CS 100 - Homework 4

Deadline:

11:00 am (the beginning of class) on Friday, September 21, 2018.

Purpose:

To practice recognizing and completing some deductive patterns, to practice recognizing some inductive patterns, to practice recognizing if an argument is deductive or inductive, to practice determining if a deductive argument is valid or invalid and sound or unsound, and to practice determining if an inductive argument is strong or weak and cogent or uncogent.

How to submit:

- Submit your work for this homework **ON PAPER** (with answers legibly hand-written or typed)
 - I will accept your work on paper ONLY, unless special arrangement is made. You may turn it in at the beginning of class, or into the Math/Computer Science department office (on the 3rd Floor of BSS, with instructions to place it into my mailbox) BEFORE the the due date and time, in order to receive credit.
 - Make sure your name is at the top of each page of the document!

Problem 1 - 10 points

(adapted from course text, Exercise 3.3)

Each of the arguments below happens to be **DEDUCTIVE**. Your task is to indicate which **common deductive pattern** it uses:

- hypothetical syllogism: modus ponens
- hypothetical syllogism: modus tollens
- hypothetical syllogism: chain argument
- hypothetical syllogism: denying the antecedent
- hypothetical syllogism: affirming the consequent
- categorical syllogism
- argument by elimination
- argument based on mathematics
- argument from definition

For each of the specified arguments, indicate which type of deductive pattern it uses.

- 1-1. All inductive generalizations are inductive. Some inductive generalization are unreliable. Therefore, some inductive arguments are unreliable.
- 1-2. This tree is deciduous. It must be the case, therefore, that it periodically sheds its leaves.
- 1-3. If Steve is 48 years old and Pam is exactly 19 years younger than Steve, it necessarily follows that Pam is 29 years old.
- 1-4. Joan is an extrovert. It follows that she is outgoing.
- 1-5. If my car is out of gas, it won't start. My car won't start. Therefore, it is out of gas.

Problem 2 - 14 points

(adapted from course text, Exercise 3.3)

Each of the arguments below from this exercise happens to be **INDUCTIVE**. Your task is to indicate which **common inductive pattern** it uses:

- inductive generalization
- predictive argument
- argument from authority
- causal argument
- statistical argument
- argument from analogy

For each of the specified arguments, indicate which type of inductive pattern it uses.

- 2-1. Klaus ingested a large dose of rat poison just before he died. Therefore, it is probable that the rat poison caused Klaus' death.
- 2-2. Yale is an Ivy League school, and it has a good library. Harvard is an Ivy League school, and it has a good library. Therefore, because Brown is an Ivy League school, it probably has a good library, too.
- 2-3. Tiger Woods is one of the best golfers in the world. Melvin Rumsley has never played golf in his life. It is probable, therefore, that Melvin Rumsley could never beat Tiger Woods in a round of golf.
- 2-4. According to the *New York Public Library Desk Reference*, the pop-up toaster was invented by Charles Strite in 1927. The *New York Public Library Desk Reference* is a highly reliable reference work. Therefore, it is reasonable to believe that Charles Strite did invent the pop-up toaster in 1927.
- 2-5. There are no visible signs of forced entry. It seems probable, therefore, that the burglar had a key.
- 2-6. All previously observed polar bears have weighed less than 1,500 pounds. Therefore, all polar bears probably weight less than 1,500 pounds.
- 2-7. Five alleged eyewitnesses have testified that they saw F. Lane stab M. Jenkins. So, F. Lane did stab M. Jenkins.

Problem 3 - 20 points

(adapted from course text, Exercise 3.4)

Write out what conclusion follows validly from the statements provided.

- 3-1. Either alpha or beta. Not beta. Therefore, _____.
- 3-2. If Delta is an alpha, then Delta is a beta. Delta is not a beta. Therefore, _____.
- 3-3. All alphas are betas. Delta is not a beta. Therefore, _____.
- 3-4. If Delta is an alpha, then Delta is a beta. If Delta is a gamma, then Delta is a beta.Either Delta is an alpha or Delta is a gamma. Therefore, _____.
- 3-5. Some alphas are betas. All betas are gammas. Therefore, _____.
- 3-6. If alpha, then beta. Alpha. Therefore, _____.
- 3-7. All alphas are betas. Delta is an alpha. Therefore, _____.
- 3-8. No alphas are betas. Delta is an alpha. Therefore, _____.

- 3-9. If Delta is an alpha, then Delta is a beta. If Delta is a beta, Then Delta is a gamma. Therefore, _____.
- 3-10. Either Delta is an alpha or Delta is a beta. If Delta is an alpha, then Delta is a gamma. If Delta is a beta, then Delta is a sigma. Therefore, _____.

