CS211 ALGORITHMS & DATA STRUCTURES II

LAB 5

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CRYPTOGRAPHY

Pen and Paper Exercise

Calculate 7^{29} mod 11 by hand (see crypto notes).

Don't even use a calculator. Lots of people forget their calculator in the exam, so it's worth being able to do every single step by hand.

Programming Exercise

Write a program that takes in a sentence from the user, and outputs that sentence in Morse code. Your program should sound as close as possible to the Morse code examples heard here: https://en.wikipedia.org/wiki/Morse_code

This method for producing beeps might prove useful:

```
import javax.sound.sampled.*;

  public static void tone(int hz, int msecs, double vol) throws LineUnavailableException{
      float SAMPLE_RATE = 8000f;
      byte[] buf = new byte[1];
      AudioFormat af = new AudioFormat(SAMPLE_RATE,8,1,true,false);
      SourceDataLine sdl = AudioSystem.getSourceDataLine(af);
      sdl.open(af);
      sdl.start();
      for (int i=0; i < msecs*8; i++) {
        double angle = i / (SAMPLE_RATE / hz) * 2.0 * Math.PI;
        buf[0] = (byte)(Math.sin(angle) * 127.0 * vol);
        sdl.write(buf,0,1);
      }
      sdl.drain();
      sdl.stop();
      sdl.close();
  }
```

Advanced Bonus Programming Exercise

Write a program that can listen to another computer beeping beside it and print the message on the screen that is being transmitted. Then we have 2-way Morse code, and it should be possible to have a conversation in Morse code over the phone.