These are some practice problems for your final. These problems only cover the "new" material we have covered since the last exam. However, your final will be cumulative, with approximately 50% on the "new material", 25% on the material also covered by Exam 1, and 25% on the material also covered by Exam 1. In addition to these problems, I recommend you:

- review the previous tests
- try the end of chapter problems - I'm more then happy to check your answers if you're unsure of any of them.
- review the practice problems from the previous exams
- review any in-class problems, worksheets, and activities

The exam will be very similar to the previous exams in format. Some multiple choice, some multiple answer, some code writing, etc. It will be closed book, closed notes.

Material you are responsible for:

- From the textbook
  - Chapters 1-8
  - Chapter 9, pp 156-162
  - Chapter 11-12
  - Chapter 14
- Anything we have covered in class such as extra history, Watson, etc.
1. Consider the following code snippet. Describe what the user will see when it is executed.

```javascript
x = 0;
y = 5;

if (x < y) {
    x = x + 1;
y = 2;
    alert('Stage 1');
}
if (x == 0) {
    x = 4;
y = 6;
    alert('Stage 2');
} else {
    x = 2;
y = 10;
}

alert('The value of x is ' + x);
alert('The value of y is ' + y);
```

2. Evaluate the following boolean expressions
   (a) true && true
   (b) true || false
   (c) false && false || true
   (d) !(6 == 3 * 2)
   (e) !(8 == 9-1)) && (16 != 2 + 6 * 2)

3. Write a snippet of code in JavaScript (e.g. you do NOT have to define a function or write HTML code) which does the following:
   (a) uses two variables: temp and cold which represent the current temperature and the
       temperature at which the user feels cold.
   (b) if the current temperature is lower than the point at which the user feels cold, your code
       should display an alert telling the user to dress warmly. otherwise, the user should be told
       that it's nice weather.

4. Convert the following decimal numbers to binary:
   (a) 23
   (b) 65
   (c) 1022

5. Convert the following binary numbers to decimal
   (a) 1001111
   (b) 111000111
   (c) 1100010010

6. Interpret the following sequence of bits as
   (a) ASCII characters (table on pg 222 in your book)
(b) 4-bit binary numbers

01001000011011110111011100111111

7. Explain the difference between lossy and lossless compression.
8. What is meant by sampling analog data? How does this convert analog data to digital data?

9. A webpage contains the following two code snippets: one written in JavaScript and one in HTML. In your own words explain what will be displayed when the button below is clicked.

```javascript
function mystery(a, b, c) {
    x = a + b + c;
    x = x / 3;
    return x;
}
...
<input type="button" value="Click me!" onclick="z = mystery(12, 1, 2); alert('The value of z is: " + z);">
```

10. Using simple 16-bit machine language 261 of your textbook (Figure 14.10), write a series of bits which represent the following instructions:
    (a) Load the contents of memory location 21 into register 3
    (b) Move the contents of register 2 to register 3
    (c) Subtract the values in register 1 from register 3 and store the result in register 0.

11. Explain the purpose of a Program Counter in the Control Unit of a CPU.

12. How are the registers of a CPU different from main memory?

13. For each of the images of a simulation below, explain what will happen when the simulation is run.