Problem 4 - 10 points

(adapted from course text, Exercise 3.5)

All of the arguments below are **DEDUCTIVE**.

For each argument below, state whether it is VALID or INVALID.

- 4-1. If we're at the North Pole, then we're on Earth. We are on Earth. Therefore, we're at the North Pole.
- 4-2. *Bill:* I guess some of the seniors were late to practice this morning.

Diane: How do you know?

Bill: Because the coach said that anyone late to practice this morning would have to do wind sprints, and I just saw some of the seniors doing wind sprints.

- 4-3. If anything is a trout, then it is a fish. A dolphin is not a fish. Therefore, a dolphin is not a trout.
- 4-4. Some people like ice cream. Some people like cake. So, some people who like ice cream must also like cake.
- 4-5. Science is often defined as the organized arrangement of known facts. But that cannot be the correct definition because a phone book is an organized arrangement of facts, and a phone book is not science.

Problem 5 - 10 points

(adapted from course text, Exercise 3.5)

All of the arguments below are **DEDUCTIVE**.

For each argument below, give **TWO** answers:

• whether it is **VALID** or **INVALID**, *AND*

- whether it is **SOUND** or **UNSOUND**
- 5-1. If Rome is in Italy, then Rome is in Europe. Rome is in Italy. So, Rome is in Europe.
- 5-2. Los Angeles is west of Chicago. Hence, Atlanta is east of Chicago because Atlanta is east of Los Angeles.
- 5-3. Either dogs are cats, or dogs are fish. Dogs are not fish. So, dogs are cats.
- 5-4. No cars are trucks. A Mazda Miata is a car. So, a Mazda Miata is not a truck.
- 5-5. Some apples are red. Some apples are delicious. So, some apples are red and delicious.

Problem 6 - 12 points

(adapted from course text, Exercise 3.5)

All of the arguments below are **INDUCTIVE**.

For each argument below, give **TWO** answers:

• whether it is STRONG or WEAK, AND

• whether it is COGENT or UNCOGENT

- 6-1. The vast majority of American presidents have owned iPods. Therefore, the next American president will probably own an iPod.
- 6-2. Shakespeare was English, and he was a great poet. Milton was English, and he was a great poet. I guess most great poets were English.
- 6-3. Very few people in this country are named Obadiah. Therefore, the next person I meet is unlikely to be named Obadiah.
- 6-4. Cigarette smoking causes lung cancer. Therefore, if you have been a heavy smoker for many years, you will probably die of lung cancer.
- 6-5. Billions of men around the world shave daily. Therefore, somewhere in the world, someone is likely to be shaving right now.
- 6-6. Ninety percent of Americans jog daily. Tom Cruise is an American. So, Tom Cruise probably jogs daily.

Problem 7 - 24 points

(adapted from course text, Exercise 3.5)

For each argument specified below, give **TWO** answers:

- whether it is **DEDUCTIVE** or **INDUCTIVE**.
 - and, IF it is **deductive**, ALSO put if it is **VALID** or **INVALID**
 - and, IF it is inductive, ALSO put if it is STRONG or WEAK
- 7-1. Most college students sleep late on Sunday mornings. Wes is a college student. So, Wes probably sleeps late on Sunday mornings.
- 7-2. It is totally dark in here, but I know that the only things in the drawer are socks, ten black, ten white. I had better take out eleven socks to be sure I get a patched pair.
- 7-3. If it rained, the streets are wet. The streets are wet. So, it rained.
- 7-4. This bathwater is tepid. It follows that it is neither extremely hot nor extremely cold.
- 7-5. In a recent Gallup poll, 72 percent of Americans polled said they favored the death penalty. Therefore, approximately 72 percent of Americans probably do favor the death penalty.
- 7-6. Some Native Americans are Democrats. Some Democrats are Supreme Court justices. So, some Supreme Court justices must be Native Americans.
- 7-7. Do most Americans like rap music? Apparently not. In a random survey of ten thousand nursing home patients around the country, fewer than 5 percent said they enjoyed listening to rap music.
- 7-8. All birds can fly. Penguins are birds. So, penguins can fly.
- 7-9. John's home address is 47 Riverside Drive. It follows that he probably lives near a river.
- 7-10. There are more than 50 students in this class. It is likely the case, therefore, that at least one of them is a Capricorn.
- 7-11. Smedley ran 5 miles in 38 minutes. It follows that he must have run at least 1 mile in less than 8 minutes.
- 7-12. The Empire State Building is taller than the Sears Tower. Therefore, because the Eiffel Tower is shorter than the Empire State Building, it follows that Sears Tower is taller than the Eiffel Tower.