

Chapter 1: Basic Concepts

a. Answer the following questions?

- i. What is a statement? Give an example of a sentence that can be considered a statements and one that cannot. Explain your example.
- ii. What does it mean that an argument is valid?
 1. What is the relationship between the premises and the conclusion?
- iii. What is a sound argument?
- iv. What is an unsound argument?
- v. Name the “famous forms” and give an instance for each.
- vi. When is a conditional statement false? Why?
- vii. What is a counter-example? What does it prove?
 1. Explain what I can know if I am not able to create a counter example.
- viii. Write the following statements using stylistic variants (use three): If I go to the movies, I wear a pink dress.

b. True or false: justify if false.

- i. __An invalid argument can never have true premises and a true conclusion.
- ii. __A valid argument can have true premises and a false conclusion.
- iii. __All valid arguments are sound.
- iv. __All strong arguments are valid.
- v. __If an argument has true premises and a false conclusion, I can be certain that it is invalid.
- vi. __In order to create a counter example, I need to create an instance of a particular form that has true premises and a false conclusion.

c. Create counter examples of the following arguments.

- i. All A are B, All C are B; therefore, All A are C.
- ii. No A are B, All B are C; therefore No A are C.
- iii. If I go to the movies, then I leave my laptop at home. I do not go to the movies. Therefore, I did not leave my laptop at home.
- iv. Either I go to the movies or I play tennis. I went to the movies. Therefore, I did not play tennis.
- v. All foods are nourishing things. Some melons are nourishing things. Therefore, some melons are foods.
- vi. No laptops are things with cases. No phones are things with cases. Therefore, some laptops are cellphones.
- vii. All nuns are women. No nuns are males. Therefore, no males are women.
- viii. No liquors are wines. Some beers are not wines. Therefore, some beers are not liquors.
- ix. No teachers are people that will condone laziness. No people that will condone laziness are intellectuals. Therefore, no intellectuals are teachers.

Chapter 4: Fallacies

1. Formal and Informal Fallacies

Fallacies: errors in reasoning that are psychologically persuasive. They are defects in arguments that consists in something other than false premises.

Formal Fallacy: explicit use of an invalid form (Denying the Antecedent, Affirming the Consequent).

Informal Fallacy: errors in reasoning that do not involve the explicit use of an invalid form. In order to detect it one needs to examine that argument's content.

A. Determine if the Following Fallacies are Formal or Informal:

- a. If Rasputin was really mad, then he deceived Czar Nicholas II. Rasputin was not really bad. Therefore, he did deceive Czar Nicholas II.
- b. Everything that runs has feet. The Columbia River runs very swiftly. Therefore, the Columbia River has feet.
- c. The ship of state is like a ship at sea. No sailor is ever allowed to protest orders from the captain. For the same reason, no citizen should ever be allowed to protest presidential policies.
- d. Renowned violinist Pinchas Zukerman has said, "When it comes to vodka, Smirnoff plays second fiddle to none". We must conclude that Smirnoff is the best vodka available.
- e. If the Chinese government systematically kills its unwanted orphan, then it is immoral. It is indeed immoral. Therefore, the Chinese government systematically kills its unwanted orphans.
- f. Barbara Streisand, Paul Newman and Julia Roberts are Democrats. Therefore, it must be the case that all Hollywood stars are Democrats.

2. Fallacies Involving Irrelevant Premises:

- a. **Argument Against the Person (Ad Hominem)**
 - i. **Abusive**
 - ii. **Circumstantial**
 - iii. **Tu quoque ("you too")**
- b. **Straw Man Fallacy**
- c. **Appeal to Force**
- d. **Appeal to the People**
- e. **Appeal to Pity**
- f. **Appeal to Ignorance**

Exercises 2:

