reflection on the workings of our institutions, manners of actions and behaviors of individuals and groups, and reflection on the most pressing problems that emanate from maliciousness of professionals, contradictions in science and technology and contradictions in development projects and plans of states, governments …

- **Social/political philosophy:** studies about of the value judgments operating in a civil society. “Power-authority, justice and Government?”
  - *What form of government is best?*
  - *What economic system is best?*
  - *How can we manage the employment of power, authority?*
  - *What is justice/injustice?*

Core branches of Philosophy

- There are other branches of philosophy like:
- Philosophy of religion
- Philosophy of language
- Philosophy of Law - jurisprudence
- Philosophy of Mind
- Philosophy of Science and Technology
- Applied Ethics (Environmental Ethics and Justice, development ethics, professional ethics)
- Logic and Critical Thinking

1.3. Importance of philosophy

- *to examine one's life in the world,*
- *to actualize our selves.*
- *Intellectual and Behavioral Independence (helps us to cultivate the moral and intellectual virtues)*
- *Reflective self-awareness… knowing your self.*
- *Flexibility, Tolerance, and Open-Mindedness*
- *Creative and Critical Thinking*
- *To deal with uncertainty of living*

Chapter 2:Basic concepts of Logic

Contents of the Chapter

2.1. Basic Concepts of Logic: Logic, Arguments, Premises and Conclusions, Statements, Inferential Link (Claim)

2.2. Techniques of Recognizing Arguments

2.3. Types of Arguments: deduction and induction

2.4. Evaluating arguments (Validity, Soundness, Strength, Cogency)

2.1. Basic concepts of Logic: Argument, premise and conclusion

I. Meaning:

- Etymologically, the term" logic" is derived from the Greek word **"Logos"** which means reason, thought, principle, law, rule, system, language, discourse, explanation, truth, reality etc.
- Logic is a systematic law governed and structured representation of truth about reality based on sufficient reason in understandable and meaningful way.
- It is an attempt to codify the rules of rational thought.
- It is the science that evaluates arguments
- Logic is the science and art of reasoning process and argumentation; those principles, laws, rules and methods which the mind of man in its thinking must follow for accurate and secure treatment of truth.
- In other words, logic is the study of methods for evaluating arguments.

Cont….

II. Purpose of Logic

- The primary task of logic is to setup criteria for distinguishing good arguments from bad ones.
- The purpose or objective of logic is to test, evaluate and analyze arguments of one’s own and the arguments of others.
- To increase confidence of arguers.
- Gives us rational self-confidence in accepting or denying the ideas and positions of others

The meaning of Argument

- **Argument**

- In logic, **argument** is a group of **statements** in which one (premise) provides support to believe in another (conclusion).
- It doesn’t mean ***verbal fight***.
- Analyzing arguments is important to distinguish premises from conclusion.
- The reasoning process expressed by an argument is said to be **inference**.
- Inferential claim is a flow of ideas, that assures the consistency and coherence of thought or reasoning process.

Cont..

- **Premise**

- is the statement which provides reason (evidence) for believing the truth of the conclusion
- It is the statement on the basis of which the conclusion is affirmed.

- **Conclusion**

- is the statement that is claimed to follow from the premise or affirmed on the basis of the premise
- It is the logical outcome of correct reasoning process based on sufficient evidence.

- **Statement (proposition)**

- It is a declarative sentence that has truth values of either true or false
- a sentence used to assert or deny something and evaluated as true or false

Cont..

Example:

- Hawassa is the capital city of Tigray Region. (F)
- Ethiopia is endowed with various heritages. (T)
- **Note that all statements are sentences but not all sentences are statements.**

Example:

- How old are u? (Question)
- Stop cheating! (Command)
- Let us go to Lake Langano today (proposal)
- We suggest welfare state to Ethiopia (suggestion)
- You are beautiful! (Exclamation)

Cont..

- **Inferential Claim (Inference, inferential link)**

Refers to the link or flow of ideas between premises and between premises and the conclusion

- It is one of the necessary conditions that makes passages argumentative passages
- Without inferential link, any passage cannot be an argumentative passage

Recognizing Premise and Conclusion

- **There are two ways of identifying conclusion and premises**
  1. **Using indictors:**
     - Conclusion follows from the conclusion indicator and premises follow from premise indicators.

Premise Indicators	Conclusion indicators
Since	Therefore
as indicated by	wherefore
because	accordingly
for	Hence, thus
in that	we may conclude
may be inferred from	entail that
as	consequently
given that	it follows that
seeing	Implies
for the reason that	for this reason
owing to	in consequence
indicated by	proves that, as a result
may be deduced from	I conclude that

  - Mere occurrence of indicators is not guarantee for the existence of an argument.
- E.g. since 1991, Ethiopia has adopted ethnic federalism
- Sometimes we can use single premise indicator to indicate two or more premises often followed by conjunctions like ‘and’ and this semicolon ‘;’

Cont..

II. using inferential claim

- It implies by studying the nature of statements (statements that serve as evidence or a statement stated as the final assertion).
- If a statement is given as the main point of the argument or as a closing statement, it is a conclusion.
- On the other hand, if the statement is taken as information, reason or evidence, it is premise.

Cont..

Example:

1. Women of the rural society are not empowered. The majority of them lack education opportunity and equal access to resources.
2. These days quality of Education has reduced in our country. Students score has reducing yearly.
3. The sky is dark. There will be rain today.

2.2. Recognizing Arguments

- **How can we determine whether a passage is an argumentative passage or not?**
- **Two methods to recognize arguments**
- **I. There are two criteria for a passage to be argument:**
  - **Factual Claim (**At least one of the statements must claim to present evidence or reasons**). A claim that something is true.**
  - **Inferential claim (**there must be a claim that something follows from the alleged evidence).
- Inferential claim can be **explicit** (indicated by indicators) or **implicit** (identified by inferential relationship).

Cont..

II. Knowing some of the **primarily** or naturally non-argumetative passages

The following are non-argument forms:

- **Passage lacking an inferential claim**
  - Piece of advice
  - Warning
  - Statement of belief or opinion
  - Loosely associated statements,
  - A report
  - Expository passages, Illustrations and Explanations

- Note
- In the case of Expository passages, Illustrations and Explanations, though they are primarily written for non-argumentative purposes, sometimes if the issue is controversial they can serve as arguments as they appear or with slightest re-arrangements.
- Expository passages are passages that begin with topic statements and follow with additional statements that develop the topic statement.
- There are three states of matter: solid, liquid and gas. Solid are….. Liquid are …. And gases

Cont..

