

# H101 Homework III

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## Introduction

Some of the questions—maybe all—might not have precise answers. Again, I'm looking for *how* you're thinking—and I like *abnormal* thinking too. Please, you may discuss in a very vague way the problems, but you are expected to do this on your own. Please turn in typed—with pages names, stapled, *etc.*. Due Tuesday at the beginning of class.

## Problems

1. Which of the following are valid Propositional Logic (PL) atoms:
  - (a)  $4 + 4 = 9$
  - (b)  $x = 2 \wedge \vee \mathbf{True}$
  - (c)  $\mathbf{True}$
  - (d)  $\neg \text{I am happy to be alive} \wedge \text{she is droll.}$
  - (e) What's that?
  - (f)  $\rightarrow AB$
  - (g)  $\neg\neg\neg\neg \mathbf{F}$
  - (h)  $\text{It rains} \rightarrow \text{I nap.}$
2. Let  $A, B \in \text{PL}$  (they are correctly formed). What does  $A$  is *logically equivalent* to  $B$  mean? How would you show it?
3. What is an environment  $\sigma$ ?
4. Discuss in a paragraph a device that would be improved if it could reason—don't use any of the examples in class.
5. In the question above, you wanted to imbue the device with reason—can you find a *kludge* to approximate it?
6. Define in a paragraph *structure*. What is structure used for?
7. These questions have to do with *Blink!*
  - The successful car salesman was good, because he was a good car salesman—but the author says the salesman was good because? What was the car salesman's name?
  - Did Goldman actually have an algorithm in his solution? How much better were the comparisons after two years?
  - What aspect of *Blink!* applies to the Warren Harding story?

- The book is overwhelmingly positive in its presentation of instantaneous judgements. Speculate if the author had been less biased and examined cases which resolved unsuccessfully.
  - One marvelous things about people is they can adapt. Given the experts on reading people's faces, posture *etc.*, what happens when you come across someone who can intentionally fool you? How can you possible estimate this population *vs.* the population who can be read?
  - Give several cases which you would *not* go with your gut instinct or blink. Briefly explain why in each case
8. Let  $\sigma = [A/T, B_{55}/F, he/George\ Washington]$ . Apply the environment to the following sentences
- (a)  $A \wedge A$
  - (b)  $A \rightarrow (B_{55} \rightarrow \text{he was the first President of the United States})$
  - (c) T
  - (d)  $B_{55} \vee B_{54}$
9. Conversion of bases. I will write  $X_y$  to mean  $X$  is base  $y$ .
- (a) Convert  $4_5$  to base 10.
  - (b) Convert  $1010_2$  to base 3.
  - (c) what numbers remain the same in all bases 2, 3, 4, ...?
10. What two questions can you ask of a set?
11. Why are  $\{1, 1, 1, 1\}$  and  $\{1, 1\}$  equal?
12. Write the definition of set intersection: every element  $x$  that belongs to  $A$  also belongs to  $B$ .
13. What are the three ways to describe a set?
14. Given sets  $A, B$ , and  $A \subset B$  what is the PL equivalent? Convince me you understand why.
15. One thing we did not do when assessing whether the Economist was liberal, conservative, *etc.* was to define what those terms mean. What do those terms mean to *you*—I don't want a dictionary definition.
16. Why do you suppose Andrew didn't show up for class on Thursday? Be honest in your answer—I'm not looking for a quip.
17. For the next problem, on the right side of the table is a word, on the left, two letters. Quickly scan each row and circle the letter that comes to mind first. We will look at the answers later in class

happy	A	V
big	Z	W
autumn	C	L
hand	E	Q
Apple	H	B
Wind	A	C
Quiet	P	L