A. Succinctly explain each of the fallacies.

B. Identify the fallacy and give a brief explanation for your answer.

- a. The position open in the accounting department should be given to Frank Thompson. Frank has six hungry children to feed, and his wife desperately needs an operation to save her eyesight.
- b. President George Bush argues that we should open up the Arctic National Wildlife Refuge for oil drilling. But Bush just wants to reward his rich cronies in the oil industry who got him elected. Thus, we can hardly take Bush's argument seriously.
- c. You should read Irving Stone's last novel right away. It's sold over a million copies, and practically everyone in the Manhattan cocktail circuit is talking about it.
- d. Friedrich Nietzsche's philosophy is not worth the paper it is printed on. Nietzsche was an immoral reprobate who went completely insane from syphilis before he died.
- e. Surely you welcome the opportunity to join our protective organization. Think of all the money you will lose from broken windows, overturned trucks and damaged merchandise in the event of your not joining.
- f. Senator Barrow advocates increased Social Security benefits for the poor. It is regrettable that the senator finds it necessary to advocate socialism. Socialism defeats initiative, takes away promised rewards, and leads directly to inefficiency and big government. Clearly socialism is not good.
- g. The editors of the Daily Register have accused our company of being one of the city's worst water polluters. But the Daily Register is responsible for much more pollution than we are. After all, they own the Western Paper Company, and that company discharges tons of chemical residues into the city's river every day.
- h. Ladies and gentlemen, today the lines of battle have been drawn. When the din of clashing armor has finally died away, the Republican Party will emerge victorious! We are the true party for the American people! We embody the values that real Americans hold sacred!
- i. Brewing magnate Joseph Coors has argued that government should get off the back of the American businessman. Obviously, Coors wants to abolish government altogether. Yet without government there would be no defense, no judicial system, no Social Security, and no health and safety regulations. None of us wants to forgo these benefits. Thus, we can see Coors argument as absurd.
- j. Of course you want to buy a pair of Slinky fashion jeans. Slinky jeans really show off your figure, and all the Hollywood starlets down the Strip can be seen wearing them.
- k. I cannot believe how some people believe in Evolution. It seems absurd to me that they actually believe in the possibility of having dogs giving birth to cats.

- l. If you weren't so silly you had no problem seeing as true my point of view.
- m. I know that some of you oppose the appointment of David Cole as the new sales manager. Upon further consideration, however, I am confident you will find him well qualified for the job. If Cole is not appointed, it may become necessary to make severe cuts in your department.
- n. Dr. Morrison has argued that smoking is responsible for the majority of health problems in this country and that every smoker who has even the slightest concern for his or her health should quit. Unfortunately, however, we must consign Dr. Morrison argument to the trash bin. Only yesterday I saw none other than Dr. Morrison himself smoking a cigar.
- o. Teams of scientists attempted over a number of decades to detect the existence of the luminiferous aether, and all failed to do so. Therefore, the luminiferous aether does not exist.

C. True or False: If it is false, explain why.

- a. In the appeal to force, the arguer physically attacks the listener.
- b. In the tu quoque fallacy, the arguer threatens the reader or listener.
- c. In the straw man fallacy, an arguer often distorts another person's argument by making it look more extreme than it really is.
- d. In the tu quoque fallacy, the person committing the fallacy is that who is being a hypocrite.
- e. The main point in the appeal to people fallacy is to make people accept your argument by showing the poor state in which you/others are in.
- f. The appeal to ignorance argument consists of refuting an opponent's argument by claiming they are ignorant.

3. Fallacies Involving Ambiguity

- a. **Equivocation**
- b. **Amphiboly**
- c. **Composition**
- d. **Division**

Exercises 3:

A. Succinctly explain each of the fallacies.

B. Identify the fallacy and give a brief explanation for your answer.

- a. Some triangles are obtuse. Whatever is obtuse is ignorant. Therefore, some triangles are ignorant.
- b. The Royal Society is over 300 years old. Professor Thompson is a member of the Royal Society. Therefore, Professor Thompson is 300 years old.
- c. The tour guy said that standing in Greenwich Village, the Empire State Building could easily be seen. It follows that the Empire Building is in Greenwich Village.

- d. Sodium and chlorine, the atomic components of salt are both deadly poisonous. Therefore, salt is deadly poisonous.
- e. Any law can be repealed by the legislative authority. But the law of gravity is a law. Therefore, the law of gravity can be repealed by the legislative authority.
- f. We have a duty to do what is right. We have a right to speak out in defense of the innocent. Therefore, we have a duty to speak on defense of the innocent.
- g. Each player on the basketball team is an excellent athlete. Therefore, the team as a whole is excellent.
- h. John told Henry that he made a mistake. It follows that John has at least the courage to admit his own mistakes.
- i. Staley Steamers have almost disappeared. This car is a Stanley Steamer. Therefore, this car has almost disappeared.
- j. Professor Johnson said that he will give a lecture about heart failure in the biology lecture hall. It must be the case that a number of hearth failures have occurred there recently.
- k. Salt is a nonpoisonous compound. Therefore, its component elements, sodium and chlorine, are nonpoisonous.
- l. Maria likes anchovies. She also likes chocolate ice cream. Therefore, it is certain that she would like a chocolate sundae topped with anchovies.
- m. This jigsaw puzzle, when assembled, is circular in shape. Therefore, each piece is circular in shape.
- n. Ms. Hart stated in her will, "I leave my 500-carat necklace and my pet chinchilla to Alice and Theresa." Therefore, we conclude that Alice gets the necklace and Therese gets the chinchilla.
- o. The average American family has 2.5 children. The Jones family is an average American family. Therefore, the Jones family has 2.5 children.