- **Conditional Statements**

Conditional statements have two parts: **antecedent and consequent**

- If---***antecedent-***----then---***consequent***---------
- ***------Consequent*** ------ if -----***antecedent------***

- E.g. If **I study hard**, then **I will pass the exam**.
- **Summary on Conditional Sentences:**

❖ Single conditional statements cannot be arguments

E.g. If iron is dense than mercury, then it will float in mercury.

❖ A conditional statement may serve as either the premises or conclusion (or both) of an argument.

E.g. If any natural resource is within the boundary of any nation, then the nation can invest on it.

River Abay is within the boundary of Ethiopia.

Therefore, Ethiopia can invest on it, including building a hydroelectric dam.

❖**The inferential content of a conditional statement may be re -expressed to form an argument.**

- **E.g.** If both Saturn and Uranus have rings, then the Saturn has rings.
- The inferential content of this CS may be re-expressed to form argument:
- Both Saturn and Uranus have rings.
- Therefore, Saturn has rings.
- If Kebede is the father of Hailu, then Hailu is the son of Kebede.
- Kebede is the father of Hailu. Thus, Hailu is the son of Kebede.

Cont..

- Conditional statements are especially important in logic because they express the relationship between **necessary** and **sufficient** conditions.
- ‘A’ is a sufficient condition for ‘B’ = occurrence of A is needed for occurrence of ‘B’
- ‘A’ is a necessary condition for ‘B’ = B can’t occur without the occurrence of A.

Here is another example:

- **If oxygen is not present, then there can be no fire.**

It means that oxygen is a necessary condition for the occurrence of fire; that is, in the absence of oxygen, fire cannot exist.

If there is rain, then streets are wet.

Rain makes streets wet, but it is not the only one. Streets can be wet even without the presence of rain, like for example by leakage of pipe water.

2.3. Types of Arguments

- Arguments can broadly be classified as **deductive** and **inductive**.
- Deductive and inductive arguments differ in the strength of the inferential claim of the argument.
- They differ with respect to the ways in which the premise supports the conclusion.

❖**Deductive Arguments**

- Conclusion is claimed to follow from its premises with absolute necessity.
- Makes a claim that the conclusion follows from the reason, evidences, or premises with the force of necessity.
- Involve necessary reasoning
- If the premises are true then it is impossible for the conclusion to be false.

Examples:

- All human beings are mortal. Taye is a human being. Therefore, Taye is mortal.
- All sub- Saharan countries are least developed countries. Ethiopia is found in sub- Saharan region. It follows that Ethiopia is a least developed country.

2. Inductive Arguments:

- It is one whose conclusion is claimed to follow from its premises only with probability.
- It is **improbable** for the conclusion to be **false if the premises are true**.
- Involves probabilistic reasoning process
- Example: majority of students in this class are females. Hiwot is a member of this class. Therefore, probably Hiwot is a female.

Cont..

We can identify the type of arguments using 3 methods:

1. **Using Special Conclusion indicators:**

Deductive Argument Conclusion Indicators: necessarily, certainly, absolutely, definitely, etc.

Inductive Argument Conclusion Indicators:

Likely, plausibly, probably, reasonable to conclude

“It must be the case that…” (can indicate both)

2. Studying the Actual Strength of the Premise and the Conclusion:

If the conclusion actually does follow with strict necessity from the premises, the argument is clearly deductive.

Example

All dogs are mammals.

Boby is a dog.

Therefore, boby is mammal.

3. The Character or Form of Argumentation the Arguer Uses

Deductive Argument Forms

I. Argument based on mathematics: arguments that are based on arithmetic and geometric calculations; except statistical probabilities

e.g. I **have one red pen and two black pens. Hence, I have three pens.**

II. An argument from Definition

e.g. **God is omniscient. Hence, he knows every thing**.

All bachelors are unmarried men. Kebede is a bachelor. Therefore, necessarily Kebede is unmarried man.

Angel is honest; it is follows that Angel tells the truth.

III. Syllogism (two premises and one conclusion)

- **Categorical syllogism (All, Some and None)**
- **Hypothetical syllogism** (**syllogism having a conditional statement for one or both of its premises**.)
- **Disjunctive syllogism** (syllogism having “either…… or” statement)

Example 1:

- *All Egyptians are Muslims.*
- *No Muslim is a Christian.*
- *Hence, no Egyptian is a Christian.*

Example 2:

If there is democracy in one country, then there would be rule of law. If there is rule of law, there would be development. Hence, if there is democracy in one country, then there would be development.

Example 3:

Robert is either an American or Ethiopia. Robert is not an American. Hence, Robert is an Ethiopian.

III. Inductive argument Forms

A. Argument based on prediction: predicting about the future based on past experience and present reality.

E.g. ***Yesterday and today, Bahir Dar is sunny. Hence, Bahir Dar may be sunny by tomorrow.***

B. Argument from analogy: based on similarity between two things

Aster's Car is Toyota and model 1996 made in Japan and travels 300 kms/hr..

Hana's Car is also Toyota and model 1996 made in Japan. Therefore it is probable that Hana's car ban travels 300kms/hr.

Computer A and Computer B both are Toshiba products manufactured in 2012.

Computer A is fast processing.

Hence, Computer B is fast processing.

C. Inductive generalization:

E.g. About 25 students in this class (40 students) passed the exam. Then it is probable that all of the students have passed the exam.

D. Argument from authority: based on the claims of an expert in certain subject matter.

E.g. ***According to Dr. Kebede who is and expert of epidemiology, there is a sign of certain pandemic in this area. Therefore, it is probable that the disease will expand within few months.***

E. Argument based on signs: signs are symbolic representations of realities.

E.g. *Across the road, I am looking the picture of children holding exercise book. Hence, there may be a school around.*

F. Causal Inferences: based on the cause and effect relationship of things.

E.g. The cloud is becoming **dark** and the thunder is **roaming**. So, let us go home quickly, there is probability of rain.

2.4. Evaluation of Arguments

Argument type	Evaluation Criteria
Deductive	❑ Valid ❑ Invalid ❑ Sound (Valid Argument + all true Premises). **It is the most perfect DA** ❑ Unsound
Inductive	• Strong • Weak • Cogent (Strong argument + all true premises). It is the most perfect IA.

Deductive Argument Evaluation

Validity: is an argument in w/c it is impossible for the conclusion to be false and the premise is true.

Two steps

Step 1: assume the premises to be true

❖Check the reasoning process

E.g.

1. All cats are ants.

All ants are mammals.

Therefore, necessarily all cats are mammals.

2. All cows are animals.

All mammals are animals.

Therefore, all cows are mammals.

