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.   When is a conditional statement false? Why?

        vi.   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.

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?

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.**

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 the 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 people 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: ~. Translation: Not.**

    b. **Symbol for conjunction: . Translation: And.**

    c. **Symbol for disjunction: v. Translation: Or.**
    d. **Symbol for conditional statements: ⟶ Translation: If-then.**
    e. **Symbol for biconditional: ⟷ 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: ~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.M**

        c. **Either I play soccer or I watch television.**
            i.   **S: I play Soccer. W: I watch television**
            ii. **Translation: S v 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 ⟶ 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 ⟷ 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. ~T) v (~U.W)
    b. ~(K v L) . (G v H   ⟶)
    c. (E~F)v (W v X)
    d. (B   ~T) v ~(~C . T)
    e. (F . ~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 President 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 abandons 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 a home run, 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 conditions for Old Navy's cutting costs, then neither Nordstrom nor Sacks attracts new customers.

C. Truth Tables and Abbreviated Truth Tables
   a. Complete 7.3 A even and 7.4 A even