C. True or False: If it is false, explain why.

- a. The fallacy of equivocation arises from a syntactical defect in a statement.
- b. The fallacy of amphiboly usually involves the ambiguous use of a single word.
- c. Amphiboly usually arises from the arguer's misinterpreting a statement made by someone else.
- d. The fallacy of composition always proceeds from whole to parts.
- e. The fallacy of division always proceeds from parts to whole.

4. Fallacies Involving Unwarranted Assumptions

- a. **Begging the Question**
- b. **False Dilemma**
- c. **Appeal to Unreliable Authority**
- d. **False Cause**
- e. **Complex Question**

Exercise 4:

A. Succinctly explain each fallacy.

B. Identify the fallacy and give a brief explanation for your answer.

- a. Dr. Bradshaw, our family physician, has stated that the creation of muonic atoms of deuterium and tritium hold the key to producing a sustained nuclear fusion reaction at room temperature. In view of Dr. Bradshaw's expertise as a physician, we must conclude that this is indeed true.
- b. Either you let me attend the Garth Brooks concert or I'll be miserable for the rest of my life. I know that you do not want me to be miserable for the rest of my life, so it follows that you'll let me attend the concert.
- c. During the past two months, every time that the cheerleaders have worn blue ribbons in the hair, the basketball team has been defeated. Therefore, to prevent defeats in the future, the cheerleaders should get rid of those blue ribbons.
- d. Clearly, terminally ill patients have a right to doctor assisted suicide. After all, many of these people are unable to commit suicide by themselves.
- e. Have you stopped cheating on exams?
- f. David Duke, former Grand Wizard of the Ku Klux Klan, has stated, "Jews are not good Americans. They have no understanding of what America is." On the basis of Duke's authority, we must therefore conclude that the Jews in this country are un-American.
- g. The world in which we live displays an amazing organization. Obviously, this world was created by an intelligent god.
- h. Old Mrs. Ferguson (who is practically blind) has testified that she saw the defendant stabbed the victim with a bayonet while she was standing in the twilight shadows 100 yards from the incident. Therefore, members of the jury, you must find the defendant guilty.
- i. Where did you hide the cookies you stole?
- j. Capital punishment is justified for the crimes of murder and kidnapping because it is quite legitimate and appropriate that someone be put to death for having committed such hateful crimes.
- k. When are you going to stop talking nonsense?
- l. Successful business executives are paid salaries in excess of \$50,000. Therefore, the best way to ensure that Ferguson will become a successful executive is to raise his salary to at least \$50,000.
- m. Murder is morally wrong. This being the case, it follows that abortion is morally wrong.
- n. There are more laws on the books than ever before, and more crimes are being committed than ever before. Therefore, to reduce crimes we must eliminate the laws.
- o. Have you stopped being a mean person?

C. True or False: If it is false, explain why.

- a. The correct way of responding to a complex question is to divide the question into its component questions and answer each.
- b. False dilemma always involves an "either...or" statement, at least implicitly.

- c. If an arguer cites a statement by a recognized expert in support of a conclusion and the statement falls within the expert's range of expertise, then the arguer commits an appeal to unqualified authority.
- d. If an arguer concludes that X causes Y simply because X and Y occur over the same time interval, then the arguer commits a false cause fallacy.

Chapter 5: Categorical Logic

1. Standard Forms of Categorical Statements

Categorical Statement: It is a statement that relates two classes or categories.

- **Components:**

- **Terms:** denote classes
- **Quantity:** Universal or Particular
- **Quality:** Affirmative or Negative.

