CS 371: Computer Engineering  
Spring 2020

Instructor:

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Office Hours: 2:00 - 3:00 MWF or by appointment (use email)

Texts:  
(Required) R. Detmer, Essentials of 80x86 Assembly Language, Jones & Bartlett Learning  

Assignments:  
Three assembler programming assignments and three hardware assignments.

Project:  
The project will be the construction of a simple CPU.

Homework:  
“Daily” assignments, which have no direct affect on your grade, but do count as slush!

Course Objective and Learning Outcomes

Big picture, this course fills the gap between the statements and data structures of a high-level language (e.g., Java) and the hardware logic gates from which a computer is built. By the end of this class you should be able to say the following:

1. I can produce an analysis (truth table) from a simple circuit diagram involving basic logic gates.
2. I can design a circuit from my own analysis of a problem statement.
3. I can design and build a simple CPU.
4. I can write correct assembly-language programs for simple tasks.
5. I understand the mapping from basic high-level source code features such as while loop, if statements, and arrays to assembly language.

Grading:

Lab work 50  
Programming Assignments 50  
Hardware Assignments 50  
Project 100  
Midterm 100  
Final 100  
Slush ?  
Total 45%

Late work:
Assignments are due on their due date at the start of class; those handed in after that lose 10% a day (a day is defined as 24 hours).

LAF:
Printed assignments should be submitted 2-up. Alas, illegible and/or sloppy assignments will suffer :(

Cheating:

Don’t. Individual work is expected on your programs and exams (note that asking for help finding a “bug” is not considered cheating). You are always welcome to ask if a particular type of collaboration is OK. Please do so before engaging in a collaboration you are unsure about.

I fully expect you to live up to your Honor Code Pledge.

Tentative Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Readings (always read chapter summaries)</th>
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<tbody>
<tr>
<td>1</td>
<td>introduction / assembly coding 101</td>
<td>Detmer 1, 2 (except 2.5), pages 60, 69-71</td>
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<tr>
<td>2</td>
<td>addressing modes, basic instructions</td>
<td>pages 75-77, 81, 90-94, 102-106, 3.5, 4.1-4.2</td>
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<td>3</td>
<td>control: loops and procedures</td>
<td>4(except 4.5), 5.1-5.3, Figure 6.1</td>
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<tr>
<td>4</td>
<td>data types (pointers and arrays), procedures</td>
<td>4.5, 4.6, 5.1-5.3, 5.5</td>
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<td>5</td>
<td>bits &amp; shifts, more maths, interrupts and I/O</td>
<td>6, 7?</td>
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<tr>
<td>6</td>
<td>hardware 101 / arithmetic circuits</td>
<td>Mano 1, 2</td>
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<tr>
<td>7</td>
<td>K-maps / combinational logic</td>
<td>2</td>
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<tr>
<td>8</td>
<td>Spring Break ... Yippee!!</td>
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<tr>
<td>9</td>
<td>multiplexers</td>
<td>3</td>
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<tr>
<td>10</td>
<td>just in case / buffer / MIDTERM</td>
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<tr>
<td>11</td>
<td>sequential circuits</td>
<td>4</td>
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<td>12</td>
<td>flip flops (have a pair?), registers</td>
<td>4, 6</td>
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<tr>
<td>13</td>
<td>register transfer</td>
<td>6, 8</td>
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<td>14</td>
<td>computer design / clock dividers</td>
<td>8</td>
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<tr>
<td>15</td>
<td>FINAL</td>
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Note: If you have a disability which is documented with the Disability Support Services Office and wish to discuss academic accommodations with me, please contact me as soon as possible.

To request academic accommodations due to a disability, please contact Disability Support Services (DSS), Newman Towers West 107, at DSS@loyola.edu or call (410) 617-2750/2062. If you already registered with DSS and requested an accommodations letter (and DSS has sent the letter to your professors via email), please schedule a brief meeting to discuss the accommodations you might need in this class.