1 What should I hand-in?

The homework must be typed–no handwriting. Your name, username, and page number must appear on each page–likely you’re using Microsoft Word–check the header and the footer. There’s one student who’s handwriting looks like typing (I won’t single him out, but he sits in the front row a lot and intends on majoring in applied physics); I’d make a special exception for him, except it looks like he prints 6pt font. Your answers should be 11pt font. Please do your own work–please.

Questions might be strange and vague–what I’m looking for is contemplative answers. Don’t presume that because you can regurgitate my lectures that that’s what I want–I’m giving you a chance to explore and take chances. Here’s what I imagine the scale to be (See Fig. 1

Figure 1: Left is good. Right is bad.

2 Due Thursday, Sept. 20, 2007 at the beginning of class

Note: for bases, I will subscript the base I want the number to be in. For example, 1012 is base 2 and is equal to 510.

1. Convert 445 to base 10
2. Convert 889 to base 10
3. Convert 102410 to base 2
4. Find the values of the following expressions in base 10: \( \frac{10_2}{10_2} + \frac{10_5}{10_5} + 310_2 \)
5. In 50 words (exactly) explain the difference between analog and digital.
6. In 20 words (exactly) explain what “Logic” is.
7. Define Informatics in your own words (don’t be stingy on the words)
8. For the following Propositional Statements, mark whether it possesses correct syntax or not:

1. $A \land B$
2. $A \rightarrow A$
3. $B \lor (A \land C)$

9. In class we learned about the operators $\land$, $\lor$, $\rightarrow$. A binary operator is said to be *commutative* if the arguments can be exchanged with one another and the result is the same. For example ‘+’ is commutative, because $3+4 = 4+3$. Division isn’t commutative, because $3/4 \neq 4/3$. Identify from the above operators the ones, if any, that are commutative. Prove your answer.

10. Create a circuit that models the $\leftrightarrow$ operator.

11. In Fig. 2 two circuits are drawn. Create a *truth table* for each circuit. Write the equivalent propositional logic formula for circuit one. *Try* to write one for circuit two. The wire is colored green just to distinguish between the two wires issuing from the AND gates.

12. In 30 words describe what “problem solving” is. Include an explanation of “solution.”

13. Is a vending machine *likely* a finite automaton?

14. Define “epistomology”. Compare and contrast in about a paragraph *science* and *technology*.
15. Who wrote the following poem? What emotions does it invoke in you? Please memorize it.

so much depends
upon
a red wheel
barrow
glazed with rain
water
beside the white
chickens.

16. In the Fig. 3 are two grids and two mice. Above each grid is a color pallete. For the top grid, you can only use black and white—for the bottom grid you can use four colors shown. In both grids, but coloring squares (a square can have only one color), draw the mice. What are you learning while you do this fun, exciting exercise that your friends will be envious of? Give a good explanation. You may print this page out and hand it in as part of the assignment if you do not know how to snag images from *pdf files.

Figure 3: Rendering mice.