- A. **Standard Form:**

- a. **Quantifier**
- b. **Subject term and predicate term MUST be nouns or noun-like structures**
- c. **Copula ("are" or "are not").**
 - **A: All S are P (Universal, Affirmative)**
 - **E: No S are P (Universal, Negative)**
 - **I: Some S are P (Particular, Affirmative)**
 - **O: Some S are not P (Particular, Negative).**

Exercise 1:

A. Name the form of each categorical statement. Name the quantity and quality.

- a. **All cats are dogs.**
- b. No coral reefs are dead things.
- c. Only colorful works of art are beautiful things.
- d. Some mammals are carnivores.
- e. Some dogs are not collies.
- f. All people who go to school are motivated students.
- g. Some alligators are animals that lay eggs.
- h. Some birds are not animals that can fly.
- i. All Florida schools are institutions that accept students.
- j. Some lions are predators.

B. Standard form: Which of them are in standard form? If it is in standard form only name the type of statement. If it is not in standard form, rewrite it so that it is.

- a. Every person that is in jail is a criminal.

- b. Nothing that has wings is a mammal.
- c. If anything is a bird, that it is not a mammal.
- d. All collies are dogs.
- e. At least one photographer is not a person that loves talking to Hollywood stars.
- f. There are people that are not astronauts.
- g. Any professor is a person that loves teaching.
- h. If anything is a robot, then it is not sentient.
- i. Not all flying objects are planes.
- j. Nothing is a soldier unless it is not a teacher.
- k. Some questionnaires are things with questions.
- l. Something is both a dog and an animal.
- m. There is a dog that it is not a collie.
- n. There exists an animal that is not a mammal.

2. Traditional Square of Opposition: Logical Relations between categorical Statements.

- a. **Contradictories: A and O, E and I.**
- b. **Contraries: A and E.**
- c. **Subcontraries: I and O.**
- d. **Subalternation: A implies I; E implies O.**

Exercises 2:

- A. Draw the Square of Opposition.**
- B. Explain each logical relationship on the basis of truth values.**
- C. Give the names of the logical relations that hold between the following pair of statements:**
 - a. All animals are dogs./ No animals are dogs.
 - b. Some swans are ducks./ Some swans are not ducks.
 - c. All mammals are animals./Some animals are mammals.
 - d. No cats are dogs./All cats are dogs.
 - e. Some people that go to school are not students./ Some people that go to school are students.
 - f. No students that get a D are people that pass the class./Some students that get a D are not people that pass the class.
 - g. All smurfs are blue beings./Some smurfs are blue beings.
 - h. Some turtles are mutants./ Some turtles are not mutants.
 - i. All plates are round objects./No plates are round objects.
 - j. Some people that go to the gym are people that care about their bodies./ All people that go to the gym are people that care about their bodies.
 - k. Some readers are people that read the newspaper./ Some readers are people that do not read the newspaper.

D. Which of the following immediate inferences are valid? Which ones are not?

- a. Some fleas are annoying beings. Therefore, it is not true that no fleas are annoying beings.
- b. Some dogs are collies. Therefore, some dogs are not collies.
- c. Some astronomers are not women. Therefore, no astronomers are women.
- d. All men are carnivores. So, it is false that some men are not carnivores.
- e. It is false that some people are not believers in God. Therefore, some people are believers in God.
- f. It is false that no teachers are women. Therefore, some women are teachers.
- g. Some lawyers are people that earn their living defending people. Therefore, all lawyers are people that earn their living defending people.
- h. No voters are people who do not vote. Therefore, it is not true that all voters are people who do not vote.
- i. No birds are mammals. Therefore, it is false that some birds are mammals.
- j. All oranges are orange things. Therefore, it is not true that some oranges are not orange things.

E. Truth Values

- a. Suppose that A is false, what are the truth values of E, O and I?
- b. Suppose E is false, what are the truth values of A, O and I?
- c. Suppose that I is false, what are the truth values of E, O and A?
- d. Suppose O is false, what are the truth values of A, E and I?

3. Further Immediate Inferences.

- a. **Conversion: Valid for E and I.**
- b. **Obversion: Valid for all.**
- c. **Contraposition: Valid for A and O.**

Exercise 3:

A. Form the Converse and indicate if it is valid for that type of statement.

- a. Some books are novels.
- b. All smurfs are blue beings.
- c. Some circles are non-rectangles.
- d. No plants are animals.
- e. Some squares are not bulldogs.
- f. No ants are fleas.
- g. Some comic books are not science fiction pieces.
- h. All flowers are plants.
- i. No hurricanes are meteorological phenomena.
- j. Some dogs are collies.

