CSCI 2321 (Principles of Computer Design), Spring 2015
Homework 3

Credit: 15 points.

1 Reading

Be sure you have read all assigned sections of Chapter 3 and Appendix B.

2 Notes

- If the assignment asks you to do one or more problems from the textbook, *be sure* you get them from the edition specified in the syllabus; these sets of problems change from edition to edition.
- If a question requires you to do calculations, your odds of getting partial credit are much better if you show enough work to make it clear how you arrived at your answer.

3 Problems

Do the following problems. You may write out your answers by hand or using a word processor or other program, but please submit hard copy, either in class or in one of my mailboxes (outside my office or in the ASO).

1. (5 points) Do problems 3.22 and 3.23 from the textbook. (You will learn more if you do as much as possible just using pencil and paper and your brain rather than a calculator or the like.)
2. (Optional, up to 5 extra-credit points.) Do problems 3.12 and 3.18 from the textbook. Problem 3.18 is in my opinion somewhat ambiguously stated, but I think the two inputs (74 and 21) are meant to be interpreted as base-8 numbers.

   To do this problem you will need to read the material about multiplication and division in sections 3.3 and 3.4. The goal is to produce tables like the ones in Figures 3.6 and 3.10, except with 6-bit values rather than the 4-bit values in the figures. The problems tell you to use the hardware described in Figures 3.3 and 3.8, so you'll want to look at those figures — at least at the captions since that's where the textbook tells you how the various registers and work areas are initialized — but you'll probably also want to look at the algorithms sketched in Figures 3.4 and 3.9.
3. (5 points) Do problems B.7 and B.8 from the textbook.
4. (5 points) Do problems B.37 and B.38 from the textbook. For B.37 you are to produce something analogous to the diagram in Figure B.10.2; for B.38 you are to produce something analogous to the Boolean expressions in the text following Figure B.10.2 (except that you will need a separate expression for each bit of the output state, assuming you have more than two, which you almost certainly will). *Hint:* You might need more than three states.