These are instructions for the lab on Wed 8/29 or Thurs 8/30 (depending on

which section you have.)

MAKE SURE YOU KNOW WHAT TIME AND ROOM YOUR CLASS IS IN!!

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BEFORE CLASS:

There is a survey that you need to photocopy before class. Look up your

sections of the course on testudo.umd.edu to find out how many copies you

will need. Make some extra ones in case some students arrive who are still

on the waitlist (but not yet on the official roster).

In general, the copiers are not reliable -- it's best to make copies the day

before whenever possible.

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BE SURE TO ALLOCATE 5 MINUTES AT THE END OF THE CLASS SESSION FOR THE

SURVEYS. For example, if your class is from 12:00 to 12:50 then you should

start handing out the surveys at or just slightly before 12:45.

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Introduce yourself -- write your name on the board and tell the students

that they should know your name and also which section they are in!

Tell them a little bit about yourself.

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Announce these reminders for students:

\* Office hours are underway -- check the schedule and come see us!

\* We will be posting "study questions" on the class weboage.

The authentication is

login: 131

password: student

\* Tell them that there will frequently be a quiz with content that

was presented the previous week in lecture and lab, or possibly things

from before. Quizzes are not announced, so they'd better come to class

every time.

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Go over the concept of different number bases. You may present this any way

you want -- WE ARE NOT COVERING IT IN LECTURE, SO IT'S UP TO YOU TO DO A GOOD

JOB. The goal is to get them to be able to convert numbers in base 10

to and from other bases. (Also, we'd like them to be able to do the

easy conversions between binary, octal, and hexidecimal. These are trivial.)

Here is an outline of how I would present this concept:

I suggest starting with a base OTHER THAN binary -- how about "base 6".

Remind them of how base 10 works (they learned this in elementary school)

592 = 5 \* 10^2 + 9 \* 10^1 + 2 \* 10^0

Explain that in base 6, we are only allowed digits 0-5, and we want to

represent all of the numbers but just with these symbols.

Show that 253\_6 (253 base 6) =

2 \* 6^2 + 5 \* 6^1 + 3 \* 6^0 [everything on the right is

base 10]

= 2 \* 36 + 5 \* 6 + 3 \* 1

= 72 + 30 + 3

= 105\_10 (105 base 10)

Do another example going from a different base.

(come up with others if they are having difficulty)

136\_7 = 76\_10

423\_5 = 113\_10

Show the algorithm for going the other direction [for example start with a

base 10 number and convert it into base 7].

One way to explain this is via repeated "integer division". This means

truncating while remembering the "remainder":

Let's convert 76\_10 into base 7:

76\_10 divided by 7 gives you 10 remainder 6

10\_10 divided by 7 gives you 1 remainder 3

1\_10 divided by 7 gives you 0 remainder 1 so 76\_10=136\_7

Now let's convert 113\_10 into base 5:

113\_10 divided by 5 gives 22 remainder 3

22\_10 divided by 5 gives 4 remainder 2

4\_10 divided by 5 gives 0 remainder 4 so 113\_10 = 423\_5

Do the exact same steps, but for base 2. (Motivate this by explaining how

internally, the computer stores EVERYTHING this way, so it is a good skill

to be able to translate numbers back and forth between our usual

representation (base 10) and the computer's usual representation (base 2)).

Practice going back-and-forth between base 2 and base 10 a bit -- this is the

most important case for us.

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Introduce the terms hexadecimal (base 16)

and octal (base 8)

Do direct conversions among bases 2, 8, and 16. [This just amounts to

translating digits. For example, To translate 75 (base 8) into base 2,

you just translate one digit at a time. 7 becomes "111" and 5 becomes

"101" so the result is 111101 (base 2).]

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By the end of today's lab session, they should be able to convert from

base 10 to any other base, from any other base to base 10, from octal to

binary and back, from hexadecimal to binary and back.

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If you have extra time, quiz them by putting examples on the board and

having them try them out. Then go over them carefully yourself on the

board.

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During the last 5 minutes of class:

Hand out the survey and have them fill it out. You should openly tell them

that one of the reasons we are doing this is so that when doing paired

exercises we can pair experienced students with less experienced ones.

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I'll explian what to do with the surveys before the following class.