B. Form the Obverse for the following statements.

- a. Some CIA agents are spies.
- b. All FBI agents are people that love investigating.
- c. Some people that believe in Jesus are not Catholic.
- d. No mammals are birds.
- e. Some dogs are not animals that have tails.
- f. All candles are things that can be lit up.
- g. Some perfumes are disgusting things.
- h. All women are doctors.
- i. Some doctors are not women.
- j. No men are lawyers.

C. Form the Obverse and indicate whether it is valid for each type of statement.

- a. All cats are animals.
- b. Some people are not cat lovers.
- c. No smurfs are white beings.
- d. Some books are not cellphones.
- e. Some cellphones are book.
- f. All computers are things that can be used to communicate thoughts.
- g. All cooks are women.
- h. Some cooks are men.
- i. No logic books are interesting books.
- j. Some ethics books are praised by editors.

Chapter 6: Venn Diagrams and Categorical Syllogisms

1. Syllogisms: Standard form, Mood and Figure.

- a. **Categorical Syllogisms: Arguments composed of Categorical Statements. They have two premises and one conclusion.**
- b. **Components**
 - i. **Major term: Predicate of the Conclusion**
 - ii. **Minor term: Subject of the Conclusion.**
 - iii. **Middle term: Appears in both premises.**
- c. **Standard form:**
 - i. **Each statement must be in standard form.**
 - ii. **First Premise is the Major Premise: Major terms.**
 - iii. **Second Premise is the Minor Premise: Minor term.**
- d. **Mood: Determined by the types of statements.**
- e. **Figure: Determined by the position of the middle term.**

Exercises 1:

A. Which of the following syllogisms are in standard form? If they are not, put them into standard form. Then indicate the mood and the figure for each.

- a. Some presidential candidates are Senators. All senators are politicians. Therefore, some politicians are presidential candidates.
- b. At least one dog is a collie. All dogs are animals. Therefore, some animals are collies.
- c. All movies are films. Some films are westerns. Therefore, some movies are not westerns.
- d. No books are novels. Some books are comics. Therefore, only novels are comics.
- e. Some cellphones are not outstanding. Some cellphones are robots. Therefore, no robots are outstanding.
- f. Nothing is a bird unless it is not a mammal. Some birds have wings. Therefore, some mammals do not have wings.
- g. All boy scouts are diligent people. All diligent people are nice people. Therefore, some boy scouts are nice people.
- h. Not all bandits will be hanged. After all, at least one bandit is not a horse thief, and every horse thief will be hanged.
- i. There exists a drifter who is a sheriff; for at least one sheriff is a gunslinger, and a thing is a gunslinger only if is a drifter.
- j. If anything is a bounty hunter, then it is not a sodbuster. At least one outlaw is a sodbuster; therefore, not every outlaw is a bounty hunter.
- k. Nothing is a rodeo unless it in not an opera. Each opera includes singers. So, nothing that is a rodeo includes singers.
- l. Some musicians are not classically trained musicians. All jazz musicians are musicians. Therefore, some jazz musicians are not classically trained musicians.
- m. Every author is insightful. All novelists are authors. Therefore, all insightful people are novelists.
- n. Some poems are not masterpieces. No limericks are masterpieces. Therefore, some limericks are not poems.
- o. Some artists are millionaires. No millionaires are poor. Therefore, at least one artist is not poor.
- p. All metaphors are figures of speech. All metaphors are words. So, all figures of speech are words.
- q. At least one bronco is not hard to ride, for all bulls are hard to ride and some broncos are not bulls.
- r. Some ballerinas are clumsy dancers. All people who hate music are clumsy dancers. Therefore, some people who hate music are ballerinas.
- s. All sculptures are beautiful. Some beautiful things are paintings. Therefore, some sculptures are not paintings.
- t. Some cats are not dogs. No mammals are cats. Therefore, some dogs are not mammals.

2. Venn Diagrams

- a. This is a method to establish the validity or invalidity of categorical arguments.
 - i. Universal statements are indicated on the diagram by shading a portion. The shading means that the area is empty.
 - ii. Particular statements are indicated by using an "X". This shows that something exists in that area.
- b. The amount of circles you need depends on the number of terms you have.

