CS 100 - Homework 3

Deadline:

11:00 am (the beginning of class) on **Friday, September 14, 2018.**

Purpose:

To practice identifying arguments and non-arguments, to practice distinguishing between arguments and explanations, to practice some less-formal deductive reasoning, and to identify types of hypothetical syllogisms.

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 - 30 points

(adapted from course text, Exercise 2.4, Part (I))

Determine which of the following passages **contain arguments** and which **do not**. Use the tests discussed in class and in the course text for what makes an argument as opposed to a report, an illustration, an observation, etc. For each, an answer of **argument** or **not an argument** is sufficient.

1-1.   He must be home. His car's in the driveway.

1-2.   If Christmas is on a Friday, the day after Christmas must be a Saturday.

1-3.   Dogs make better pets than cats because they're more intelligent and obedient.

1-4.   The rich and famous tend not to be happy, well-adjusted personalities. Look at Britney Spears.

1-5.   The Cascades mountain range contains many majestic peaks. Mt. Rainier and Mt. Hood, for instance, are both more than 10,000 feet.

1-6.   If there were no maldistribution, if everyone shares equally, and if no grain were fed to animals, all of humanity would be adequately nourished today.

1-7.   Animals have a prodigious advantage over us: they foresee neither evils nor death.

1-8.   I ate because I was hungry.

1-9.   I'm trading my Ford Explorer for a Toyota Corolla because they're more reliable and get better gas mileage.

1-10. Dinosaurs became extinct 65 million years ago, probably as a result of dramatic global cooling that resulted from the impact of a large asteroid.

1-11. According to baseball statistician Bill James, Stan Musial was a better all-around baseball player than Ted Williams because Musial was, in addition to being a great hitter, a better fielder and base-runner than Williams was.

1-12. Guys are extremely reluctant to make commitments, or even to take any steps that might *lead* to commitments. That is why, when a guy goes out on a date with a woman and finds himself really liking her, he often will demonstrate his affection by avoiding her for the rest of his life.

1-13. I stayed home from school because I was sick.

1-14. You can fool all of the people some of the time, and some of the people all of the time, but you cannot fool all the people all the time.

1-15. The British statesman William Gladstone thought that we would all be healthier if   we chewed each bite of food precisely 32 times. Why else, he noted, did nature endow us with exactly 32 teeth?

Problem 2 - 20 points

(adapted from course text, Exercise 2.4, Part (II))

Determine whether the following passages are best understood as **arguments** or as **explanations**. For each, an answer of **is an argument** or **is an explanation** is sufficient.

2-1. The Great Lakes area has a concentration of industry because of the availability of water for manufacturing processes, and because water transportation is an efficient way to move raw materials and products.

2-2. A good schoolmaster is a far more useful citizen than the average bank president, politician, or general, if only because what he transmits is what gives meaning to the life of the banker, the politician, the general.

2-3. It is a fact of life on our beleaguered little planet that widespread torture, famine, and governmental criminal irresponsibility are much more likely to be found in tyrannous than in democratic governments. Why? Because the rulers of the former are much less likely to be thrown out of office for their misdeeds than the rulers of the latter.

2-4. A bullet has no conscience; neither does a malignant tumor or an automobile gone out of control. This is why good people get sick and get hurt as much as anyone.

2-5. Neptune is blue because its atmosphere contains methane.

2-6. My mother, who graduated from high school at 16, had no hope of affording college, so she went to work in the local post office for a dollar a day.

2-7. Why are there laws of gravity? Because, Einstein revealed, large masses distort space-time, causing objects to move along geodesic paths.

2-8. Since rights claimed against the government should (at least within a democracy) be held equally by all citizens, and since not every citizen could be employed by the government, citizens cannot claim a right to a job from the government.

2-9. True success always starts with an inner vision, however incomplete it might be. That's why most of the books on success by famous coaches, business stars, motivational consultants, and psychologists begin with chapters on goal setting.

2-10. Men seem to fly around the television more than women. Men get that remote control in their hands, they don't even know what the hell they're not watching... Women won't do this. Women will stop and go, "Well let me see what the show is, before I change the channel. Maybe we can nurture it, work with it, help it grow into something." Men don't do that. Because women nest and men hunt. That's why we watch TV differently.

Problem 3 - 22 points

(adapted from course text, Exercise 3.1 Part (I) and Part (II))

Deductive reasoning isn't just some technical and specialized form of reasoning engaged in only by logicians or mathematicians. It is something we all do pretty naturally. See if you can solve the following mini-mysteries on your own, using your own native reasoning abilities. (Scratch paper can be helpful, also.)

3-1.   The murder was not committed on the moor.

    If Windibank was the murderer, then the weapon was a rope.

    Either Windibank was the murderer, or Calhoun was the murderer.

    If the weapon was a rope, then the murder was committed on the downs.

    If Calhoun was the murderer, then the weapon was a crowbar.

    If the weapon was a crowbar, then the murder was committed on the moor.

    Who was the murderer, and with what weapon, and where?

3-2.   The murder did not occur in the library.

    If Adler was the murderer, then the weapon was a revolver.

    Either Hope was the murderer, or Adler was the murderer.

    If Hope was the murderer, then the murder took place in the library.

    Who was the murderer, and with what weapon?

3-3.   Five college students, Buck, Jennifer, Li, Ursula, and Tyler, are talking about what they should bring to Patrick's party.

    Buck says he'll bring chips or mixed nuts unless somebody else wants to bring a salty snack, in which case he'll being some soda.

    Jennifer says she's allergic to nuts but would be happy to bring some pretzels if Buck wants to pick up some soda.

    Li says he'll bring cookies unless somebody else brings a dessert, in which case he'll bring some homemade dip.

    Ursula says if Li brings a dip, she'll bring chips if nobody else does.

    Tyler says he'll bring soda is nobody else does; otherwise, he'll bring ice cream.

    If each of these students does what they say, what will each student bring to the party?

3-4.   Seth, Maria, Antoine, and JoBeth are college friends in the U.S. who plan to spend a semester abroad together.

    They can study in China, Germany, Australia, Japan, England, or Canada.

    Seth is willing to go anywhere except Asia.

    Maria prefers not to go to a country south of the Equator.

    Antoine wants to study in either Europe or Australia.

    JoBeth doesn't care where they go, as long as it's not England.

    What is the one country that satisfies all these various preferences?

Problem 4 - 28 points

(adapted from course text, Exercise 3.2)

For each of the following, indicate what type of **hypothetical syllogism** is it:

- *modus ponens*
- *modus tollens*
- chain argument
- denying the antecedent (a logically **invalid** form of syllogism)
- affirming the consequent (a logically **invalid** form of syllogism)

NOTE: Some minor rephrasing of each problem may be needed to make the logical pattern apparent.

4-1.   If we're in Toronto, then we are in Canada. So, because if we are in Canada, we are in North America, if we are in Toronto, then we are in North America.

4-2.   If we're in Shanghai, then we are in China. So, we are in China, because we are in Shanghai.

4-3.   Since we're in India, we are in Kolkata, since we are in India if we are in Kolkata.

4-4.   We are not in Mexico, because if we are in Mexico City, we are in Mexico, and we are not in Mexico City.

4-5.   If we're in Fort Worth, then we are in Texas. We are not in Texas. So, we are not in Fort Worth.

4-6.   We're in Berlin, given that if we are in Berlin, then we are in Germany, and we are in Germany.

4-7.   If we're in Houston, then we are in the United States. We are not in Houston. So, we are not in the United States.