Homework 2

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Homework

1. Define the following terms:
   (a) reasoning
   (b) logic
   (c) disparate
   (d) tautology
   (e) Precision
   (f) chagrin
   (g) telephonic
   (h) luddite
   (i) ostensive

2. Your friend who’s a computer scientist tells you that most problems can be solved using programming. What would be your response?

3. There are many kinds of logics. Some try to model belief as opposed to truth. What are the difference between the two? How might we even begin to create a logic of belief? In terms of problem solving, discuss the interplay between belief and truth. Can someone believe something even if it’s not considered true? Can something be true that someone doesn’t believe it? In moving from CSA to PSA, we can ostensively change truth. Can the same be said of belief? Please explain your position.

4. Microsoft is releasing a portable device to compete with Apple’s iPod\textsuperscript{TM}. Using the Internet, find this device. What interesting features to you will this device have? Many cell phones are increasingly adding functions that clearly aren’t telephonic as we initially understood them to be, for example, cameras and MP3 players.

   (a) Digital Convergence is a term that reflects the merging of disparate technologies typically with some form of electronic communication as a significant element. Apple is contemplating creating an iPod\textsuperscript{TM} with a phone. Give two other instances of digital convergence not discussed in this homework. Like most processes, there are pros and cons for digital convergence. Why might a company want to pursue digital convergence. What reasons can you think of that would discourage a company to pursue digital convergence.

   (b) As a kind of fun exercise, please count the number of items you come into contact with that keep time. What percentage of them differ in the time they display. This is digital convergence. Is it helpful to you?

   (c) You have a choice of Microsoft’s upcoming device (you’ll have to find the name, but I’ll call it ANT for ANother Technology. You also are likely familiar with the iPod\textsuperscript{TM}. You can either have one or can find information online at www.apple.com. Pick a gadget-laden phone, like the Treo\textsuperscript{TM}. You must pick one and only one to use.
i. List five criteria that you’d use to select one of these three devices.

ii. Using weighted ranking, show which one you’d end up selecting. Use all five criteria for the three devices. Please state explicitly assumption you’re making as you work through the problem.

iii. Are your criteria reflective of most people? If not, list criteria that you believe most people would be using to pick the device. State your assumptions explicitly.

5. For this problem assume "Today is Saturday" is T, "Chicago beat Seattle" is T (and it is, since they won last night.) Assume $\sigma = \{(A,T), (C_1,F)\}$.

(a) Create a tautology from "Today is Saturday".

(b) Create the truth table for $\neg A \lor B$. What operator is logically equivalent to this truth table?

(c) Find the truth value of this formula: $\neg "Today is Saturday" \rightarrow "Chicago beat Seattle"$.

(d) Many people find the logical If-Then troublesome–why?

(e) $A \land \neg A$ is what kind of formula?

(f) Tautologies are not really meaningful in some sense, why?

6. When we convey or represent analog information to digital, we gain and lose. What do we gain? What do we lose? Which would be easier to trick—an analog system or digital?

7. For the following items, identify each as either analog or digital. For each analog, propose a method of making a digital representation. Explain what you’ve lost in terms of information.

(a) eye-color

(b) number of grapes used in a bottle of wine.

(c) The amount of grape juice rendered from the collected grapes to make wine.

(d) The amount of gasoline you put into your vehicle.

(e) The amount of money you are charged for the gasoline.

(f) Why should the answers to the last two questions make you uncomfortable?

(g) Humor

(h) Number of grains of sand on a beach.

(i) The time an organism lives.

(j) The number of people who watch a particular television show.

(k) The “collective enjoyment” of the people to decide whether to continue producing the television show.

8. Let $X$ stand for the sentence "$4+4$ is the cube of 2", $Y$ stand for the sentence "Diet Dr.Pepper tastes better than Coke Zero", and $Z$ stand for $\neg(Y \rightarrow (X \lor Y))$ In one CSA $Y$ is true (for your Professor); in another CSA $Y$ is F (an unnamed student in the 1:00pm section). Find both the values of the truth values of $Z$ in each of the CSAs. What does this tell you about CSAs?

9. Draw the circuit that is equivalent to this PL formula: $\neg(\neg A \lor \neg B)$. What operator is this logically equivalent too?

10. We’ll do more logic gates on the next homework. Visit my blog and see how Informatics students can make a million dollars. Discuss some strategies to help with recommendations.