Exercises 2:

A. Put the following categorical statement into standard form and then draw the Venn Diagram.

- a. At least one collie is a dog.
- b. Only mammals are dogs.
- c. Not every person that loves wisdom is a philosopher.
- d. If anything is a philosopher, then it is a lover of wisdom.
- e. Only people who believe in God are Catholics.
- f. Nothing is a bird unless it is not a being without wings.
- g. At least one jazz musician will be a pop singer.
- h. Every dog is a mammal.
- i. There is a musician that hates music.
- j. There is a musician that is not a hater of music.

B. Draw two Venn Diagrams for each argument—one for the premise and one for the conclusion—and indicate whether they are valid or invalid.

- a. Some tables are not desks. So, some desks are not tables.
- b. Some collies are dogs. Hence, some dogs are not collies.
- c. Some people that love wisdom are not philosophers. Therefore, all philosophers are not people that love wisdom.
- d. Some people that love the Law are lawyers. Therefore, some lawyers are people that love the Law.
- e. No cats are dogs. Therefore, some cats are not dogs.
- f. Some boring events are colloquia. Accordingly, some boring events are not colloquia.
- g. No sculptures by Rodin are boring creations. Therefore, all sculptures by Rodin are boring creations.
- h. All trial lawyers are persons with stressful jobs. Therefore, some trial lawyers are persons with stressful jobs.
- i. Some country doctors are altruistic healers. Therefore, some country doctors are not altruistic healers.
- j. No vampires are avid connoisseurs of garlic bread. Therefore, some vampires are not avid connoisseurs of garlic bread.
- k. No talk radio shows are accurate sources of information. Therefore, some talk radio shows are not accurate source of information.

- l. Some chocolate soufflés are not desserts containing olives. Therefore all chocolate soufflés are desserts containing olives.
- m. No fertility drugs are solutions to every problem. Therefore, it is false that all fertility drugs are solutions to every problem.

3. Venn Diagrams and Categorical Syllogisms.

Exercise 3:

A. Argument forms: Construct Venn Diagrams to determine whether these argument forms are valid or invalid.

- a. All P are M. Some S are not M. So, Some S are not P.
- b. Some M are P. Some M are S. So, Some S are not P.
- c. No P are M. Some M are S. So, Some S are P.
- d. Some P are M. Some S are M. So, Some S are not P.
- e. All M are P. Some M are not S. So, Some S are P.
- f. No M are P. All M are S. So, No S are P.
- g. All P are M. Some M are S. So, Some S are P.
- h. Some P are not M. Some S are M. So, Some S are not P.
- i. No P are M. All M are S. So, Some S are not P.
- j. Some M are not P. Some S are not M. So, All S are P.

B. Categorical Syllogisms: Use Venn Diagrams to determine their validity.

- a. All corporations that overcharge their customers are unethical businesses. Some unethical businesses are investor-owned utilities. Therefore, some investor-owned utilities are corporations that overcharge their customers.
- b. No AIDS victims are persons who pose an immediate threat to the lives of others. Some athletes are AIDS victims. Therefore, some athletes are not persons who pose an immediate threat to the lives of others.
- c. No individuals truly concerned with the plights of suffering humanity are persons motivated primarily by self-interest. All television evangelists are persons motivated by self-interest. Therefore, some television evangelists are not individuals truly concerned with the plights of suffering humanity.
- d. All high-fat diets are high in cholesterol. Some diets high in cholesterol are not healthy food programs. Therefore, some healthy food programs are not high-fat diets.
- e. No concertos are symphonies. No symphonies are string quartets. Therefore, no string quartets are concertos.
- f. All compounds that destroy the ozone layer are environmental hazards. All chlorofluorocarbons are compounds that destroy the ozone layer. Therefore, all chlorofluorocarbons are environmental hazards.

- g. No pediatricians are individuals who jeopardize the health of children. All faith healers are individuals who jeopardize the health of children. Therefore, no faith healers are pediatricians.
- h. Some automated teller machines are places criminals lurk. All places criminals lurk are places to be avoided at night. Therefore, some places to be avoided at night are automated teller machines.
- i. All circular triangles are plane figures. All circular triangles are three-sided figures. Therefore, some three-sided figures are plane figures.
- j. No corporations that defraud the government are organizations that government should deal with. Some defense contractors are not organizations the government should deal with. Therefore, some defense contractors are not corporations that defraud the government.
- k. No persons who profit from the illegality of their activities are persons who want their activities legalized. All drug dealers are persons who profit from the illegality of their activities. Therefore, no drug dealers are persons who want their activities legalized.
- l. Some individuals who risk heart disease are persons who will die young. Some smokers are individuals who risk heart disease. Therefore, some smokers are persons who will die young.
- m. Some communication satellites are rocket-launched facilities. All communication satellites are devices with antennas. Therefore, some devices with antennas are rocket-launched facilities.
- n. All survivalists are persons who enjoy simulated war games. No persons who enjoy simulated war games are soldiers who have tasted the agony of real war. Therefore, all soldiers who have tasted the agony of real war are not survivalists.
- o. No persons majoring in greed are individuals concerned about the welfare of society. Some college students are persons majoring in greed. Therefore, some college students are not individuals concerned about the welfare of society.