Argument 1 is valid while argument 2 is invalid.

Cont …

- Step 2: soundness; whether an argument contains correct reasoning process and it contains all actually (factually) true premises.

Sound = valid+ all true premises

All cows are mammals.

All mammals are animals.

Therefore, necessarily all cows are animals.

- In evaluating or constructing good deductive arguments, sound deductive argument is good argument in the strict sense of good arguments.

Cont..

Case 1: True P + True C (Valid)

E.g. 1:

- All television networks are broadcast media.
- **Fana** TV is a television network.
- Therefore, **Fana** is a broadcast media.
- This argument is an example of sound argument.

Sound Argument = Valid Argument + All Premises True

E.g2. True Ps + True C (Invalid)

- All cows are animals.
- All mammals are animals.
- Therefore, all cows are mammals

Cont..

Case 2: True premises and False conclusion (Always invalid)

E.g. 1:

All Ethiopians are mortal (T)

President Trump is mortal (T)

Hence, Pr. Trump is an Ethiopian (F)

E.g. 2:

- All birds are animals (T)
- All dogs are animals (T)
- Therefore, all birds are dogs (F).

Case 3: False Premises and True Conclusion

I. Valid:

All birds are Mammals. (Fp1)

All Women are birds (Fp2)

So, all women are mammals. (Tc)

II. Invalid:

All birds are mammals.

All Ostriches are mammals

All ostriches are birds.

- **Case 4: False premises and False Conclusion**

Valid:

All Americans are Ethiopians

All Egyptians are Americans.

So, All Egyptians are Ethiopians.

Invalid:

All Birds are Mammals

All ants are Mammals

So, All ants are Birds.

Inductive Argument Evaluation

Step 1. Strength

- Assume all the premises to be true
- Check the reasoning process
- check the status of probability

This bag contains 100 fruits; 50 apples, 30 oranges and 20 lemons. All previously randomly selected 50 fruits are found to be 25 A, 15 O and 10 L. Therefore, the next fruit to be randomly selected will be _____.
Apple, strong; Orange intermediate and Lemon weak.

Inductive Argument Evaluation

- Step 2: Cogency
- Cogent= Strong+ all true premises

E.g.

All previous Ethiopian PMs were males. Ethiopia held its sixth national election last month and will announce its elected PM after few months.

Therefore, probably the next PM will be a male.

- In evaluating or constructing good inductive arguments, cogent inductive argument is good argument in the strict sense of good arguments.

Chapter Thee: Language: Meaning and Definitions

3.1. Function of Language

I. Expressive/emotive function of language

- Used to express our feelings and emotions.
- Can’t be evaluated as true or false.

Example: I dislike logic.

I hate him.

II. Directive Function

- To give order and command
- Can’t be evaluated as true / false.

EXAMPLE:

Leave me alone

What is your name?

Do not close that door.

Cont..

II. Cognitive (Informative) Function : share and transfer knowledge, information and experience

To enhance communication, to assume consensus or approximately unanimity of understanding and thought

- Conveys information about something.
- Refers to the content of something.
- Communicates the meaning of something concepts (terms).
- Can be evaluated as true/false.
- It is formal and cares about proper grammar and selection of terms and expressions

Example:

1. Ethiopia is a developed country.
2. Hawassa city is a capital of SNNPRS

Challenges of cognitive function of language

- Always you are expected to avoid emotive use of language in logic and argumentation and use cognitive function of language properly.
- **Two basic challenges or problems of cognitive function of language**
- **Vagueness of terms:** lacking precise and exact meaning, allow for continuous range of interpretations
- Poor, rich, fresh, light-bright, beautiful, love, hatred
- **Minimize** vagueness by contextualizing the applicability of the term.
- Poor is someone whose monthly income is less than or equal to 500 Eth. Birr.

- **Ambiguity:** there are terms that entertain more than one clear and understandable meaning. Right, law, bank, light, win
- We can avoid ambiguity by using single meaning at a time, specifying which meaning are we using.

Cont…

3.2. The Intensional and extension of terms

Term is a subject of statement that contains **proper names**, **common names** and **descriptive**

Proper Name	Common Name	Descriptive Phrases
Ethiopia John Kidist Ras Dashen	House Person Animal	The late president of Ethiopia Third world countries Those who work hard

Cont..

- **Note that** verbs, adverbs, prepositions, adjectives and conjunctions are not terms.
- There are two meanings of terms**: intensional and extensions**
- **Intensional meaning:** consist of qualities and attributes that the term **connotes**.
- **Extensional meaning:** consists of the **members** of the term denotes.

Cont..

- The intentional meaning of a term is called ***intension or connotation***, and the extensional meaning of is called ***extension or denotation***.

Example

1. **Ship** is 'vehicle for conveyance on water' (**Intention**)

An animal is a living thing that naturally moves from place to place in its own inherent impulse.

2. Ship include cargo ship, passenger ship, battle ship, and sailing ship (**extension)**

Animals include mammals, cattle, vertebrates and reptiles.

Cont..

3. "**Inventor**" means a person who is, clever, intuitive, creative and imaginative.

4. "**Inventor**" means such as Thomas Edison, Alexander Graham Bell, and Samuel F.B. Morse. (**N.B**:

- **Connotation of a term remains more or less the same from person to person and from time to time.**
- **The denotation of a term also remains the same from person to person, but it may change with the passage of time.**

Cont..

- So, some terms are **empty extension**.
  - No class member for the term
  - E. g. Dinosaur, Current king of Ethiopia, ጭራቅ

- If terms have extension, they have intention
- But, if terms have intention, they might not have extension.
- So intension determines extension.

Cont..

- **Terms may be put in the order of increasing intention, increasing extension, decreasing intention, decreasing extension.**
- **Increasing intention:** a series of terms from more general and difficult to define to more specific and easier to tell the attributes.
- E.g. Animal, mammals, cattle, goat
- **Increasing extension:** if the term is not empty extension it is arrangement of terms from the one that has less number of members to the one that contains more members
- The order of **decreasing intension** is the reverse of that of increasing intension.

Cont..

Increasing extension (decreasing intension)

Africa, East Africa, Ethiopia, Addis Ababa

Increasing intension (decreasing extension)

Cont..

Exceptions:

- **There are certain cases where there is empty extension but increasing intension.**
- **Example: Unicorn, unicorn with blue eyes, unicorn with blue eyes and green horn.**

- **This example illustrates:**
- Existence of empty extension.
- Increasing intention
- Constant extension.

Cont..

