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 than 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.
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. Convert the following decimal numbers to 16-bit two's complement format.
   (a) 24
   (b) -24
7. Interpret the following sequence of bits as
   (a) ASCII characters (table on pg 222 in your book)
   (b) 4-bit binary numbers

   01001000110111011101111111

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

10. In your own words explain what the following code does.

    ```javascript
    num1 = Math.ceil(Math.random()*10);
    num2 = Math.ceil(Math.random()*10);

    while (num1 != num2) {
      num1 = Math.ceil(Math.random()*10);
      num2 = Math.ceil(Math.random()*10);
    }

    alert('Success! num1 is ' + num1 + ' and num2 is ' + num2);
    ```

11. Consider the following code snippet:
    ```javascript
    x = 4;
    while (x < 10) {
      alert('The value of x is ' + x);
      //comment
    }
    ```

    (a) What logic error does the following code demonstrate?
    (b) What JavaScript statement could you put in place of the //comment to fix the problem?

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

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

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