Chapter 7: Statement Logic

1. Symbolizing English Arguments.

- a. Symbol for negation: \sim . Translation: Not.
- b. Symbol for conjunction: \bullet . Translation: And.
- c. Symbol for disjunction: \vee . Translation: Or.
- d. Symbol for conditional statements: \rightarrow . Translation: If-then.
- e. Symbol for biconditional: \leftrightarrow . Translation: If and only If.

Examples:

- a. It is not the case that my name is Agostina.
 - i. A: My name is Agostina,
 - ii. Translation: $\sim A$

- b. Carla is a teacher and a married woman.
 - i. T: Carla is a teacher. M: Carla is a married woman.
 - ii. Translation: $T \bullet M$
- c. Either I play soccer or I watch television.
 - i. S: I play Soccer. W: I watch television
 - ii. Translation: $S \vee W$
- d. If my husband takes me to the movies, then I will make dinner for him.
 - i. H: My husband takes me to the movies. D: I will make dinner for him.
 - ii. Translation: $H \rightarrow D$
- e. My mother is nicer than my father if and only if my father is nicer than my mother.
 - i. M: My mother is nicer than my father. F: MY father is nicer than my mother.
 - ii. Translation: $M \leftrightarrow F$

Exercise 1:

A. Well-Formed Formula: Which of the following is a symbolic expression of a well-formed formula? Take into consideration the permissible changes.

- a. $(S \cdot \sim T) \vee (\sim U \cdot W)$
- b. $\sim(K \vee L) \cdot (G \vee H \rightarrow)$
- c. $(E \sim F) \vee (W \vee X)$
- d. $(B \rightarrow \sim T) \vee \sim(\sim C \cdot T)$
- e. $(F \cdot \sim c)$

B. Symbolizing: Translate the following statements.

- a. California does not allow smoking in restaurants.
- b. Florida has a major theme park but Maine does not.
- c. Either AMC or Loews gives students discounts.
- d. If Nintendo produces an alien game, then so does Sega.
- e. Both FedEx and UPS deliver overnight.
- f. Nintendo produces an alien game if Sega does.
- g. Brad Pitt will be a father if and only if Angelina Jolie has a baby.
- h. Matt Damon comes to the party only if Ben Affleck comes.
- i. Jennifer Lopez becomes a superstar given that *I am Real* goes platinum.
- j. The Colts' winning the Superbowl implies that Peyton Manning is a great quarterback.
- k. Alabama restricts abortion rights only if Georgia and Mississippi do.
- l. The Presidents supports campaign reform and the House adopts universal healthcare or the Senate approves missile defense.
- m. Not both Hertz and Avis rent limousines.
- n. Both Hertz and Avis do not rent limousines.
- o. Either Motrin or Contact cures headaches.

- p. If Canada subsidizes exports, then if Mexico opens new factories, then the United States raises tariffs.
- q. If Canada's subsidizing exports implies that Mexico opens new factories, then the United States raises tariffs.
- r. DMX abandon explicit lyrics if and only if neither Columbia nor BMG stops advertising.
- s. If *The New York Times* and the *Washington Post* suppress free speech, then either CNN or MSNBC will get higher ratings.
- t. Jennifer Capriatti wins tournaments and Barry bonds hits homers, or Marshall Faulk runs touchdowns.
- u. Jennifer Capriatti wins tournaments, and Barry bonds hits homers, or Marshall Faulk runs touchdowns.
- v. Microsoft does not acknowledge monopoly; however, if Intel lays off workers then either Dell or Apple will have job applicants.
- w. If the GAP's advertising a sale and Abercrombie's selling more clothes are sufficient and necessary condition for Old Navy's cutting costs, then neither Nordstrom nor Saks attracts new customers.