- **There are also cases where there no empty extension, but increasing intention.**
- Example: Living human being; living human being with a genetic code; living human being with a genetic code and a brain; living human being with a genetic code, a brain, and a height of less than 100 feet
- ***This example illustrates increasing intension but constant extension.***

Definitions and Their Purpose

- **Definition is** a group of words that assigns a meaning to some word or group of words. Accordingly, every definition consists of two parts: the **definiendum** and the **definiens**.
- The **definiendum** is the word or group of words that is supposed to be defined, and
- the **definiens** is the word or group of words that does the defining.

•E.g. ‘‘Tiger” means a large, striped, ferocious feline indigenous to the jungles of India and Asia.

- **Tiger = definiendum**
- **Difiniens: everything after the word ‘‘means’’**

Two problems of Intensional meanings

- 1. There may not be direct relation between proper names and attributes of things named
- Tracing the historicity of naming and other associated issues
- E.g. Bereket (someone who is….; and interview with someone who coned the name and the reason behind the naming)
- 2. Subjectivity of connotation (e.g. there may be difference in defining “Lion” between one who hates a Lion and another who loves it)
- *We use Conventional connotation: connotation that is used by the speakers of a given language and agreeable among certain group of people.*

3.3.Types of Definition

There are five types of definitions

1. Stipulative Definition

- Assigns a meaning to a word for the first time.
- Creating a new word or give a new meaning to an old word.
- Its Purposes: create secret codes, minimizing complexity of expressions, help us introduce new inventions (acquaintance), and enhance neutrality and minimize emotionally engendered expressions
- Can’t be evaluated as true or false, instead it is evaluated as either appropriate or inappropriate
- It may gradually become lexical definition when it becomes part of established language and common use

Cont..

- Example:
  - ‘‘**Tigon’’** refers to ‘‘offspring of male tiger and female lion’’
  - ‘‘**Operation Barbarosa’’** was the name the Germans gave to the invasion of Russia; and
  - **‘‘Operation Overlord’’** was the name the allied forces gave to the planned invasion of Normandy
  - ከርቸሌ፣ ዘብጥያ፣ ሸቤ፣ እስር ቤት፣ ማረሚያ ቤት

Cont..

2. Lexical Definition

- Used to report the meaning that a word already has in a language or from one language to another language.
- Dictionary definitions are all instances of lexical definitions.
- Can be evaluated as true/false.
- Has purpose of eliminating **ambiguity** of a word.
- It help us to learn new languages

Cont..

3. Précising Definition

- It is telling the approximate or probably exact meaning of terms.
- Has purpose of reducing vagueness.
- An expression is **vague** if there are borderline cases in which it is impossible to tell if the word applies or does not apply.
- Words such as ‘‘fresh,’’ ‘‘rich,’’ and ‘‘poor’’, “love” are vague.
- So, there is a need for a law to be applied.
- Example: *‘Poor’ means having a daily income of less than $1.2*

Cont..

- **The terms ‘‘force,’’ ‘‘energy,’’ ‘‘acid,’’ ‘‘element’’, ‘‘number’’ ‘‘equality,’’ ‘‘contract,’’ and ‘‘agent”, “rich”, “poor”, etc… requires precise definition**.
- N.B: precise definition differs from **stipulative** definition in that assignment of meaning in later case is arbitrary but not in case of precise definition.

4. Theoretical Definition

- Assigns a meaning to a word by suggesting a theory that gives a certain characterization to the entities that the term denotes.
- Can’t be evaluated as true/false if the context is not specified.
- Not all theoretical definitions are associated with science.
- Example:
  - ‘‘Light’’ is a form of electromagnetic radiation.
  - ‘‘*F = MA*.’’
- They have two purposes: creating acquaintance with certain theory and enhancing open mindedness
- Good according utilitarian theory of ethics is something that maximizes the happiness of greatest number while good according to deontological ethics is desirable regardless of its consequences.

5. Persuasive Definition

- To persuade/convince listeners/readers.
- To change the attitude of audiences.
- To win the acceptance of audiences.
- Psychological imposition of thoughts and opinions
- **Example:**
  - “Federalism” is a political intrigue that provides legitimate ground for the emergence of new regional warlords.
  - “Federalism” is a system of government that allows each region the right for self administration.
  - “Abortion” means the ruthless murdering of innocent human beings.
  - “Taxation” means the procedure by means of which our common wealth is preserved and sustained.

Cont..

- **Exercise 2: determine the type of definition**
- Let us use the word "**grellow**" to mean the color of things that are either green or yellow.
- "Miracle" means an event that (a) is an exception to a law of nature and (b) is brought about by the decision of divine being.
- "Tall man" male human over 6 feet in height.
- "Tome" large book.
- "A deductively sound argument" is one that (a) has only true premises and (b) is valid.

3.4.Techniques of intentional and extensional definitions

A. Techniques of Intensional Definition

1. Synonymous Definition

- Using a Word Having Identical Meaning.
  - Example:
- “Trouble” means difficulty.
- “Student” means pupil.
- ‘‘Physician’’ means M. doctor.
- ‘‘Intentional’’ means willful.
- ‘‘Voracious’’ means ravenous.

Cont..

2. **Etymological definition**

- Using root/ancestor words.
- Example
- “Ethics” is from Greek word Ethos, meaning habit and tradition.
- “LOGIC” is from Greek word logos, means science of reasoning.
- ‘Morality’ is from Latin, *moralis*, which means custom and tradition.

Cont..

3. **Operational definition**

- Specifies set of procedures
- Indicates actions and procedures
- Assigns experimental procedures.
  - **Example:**
- “Insane” means when a person lost control of his/her consciousness and perform unusual things.
- “Acid” means a substance that turns the color of blue litmus paper red, when brought contact with it.

Cont..

4. Definition by Genus

- **Avoids ambiguity/vagueness of terms.**
  - **Genus =** relatively larger class.
  - **Species =** relatively smaller sub-class
  - **Difference =** attributes that distinguishes species within genus**.**
- **Species Difference Genus**
- **“Mother” means female parent**
- **“Ice” means frozen water**
- **“Kitten” means young cat.**

Cont..

B. Techniques of Extension

1. **Demonstrative (Ostensive)**

- **Assigning meaning by point out an object.**
- **Example:**
  - » ‘‘Chair’’ means this and this and this—as you point to a number of chairs, one after the other.
- “Flower” means  one (using a picture that demonstrates flowers.)

Cont..

2. Enumerative:

- **By listing partial/complete members of the class**
- **Example:**
- ‘‘Actor’’ means a person such as Nick Nolte, Al Pacino, or Richard Gere.
- “Continent” means such as Africa, Asia, Latin America and Europe
- “Athlete” means such as Kenenissa Bekele, Tirunesh Dibaba, and Meseret Defar.

