CS 100 - Homework 5

Deadline:

11:00 am (the beginning of class) on **Friday, October 5, 2018.**

Purpose:

To practice converting categorical statements into standard categorical form, drawing two-circle Venn diagrams for categorical statements in standard categorical form, and using three-circle Venn diagrams to test the validity of categorical 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 - 20 points

(adapted from course text, Exercise 9.1)

PART 1: For each categorical statement below,

- IF it is already in one of the four standard forms for categorical statements, simply **write** it out,

  OTHERWISE **rewrite** it so that it IS in one of the four standard forms

  - ("All A are B", "No A are B", "Some A are B", or "Some A are not B".)

PART 2: draw a 2-circle Venn diagram of the resulting statement.

- *Be sure to label what each circle in the diagram represents!*

1-1.   Some rectangles are squares.

1-2.   Some skateboarders are jazz fans.

1-3.   All persons born in the United States are U.S. citizens.

1-4.   Many dwarves are bachelors.

1-5.   Some of the world's greatest soccer players are South Americans.

1-6.   No artichokes are fruits.

1-7.   All architects are professionals.

1-8.   Some tattoo artists are not archbishops.

1-9.   No women are persons who have been U.S. Presidents or vice presidents.

1-10. Not a single chess master is a rock star.

Problem 2 - 10 points

(adapted from course text, Exercise 9.2)

Rewrite the following "only" sentences into standard categorical form

- ("All A are B", "No A are B", "Some A are B", or "Some A are not B".)

2-1. Only fools rush in.

2-2. Only if something is a Ford is it a Mustang.

2-3. Only doctors are psychiatrists.

2-4. Something is a blue jay only if it's a bird.

2-5. Employees' restroom only.

Problem 3 - 30 points

(adapted from course text, Exercise 9.3)

Translate the following sentences into standard-categorical-form statements, using an appropriate Quantifier, Subject (Noun or Noun Phrase), Linking Verb, and Predicate (Noun or Noun Phrase).

3-1. Roses are red.

3-2. Each insect is an animal.

3-3. If anything is an igloo, then it is made of ice.

3-4. Cheaters never prosper.

3-5. You have to swing the bat to hit the ball.

3-6. If something is not a vehicle, then it is not a car.

3-7. Almost all Wexford College students graduate in four years.

3-8. Maples are trees.

3-9. Some bats are nocturnal.

3-10. Not all desserts are fattening.

3-11. All that glitters is not gold.

3-12. Every cloud has a silver lining.

3-13. World War II began in 1939.

3-14. There are birds that cannot fly.

3-15. Not every sheep is white.

Problem 4 - 40 points

(adapted from course text, Exercise 9.4)

PART 1: For each argument below, REWRITE it as a **categorical syllogism** containing 3 statements written in standard categorical form.

- IF it is already written as a **categorical syllogism** containing 3 statements written in standard categorical form, simply **write** it out,

OTHERWISE **rewrite** it so that it IS a **categorical syllogism** containing 3 statements written in standard categorical form.

PART 2: Then, give a 3-circle Venn diagram and mark it appropriately to test the validity of that argument

PART 3: And, finally, state whether the argument is **VALID** or **INVALID** based on your resulting Venn diagram.

4-1. No farmers are city dwellers. Hence, since all city dwellers are urbanites, no urbanites are farmers.

4-2. Some bankers are vegans. No anarchists are bankers. So, some anarchists are not vegans.

4-3. No mockingbirds are cardinals. Some cardinals are songbirds. So, some songbirds are not mockingbirds.

4-4. No landlubbers are sailors. Some sailors are not pirates. So, some pirates are not landlubbers.

4-5. All sound arguments are valid arguments. Therefore, because some sound arguments are mathematical arguments, some mathematical arguments are not valid arguments.

4-6. No sharks are pets, since no barracudas are pets, and no sharks are barracudas.

4-7. All curmudgeons are pessimists. All pessimists are cynics. So, some cynics are curmudgeons.

4-8. No beach bums are workaholics. Some beach bums are rollerbladers. So, some rollerbladers are not workaholics.

4-9. All ecologists are environmentalists. Hence, because all ecologists are wilderness lovers, all wilderness lovers are environmentalists.

4-10. All cats are carnivores. All tigers are cats. So, all tigers are carnivores.