

CSE-111 Great Ideas in Computer Science Final Exam Study Guide (Summer 2009)

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05/22/2009

1. The exam will cover everything that's been taught this semester, except for the history part covered in the first half.
2. The points will be distributed equally between the three major topics:
 - (a) Binary \Leftrightarrow decimal conversion, logic expression \Leftrightarrow truth tables \Leftrightarrow logic gates.
 - (b) Karel the Robot.
 - (c) Basic concepts of computers, coding methods, algorithms, operating systems, Internet, cryptography, and phishing.
3. What to study for part (a)?
 - Review the problems given in HW1, HW2, and the midterm exam. The questions asked will be similar to those appeared before.
 - Make sure you know:
 - what an XOR gate is and how/when it is used;
 - how to solve this type of problem: given a random 8 bit sequence of 0s and 1s, decipher its meaning if its coded in (1) unsigned binary number, (2) signed binary number (3) 2's complement (4) even in ASCII;
 - how to derive a logic expression & truth table & draw the final logic gate, given a description of the problem (like the free food alert problem in the midterm exam and the smart closet problem we went through in class);
 - how to perform binary arithmetic using 2's complement numbers correctly, while verifying it in decimal arithmetic.
4. What to study for part (b)?
 - Read through all the Karel slides again, carefully, even if you're already pretty familiar with programming in Karel's environment.
 - Make sure you know by heart:

- the four types of errors;
- the structure of Karel's programming language, e.g. where do you place the define-new-instruction command?
- how the commands (if/else, iterate, while) work.
- Typical questions that appeared many times on previous final exams are like:
 - Given you a section of code & a small part of Karel's world, what is the number of times Karel executed a specific command before it shut down, or the number of beepers in his bag when he shut down.
 - Given you a section of faulty code, you are then asked to find out and fix all the errors.
 - Given you a not too complicated initial world, you are then asked to write a 20-30 lines of code to perform a simple task on paper.

5. What to study for part (c)?

- Make sure you know the history of the Internet, the definition of the terms, and especially how the internet works (e.g. what is a domain name, how does it work, what is a IP address)?
- What is cryptography? What does it have to do with our daily lives? You might be asked to perform an simple exercise on cryptography in the exam.
- What is phishing? How does all different types of phishing work?
- What is an operating system?
- What is an algorithm?
- The components of a computer, their purpose and function, and different type of speed/size units.