Cont..

3. Definition by Sub-class

- By listing sub groups/sub-class.
- Example:
- “Plant” means such as grasses, fruits and vegetable.
- “Vertebrate” means such as reptiles, birds, or mammals.

Techniques of Dentition and their relationships with types of definition

- **Techniques of Intentional definition**
  - **Synonymous =** can serve as a method of constructing lexical definition
  - **Etymological =** can serve as a method of constructing lexical definition.
  - **Operational =** for stipulative, theoretical, lexical (not always), precise and persuasive
  - **Genus and difference = most effective to construct all definitions.**
- **Techniques of Extensional Definition**
- To construct lexical and stipulative definition, and sometimes theoretical and persuasive definition, but not precise definition.

Criteria of Good Definitions

- Proper Grammar
- Telling the essential Meaning
- Neither too broad nor too narrow
- Should Avoid Circularity
- Should not be negative when it can be affirmative
- Avoid figurative, ambiguity, obscurity, metaphoric speech, vagueness…
- Avoid affective terminology
- Should indicate the context

- Criteria of lexical definitions

The 8 criteria of definitions

Chapter Four: Critical Thinking

Chapter Five: Informal Fallacies

- Principles of good arguments

Chapter Five: Informal Fallacies

- Fallacy refers to **error in reasoning either intentionally or due to ignorance (lack of knowledge on how argue)**
- It is from Latin word**, fallacia** means delude, illusion, cheat.
- Fallacies always seem good arguments; but in reality they are bad arguments.
- Can be committed **intentionally** or **unintentionally.**
  - Committed when the speaker/writer fails to provide sufficient evidence or reason for his/her claim.
  - Can be **formal** and **informal**.

Cont...

A. Formal Fallacies

- Found in incorrect deductive arguments.
- Fallacies due to invalidity of arguments.
- When there is a problem in the form/structure, invalid.
- Example:
- All elephants are animals. (T)
- All mammals are animals. (T)
- Therefore, all elephants are mammals. (T)

B. Informal Fallacies

- Are those that can be detected only through analysis of the **content of the argument**.
- Theses fallacies are committed when there is a problem in the information flow or flow of ideas from premises to the conclusion

Consider the following example:

- All factories are plants.
- All plants are things that contain chlorophyll.
- Therefore, all factories are things that contain chlorophyll.

Cont.

Form:

All A are B.

All B’ are C.

All A are C.

Invalid form, and invalid content. Bcz. The argument has true premised and false conclusion.

- Some fallacies work by getting the reader or listener to feel various emotions, such as fear, pity, or camaraderie, and then attaching a certain conclusion to those emotions.

Cont..

3.2. Types of Informal Fallacies

- We can categorize informal fallacies in to Five:
- Fallacies of Relevance
- Fallacies of Weak Induction
- Fallacies of Presumption
- Fallacies of Ambiguity
- Fallacies of Grammatical Analogy

1. Fallacies of Relevance

committed when premises are logically irrelevant to the conclusion.

- Yet the premises are relevant psychologically.
- The connection between premises and conclusion is emotional.

Cont..

- **Include :**

❖**Appeal to force (**Argumentum ad Baculum: Appeal to the “Stick

❖Appeal to Pity (Argumentum ad Misericordiam)

❖ Appeal to the People (Argumentum ad Populum)

❖ Argument Against the Person (Argumentum ad Hominem)

❖ Accident

❖Straw Man

❖ Missing the Point (Ignoratio Elenchi)

❖ Red Herring

A. Fallacies of Relevance

1. Appeal to Force

- Arguer 1: poses harm to the second arguer to get acceptance of the conclusion.
- This harm can be: **physical torture or psychological terror, anxiety, fear in the mind of the audience**

A. Fallacies of Relevance

•Examples:

1. Ethiopia is the best country that has its own precious cultures. If you don't accept this, I will blow your head by this pestle. (Physical threat)

2. "I'm the best man for the job. Anyone who says otherwise is in for a world of hurt." (Physical Threat)

3. You should accept what I say, unless you know that I am brother of your wife; you will miss her one day. (Physiological threat)

It does not mean that all appeal to forces are fallacious. We can use force rightly, properly and rationally.

A. Fallacies of Relevance

2. Appeal to pity

- Occurs when an arguer attempts to support a conclusion by merely evoking **pity** from the reader or listener.
- Creating feeling of enthusiasm or compassion in the mind or heart of the audience
- It is opposite of appeal to force
- Note that not all appeal to pities are fallacious
- Right appeal to pity in charity and humanitarian aids can be rational.

A. Fallacies of Relevance

Example:

- ***Taxpayer to judge:*** Your Honor, I admit that I declared thirteen children as dependents on my tax return, even though I have only two. But if you find me guilty of tax evasion, my reputation will be ruined. I'll probably lose my job, my poor wife will not be able to have the operation that she desperately needs, and my kids will starve. Surely I am not guilty.

Student to Professor: "But, I really NEED to pass this class. I need this class in order to graduate this semester, and I can't afford to pay for more classes in the future. I already work 60 hours a week and supporting four children all by myself, and I'm barely scraping by as it is. You should give me a passing grade."

A. Fallacies of Relevance

3. Appeal to People:

- **Has two approaches: direct and indirect.**

1. Direct Approach of appeal to people:

- The *direct approach:* arguer addresses large group of people.
- Has the objective of rising a kind of **mob mentality.** This is the strategy used by nearly every propagandist and demagogue.

A. Fallacies of Relevance

2. Indirect Approach of Appeal to People Fallacy

- the arguer aims appealing to individuals separately.
- Three types:
  - **Bandwagon** argument, peer influence, contextual
  - the appeal to **vanity**, the **following the styles of admired personalities**
  - **appeal to snobbery** (Are associated with recognized people) considers oneself as a member of superior and selected group and denigrating others as inferior

A. Fallacies of Relevance

E.g. “Who is going to wear this new fashion T-shirt worn by the famous artist Gosaye for the new Ethiopian Millennium?”

C. Appeal to Snobbery

- **It is an appeal to the desire to be regarded as superior to others.**
- This Jacket is not for ordinary people. If you want to be from among the selected few dignitaries buy the Jacket.

A. Fallacies of Relevance

4. Argument Against the Person (Argumentum ad Hominem)

- This fallacy always contains two arguers.
- The second arguer attacks the second arguer him/herself not his/her idea.
- Has three forms: **abusive, circumstantial and you too (*tu quoque*).**

I. Ad hominem abusive

- The second person responds to the first person's argument by verbally abusing the first person.

