

CS 100 - Homework 12

Deadline:

Because you are submitting this ON PAPER, it is due by **5:00 pm** on Friday, December 7

How to submit:

This homework is to be submitted ON PAPER. It must be stapled, with your name on the first page.

So, you must submit it EITHER by:

- turning it in during class on Tuesday, December 4 or Thursday, December 6
- turning it into the drop-box next to the Math/Computer Science Office, BSS 320, by 5:00 pm on Friday December 7. IF YOU DO THIS, WRITE "FOR SHARON TUTTLE" ON THE TOP OF THE FIRST PAGE.

Purpose:

To practice using Venn diagrams to determine if categorical syllogisms are valid, and to practice using propositional-logic truth tables to determine if certain kinds of deductive arguments are valid.

Important notes:

- STAPLE the pages for this homework together, with YOUR NAME on the top of the first page.
- IF you submit it by turning it into the Math/CS department office, BSS 320, then put "FOR SHARON TUTTLE" on the top of the first page, also.
- Your answers may be handwritten, typed/word processed, or a combination of handwritten and typed/word-processes. BUT, they must be submitted ON-PAPER. NO electronic submissions will be accepted for THIS particular homework.

The Problems:

Problem 1

Your answers for this problem may be handwritten, typed/word-processed, or a combination of handwritten and typed/word-processed, BUT note that they are to be turned in ON-PAPER.

Use Venn diagrams to test the validity of the following arguments.

These arguments include statements already converted into standard categorical form, BUT note that you need to be careful to determine which are the premises and which is the conclusion in each.

You are expected to submit two things for each argument:

- a labelled 3-circle Venn diagram, with the circles labeled according to textbook and class convention

(with the bottom two circles representing the sets/categories involved in the conclusion) and with appropriate shading and/or X's corresponding to the argument's premises.

- after the diagram, put a statement noting whether the argument is valid or not, and why.
 - (for example: This argument is valid, because this Venn diagram indeed shows that no cardiologists are also pro wrestlers.
 - ...This argument is not valid, because this Venn diagram shows that it is not guaranteed that there is a magician who is also a painter.)

1-1. Exercise 9.4, Part I, Problem 2 ("No farmers...")

1-2. Exercise 9.4, Part I, Problem 3 ("All curmudgeons...")

1-3. Exercise 9.4, Part I, Problem 5 ("No beach bums...")

1-4. Exercise 9.4, Part I, Problem 6 ("All violinists...")

1-5. Exercise 9.4, Part I, Problem 9 (Some telemarketers...")

1-6. Exercise 9.4, Part I, Problem 12 ("All ecologists...")

1-7. Exercise 9.4, Part I, Problem 14 ("All cats...")

1-8. Exercise 9.4, Part I, Problem 15 ("All sound...")

1-9. Exercise 9.4, Part I, Problem 17 ("Some dreamers...")

1-10. Exercise 9.4, Part I, Problem 20 ("All meteorologists...")

1-11. All persons who drink and drive are irresponsible persons.

Some persons who talk on a car phone are not irresponsible persons.

So, some persons who talk on a car phone are not persons who drink and drive.

1.12. All ales are beers.

Some chardonnays are not beers.

Hence, some chardonnays are not ales.

Problem 2

Your answers for this problem may be handwritten, typed/word-processed, or a combination of handwritten and typed/word-processed, BUT note that they are to be turned in ON-PAPER.

Use propositional-logic-style truth tables to test the validity of the following arguments.

In this case, the variables to use are included, for grading sanity, BUT note that you need to be careful to determine which are the premises and which is the conclusion in each.

You are expected to submit three things for each argument:

- the argument written in propositional logic form. (for example,

$p \rightarrow q$

p

$\therefore q$

)

- a truth table for that argument, which:
 - follows the in-lecture conventions for these propositional-logic truth tables (for example,
 - use T and F for true and false
 - start with a column for each variable
 - for a 2-variable truth table, the first variable's values should be T, T, F, F; the second variable's values should be T, F, T, F)
 - includes a heading in which each column heading that is a premise is marked with a * after it, and each column heading that is a conclusion is marked with a C after it
 - has the premises and conclusion values CIRCLED for EACH row in which ALL of the premises are true (and ONLY for those rows)
 - IF YOU WISH, you may *repeat* columns so that, for example, the conclusion appears as the rightmost column, and/or so premises appear in a more-convenient column ordering.
 - for example, for the argument given as an example above, the truth table would be:

p*	qC	p→q*	qC

(T)	T	(T)	(T)
T	F	F	F
F	T	T	T
F	F	T	F

- after the truth table, put a statement noting whether the argument is valid or not, and why.
 - (for example: This argument is valid, because for each row in which all the premises are true, the conclusion is also true.
 - ...This argument is not valid, because there is a row in which all of the premises are true, but the conclusion is false.)
- 2-1.** It is the case that John passed Chemistry and Physics. So, it is also the case that John passed Chemistry or Physics.
- p=John passed Chemistry
q=John passed Physics
- 2-2.** If Vegas Jack committed the crime, then the Weasel will go free. So, Vegas Jack committed the crime and the Weasel will go free.
- p=Vegas Jack committed the crime.
q=The Weasel will go free.
- 2-3.** It's not the case that John passed Chemistry and Physics. John didn't pass Chemistry. So, John

didn't pass Physics.

p=John passed Chemistry

q=John passed Physics.

- 2-4.** Her friends don't care, and her parents don't care. So, it is not the case that BOTH her friends care and her parents care.

p=Her friends care.

q=Her parents care.

- 2-5.** It is not the case that it is BOTH raining and foggy. So, it is the case that it is not raining or it is not foggy.

p=It is raining.

q=It is foggy.

- 2-6.** It is not the case that Claire is both red-haired and left-handed. So, Claire is not red-haired, and Claire is not left-handed.

p=Claire is red-haired.

q=Claire is left-handed.

- 2-7.** If we're on Neptune, then we're in the solar system. We're in the solar system. So, we're on Neptune.

p=We're on Neptune.

q=We're in the solar system

- 2-8.** If the train is on time, then the bus is not on time. The bus is not on time. So, the train is on time.

p=The train is on time.

q=The bus is on time.

- 2-9.** If I roll a 6, then I win the game. So, if I don't roll a 6, then I don't win the game.

p=I roll a 6.

q=I win the game.