A. Fallacies of Relevance

E.g. 1 How a **stingy** person can tell us about charity. Hence, let's stop discussing about these issue raised by Tamirat.

E.g. 2. Before he died, poet Allen Ginsberg argued in favor of legalizing pornography. But Ginsberg's arguments are nothing but trash. Ginsberg was a marijuana-smoking homosexual and thoroughgoing advocate of the drug culture.

A. Fallacies of Relevance

***II. Ad hominem* circumstantial**

- The respondent attempts to discredit the opponent's argument by mentioning to certain circumstances that affect the opponent.

Example:

- Dr. Tewodros advocates a policy of increasing financial spending for higher education. But that is not innocent advocacy, for the reason that he is a college professor and would benefit financially from such a policy.

- "Of COURSE my opponent is arguing against taxation of the rich. Just look at him! He's the richest person in town. There's no way someone like that could argue anything else."

A. Fallacies of Relevance

***III. Tu quoque* (“you too”): accusing the arguer for hypocrisy**

- The second arguer says, ‘‘How dare you argue that I should stop doing *X*; why, you do (or have done) *X* yourself.

Example:

- ***Child to parent:*** Your argument that I should stop stealing candy from the corner store is no good. You told me yourself just a week ago that you, too, stole candy when you were a kid.
- **Selam**: “You shouldn’t eat fast food. I hear it’s really bad for you and could lead to health complications.”
- **Hana**: “Whatever! You eat fast food all the time!”

A. Fallacies of Relevance

- **Doctor**: "I see abnormalities on your breathing and heartbeat. You should stop smoking cigarettes.
- **Patient:** "What do you mean doctor? I have seen you by my necked eyes that the other day that you too were smoking. So, your advice is not correct.

A. Fallacies of Relevance

5. Accident

- Try to apply a general rule to specific situation that cannot be directly addressed by the rule.
- Example:

➢ *Freedom of speech* is a constitutionally guaranteed right. Therefore, Abebe should not be arrested for his “hate” speech that inspired the riot last week.

➢ There is an ethical rule that one must return the property to the right owner. If your friend asks you to return his bullet while he or she is insane or drunk.

A. Fallacies of Relevance

6. Straw man Fallacy

- Distorting the original argument of the first arguer and attacking the distorted version by assuming that the original argument is nonsense. It is missing the charity principle

Example:

- **The student status committee has presented us with an argument favoring game zones in the campus. Students are prioritizing games over study. They intend to spend their time playing than studying. Therefore, their proposal is ill intentioned.**

A. Fallacies of Relevance

- Dr. Belay argues against religious activities in the public schools. For the reasons of Secularism, there are religious institutions and religious activities will disturb teaching-learning process

Second arguer

- Dr. Belay has argued against religious activities in the public schools. Obviously Dr. Belay advocates atheism. Atheism leads to the suppression of all religions and their contributions in the society. We know that religions have their roles in cultivating good behaviors. Is that what we want for this country? I hardly think so. Clearly Dr. Belay's argument is nonsense.

A. Fallacies of Relevance

7. Missing the Point (*Ignoratio Elenchi*)

- This fallacy occurs when the premises of an argument support one particular conclusion, but then a different conclusion, often vaguely related to the correct conclusion, is drawn. Unlike other fallacies of relevance, in this case it is the conclusion that is logically irrelevant to the premise
- The conclusion drawn is not correct based on the given premises.
- Example: Our students' results are deteriorating. This shows that there is a problem in the quality of education. Teachers play significant roles in the quality of education. If they are not assisting our students to score good grades, we have to fire all the professors and replace them with new ones.

A. Fallacies of Relevance ..

- Crimes of theft and robbery have been increasing at an alarming rate lately. The conclusion is obvious: we must reinstate the death penalty immediately.
- X University has a lot of problems. Student serves and facilities are inadequate. Many of the instructors are inexperienced. It follows that; the university should be entirely closed.

A. Fallacies of Relevance ..

8. Red Herring (Off the Truck Fallacy)

- the arguer **diverts** the attention of the reader or listener by changing, shifting the subject to a different but sometimes subtly related topic that is sensitive and eye catching issue.
- Example:
- You are arguing with someone who is the follower of other religion than yours. Your argument was originally on whether the Bible of the Holly Quran is right word of God. If amidst of the debate your opponent changes the issue into religious attack.
- Conflict between Mr. X and Mrs. Y

B. Fallacies of Weak induction

- When the **connection** between **premises** and **conclusion is not strong** enough to support the conclusion.
- They miss the sufficiency principle of good arguments
- Include:
  - Appeal to Unqualified Authority (Argumentum ad Verecundiam)
  - Appeal to Ignorance (Argumentum ad Ignorantiam)
  - Hasty Generalization (Converse Accident)
  - False Cause
  - Slippery Slope
  - Weak Analogy

B. Fallacies of Weak induction

1. **Appeal to Unqualified authority:**

- ***When an authority or witness is not trustworthy due to:***
  - ***Lack of expertise***
  - ***Motive to lie***
  - ***Bias***

  E.g. Dr. Abebe who is a famous Engineer in Ethiopia told me that all development policies of Ethiopia are wrong. It implies that, Ethiopia is following wrong direction of development policy.

B. Fallacies of Weak induction

E.g. 2: According to Mr. John who is the manager of Tobacco company, Tobacco is not an addictive substance and that smoking cigarettes does not produce any addiction. Therefore, we should believe him and conclude that smoking does not in fact lead to any addiction.

- Areas that appear to be overlapping, we need due care or attention to determine who is the right expert.
- Note that there are areas that have no authorities
- For example, religious, ethical, cultural and political claims cannot be justified by an expert in the sense that scientific justifications can be done by the expert.

B. Fallacies of Weak induction

2. **Appeal to Ignorance: when lack of knowledge is assumed as a reason to believe or disbelieve something**

- Something is true because it is not proven false, and the reverse.

1. After centuries of trying, no one has been able to prove that reincarnation occurs. So, at this point, I think we can safely conclude that reincarnation is false.
2. People have been trying for centuries to provide conclusive evidence for the claims of astrology, and no one has ever succeeded. Therefore, we must conclude that astrology is a lot of nonsense.

B. Fallacies of Weak induction

Exceptions:

- **Courtroom procedures**
- E.g. a person is presumed innocent until proven guilty.
- **Some issues don’t require special qualification**
- E.g. No one has ever seen Mr. Andrews drink a glass of wine, beer, or any other alcoholic beverage. Probably Mr. Andrews is a nondrinker.

B. Fallacies of Weak induction

3. **Hasty Generalization (Converse Accident)**

- **Reaching at conclusion based on little evidence/non representative sample.**
- **Example:** I have asked 3 female students for marriage. 3 of them are financial oriented. This implies that all female students are finance oriented.
- Six Arab fundamentalists were convicted of bombing the World Trade Center in New York City. The message is clear: Arabs are nothing but a pack of religious fanatics prone to violence.

B. Fallacies of Weak induction

- **Note that large sample may not always necessary.**
- **Example:**

❖On separate occasions, I drank a bottle of wine and found tasty. Probably, I would find every bottle of wine tasty.

❖ Ten milligrams of substance Z was fed to four mice and within two minutes all four went into shock and died. Probably substance Z, in this amount, is fatal to the average mouse.

- ❖ **These two arguments are not fallacious.**

B. Fallacies of Weak induction

4. False Cause: when the assumed causal connection is found to be logically irrelevant

post hoc ergo propter hoc, *non causa pro causa*, oversimplified cause,

- **Post hoc ergo propter hoc:** Conclude that one event cause another simply because occurred before the proposed effect (temporal precedence).
  - A black cat crossed my path and later I tripped and sprained my ankle. It must be that black cats really are symbols of bad luck.
- **Non-causa pro causa**
- **Oversimplified cause Fallacy**

Cont..

Non-causa pro causa: Not the cause for the cause (temporal coincidence)

  - E.g.

- There are more laws on the books today than ever before, and more crimes are being committed than ever before. Therefore, to reduce crime we must eliminate the laws.
- ሰኔና ሰኞ

Cont..

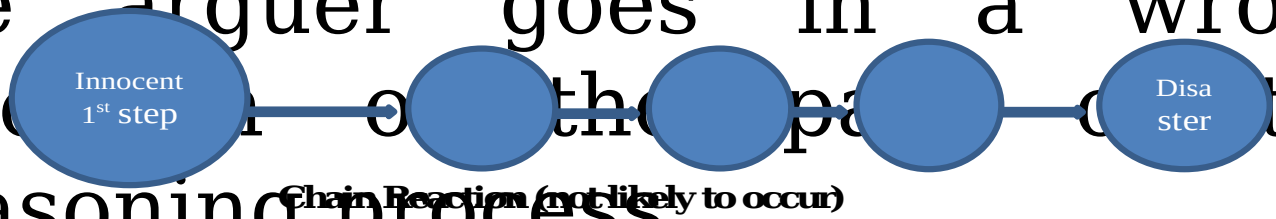
Oversimplified Cause: while there are numerous causes for something a single cause which is one of the true causes is wrongly assumed as the sole or major cause

- The quality of education in X University has been declining for years. Teachers are responsible for the decline quality education in the university.
- Today, all of us can look forward to a longer life span than our parents and grandparents. Obviously, we owe our thanks to the millions of dedicated doctors who expend every effort to ensure our health.

Cont..

5. **Fallacy of Slippery Slope: it is a variety of false cause fallacies**

- It occurs when the conclusion of an argument rests upon an alleged chain reaction and there is not sufficient reason to think that the chain reaction will actually take place.
- Amidst of the reasoning process the arguer goes in a wrong dir[illegible] o[illegible] th[illegible] pa[illegible] o[illegible] the reasoning process



Cont..

E.g.1 . The government should enact a law that female students should not be dismissed from the campus at first year. Kidist was First Year student of X University. She has dismissed during first year of study. As a result, she has joined Bars in Hawassa. This in turn made Kidist carrier of HIV which led her to death.

We should prohibit private guns by law. If we allow each to own their private guns then killing one another will be high. If so there will be a conflict between each family that gradually will lead to civil war and the distraction of the nation.

Cont..

6. **Weak Analogy**:

- Object “A” has attributes of a, b, c and z. object “B” has attributes of a, b & c. therefore, object “B” probably has attribute z.
- EXAMPLE;

1. Tadesse’s new car is bright blue, has leather upholstery, and gets excellent gas mileage.

Tewabe’s new car is also bright blue and has leather upholstery. Therefore, it probably gets excellent gas mileage, too.

2. The flow of electricity through a wire is similar to the flow of water through a pipe. When water runs downhill through a pipe, the pressure at the bottom of the hill is greater than it is at the top. Thus, when electricity flows downhill through a wire, the voltage should be greater at the bottom of the hill than at the top.

C. Fallacies of Presumption

- The premises presume what they purport to prove. When the arguer presumes or hides the key – important premise that is necessary for the subject matter at hand.
- Includes:
  - Begging the question
  - Complex question
  - False dichotomy
  - Suppressed evidence

Cont….

1. **Begging the question:**

- The assumption of the truth of the conclusion need to be proved
- The premise is not obliviously correct; concealed by tricky expressions.

A. It has the **form** **of circular reasoning.**

E.g. 1. God exists, because the Bible says so. Is the bible true? The Bible is true because it is the word of God.

2. Our company is known for its quality products for we have qualified employees. We hired competent employees with promising salaries because our company is profitable from its quality products.

Cont..

Form 2: **restating the same content with different expressions**

E.g. It is proper or justifiable to punish someone who commits serious crimes like treason and genocide by death penalty because it is legitimate and acceptable to subject someone who commits serious crimes to capital punishment.

Cont..

Form 3: Ignoring key premise

- **Murder is morally wrong. Therefore, abortion is morally wrong.**
- **The arguer fails to prove whether abortion is a form of murder or a fetus is a human being**

2. Complex Question/ Loaded Question: seemingly single question is asked and replied either as 'yes' or 'no' then based on the answer another question follows; hence the first question was complex.

E.g.

1. Have you continued drinking in pubs all the night?
2. Are you still proud of yourself being a person having many girlfriends in campus?

3. False Dichotomy: creating a dilemma by assuming as if there are only two alternatives while there are more than two alternatives.

- Black or white kind of thinking
- Limited alternative
- Either---or---fallacy

e.g.

1. If you are not for me, you are against me.
2. Either you have to accept my love request or I will commit suicide.

Cont..

4. Suppressed Evidence: misinterpreting or misunderstanding the context, doing so leads us into contrary conclusion

- The correct evidence is ignored and replaced by irrelevant ones.

1. Three friends are walking in the village and see little dog approaching them. One of them argued that dogs are friendly and they did not pose threat for those who pet them. But the dog attacked them though they try to pet it. This was due to the hidden fact that the dog was showing the symptoms of rabbis.

2. This tablet is very small, beautifully shaped and it smells good. So, it is good I give it to my child.

D. Fallacies of Ambiguity

- **These are committed when the arguer uses ambiguous statements or terminologies**

I. Equivocation: using ambiguous terms

All laws must be interpreted by the judiciary body. The laws of gravity are examples of laws. Therefore, the laws of gravity must be interpreted by the judiciary.

D. Fallacies of Ambiguity

II. Amphiboly: statements that are subject for more than one interpretation.

Standing at the gate of AAU, the statue of emperor Menelik could be easily seen. Therefore, the statue is at the gate of AAU. Or the Statue is visible from the gate of AAU.
The first statement is subject for more than one interpretation.

Technical expressions:

Leave him not kill him .

Leave him, not kill him.

Leave him not, kill him.

E. Fallacies of Grammatical Analogy

- Two arguments with grammatical similarity but different in logical arrangement.

I. Composition : erroneous or wrong transference of qualities from the parts to the whole.

Arg1. This object is made up of atoms. Each atom in this object has its own mass. Therefore, this object has its own mass.

Arg2. This object is made up of atoms. Each atom in this object is invisible with naked eyes. Therefore, this object is invisible with naked eyes.

E. Fallacies of Grammatical Analogy

II. Division: erroneous or wrong transference of qualities from the whole to the parts .

Arg1. This object is made up of atoms. This object has its own mass. Therefore, each atom has its own mass.

Arg2. This object is made up of atoms. This object is visible with naked eyes. Therefore, each atom in this object is visible with naked eyes.

Cont…

Amphiboly:

Due to ambiguous statement.

1. TV advertisement " Come to our Architecture school and learn how to build a house in six weeks' (***period of instruction? Construction***?)
2. Tewodros told me that he always quarrels with his father when **he** is drunk. (Son? Father??)

Cont..

Division:

1. USA is the richest country in the world. Hence, my uncle who lives in USA is rich.
2. Ethiopia is a leading country exporting quality coffee. Gonder, which is one of the regions in Ethiopia, must be the exporter of quality coffee.
3. Salt is non-poisonous. It must be true that its components of sodium and chloride are non-poisonous.

Cont..

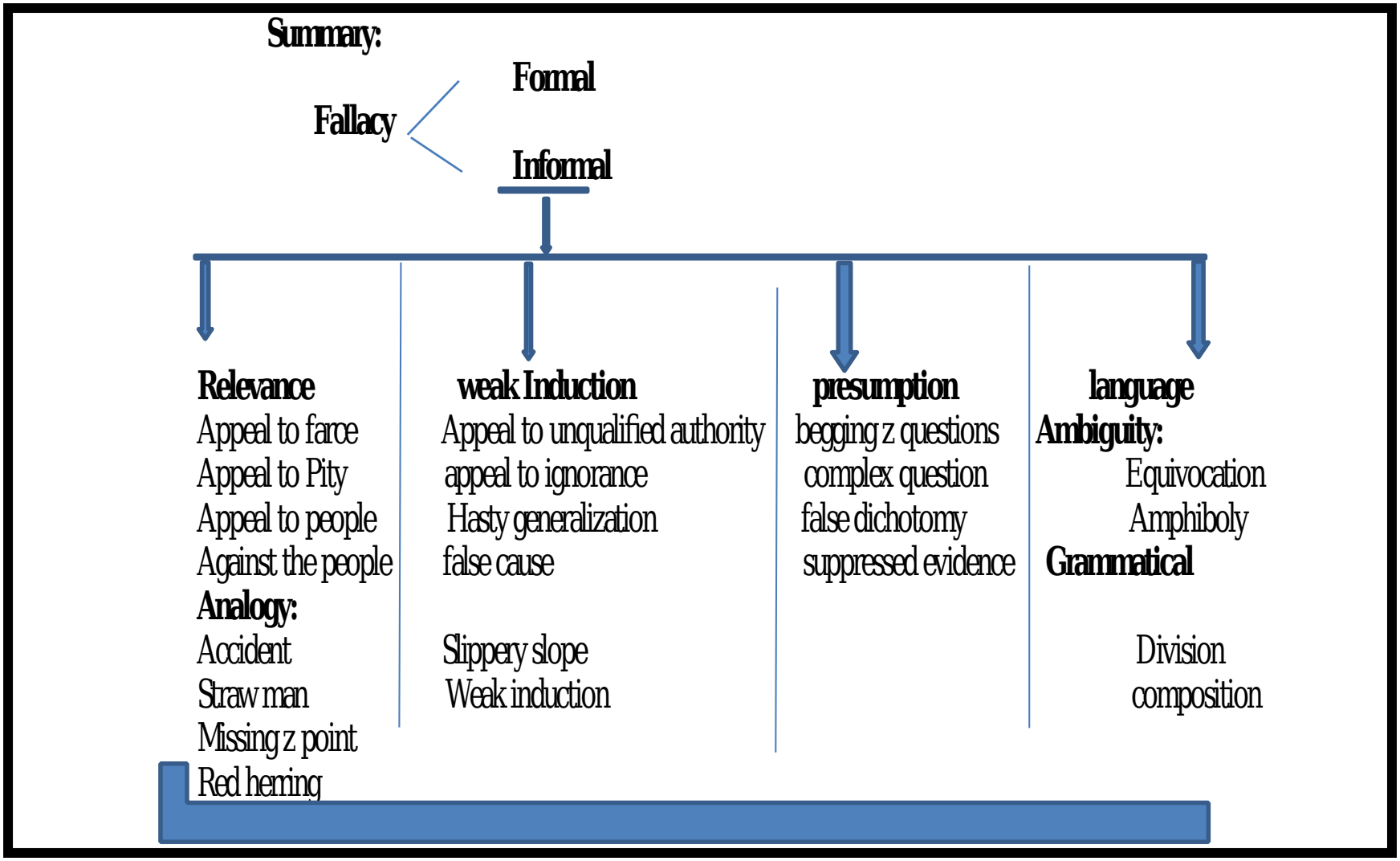
Composition:

- Opposite to division
- Wrong transfer of attributes from parts to whole.

E.G.

1. Particles of chalk are not visible. Hence, chalk is visible
2. Sodium and chloride are poisonous. Hence, salt, which is made up of sodium and chloride is poisonous.

Summary


Summary:
Fallacy
Formal
Informal
Relevance
Appeal to farce
Appeal to Pity
Appeal to people
Against the people
Analogy:
Accident
Straw man
Missing z point
Red herring
weak Induction
Appeal to unqualified authority
appeal to ignorance
Hasty generalization
false cause
Slippery slope
Weak induction
presumption
begging z questions
complex question
false dichotomy
suppressed evidence
language
Ambiguity:
Equivocation
Amphiboly
Grammatical
Division
composition