**Topics:** Algorithms and Languages - Welcome to Scratch

**Approach:** Problem, Solution, Discussion, Repeat

**Main Ideas:**

1. **Admin News**
   - Labs start this week - Tuesday at 3:00 and 4:30 in 122
   - Office Hours: Tuesday 6-9pm, what other time is convenient?
   - For Lab1: bring some digital pictures on a USB drive or floppy
   - HW 2 Distributed: Start Now, find a buddy

2. **Recap of Big Ideas**
   - Computer Science: Problems and Procedures machines can perform
   - Information (text, images, sound, smells) can be represented as lists of numbers
   - Thus storing, processing, transmitting info = storing, processing, transmitting lists of numbers
   - Algorithm: a sequence of well-defined steps
   - Course: studying existing algorithms, learning to `speak’ algorithms: devise, read, discuss

3. **Problem ---> Algorithm ---> expression**
   - a. French toast - recipe can be expressed in French, English...
   - b. Compare these two algorithms (see sheet) for finding smallest
      - How do they differ? Which do you prefer? Why?
      - What if there were 100 cards?
   - c. Adding repeat and variables
      - Discuss the advantages of these additions to the language
   - d. Summary -
      - An algorithm is a sequence of steps,
      - Most computer languages have words and grammar to:
        1. store values (variables)
        2. examine each number (compare)
        3. modify each number (store/set)
        4. repeat an operation (loop)
        5. do 'if..then' (conditional/boolean)

4. **Quick demo of setting up a website [if time allows]**

5. **Scratch - actual computer programming**
   - a. Intro to Scratch
   - b. Lots of sample programs at scratch.mit.edu
   - c. Demo - Roomba simulation
     - WTP, WTS, HIW, LMTO
   - d. Stage, Sprites, Instructions, Scripts
   - e. Stage: 480 wide x 360 tall, (0,0) at center
     - Sprites have position (x,y)
     - and direction (0=up, 90=right, -90=left, 180=down)
     - Sprites can move, turn, goto, turnto
   - f. Action, Conditional Execution, Boolean Expressions, Loops
   - g. How do we get it to move? bounce off walls? off objects?
     - What about random bouncing off walls?
     - What about running over rugs? or plants?
   - h. Problem-solving strategies:
     - devise an outline
     - start small
     - focus on specific problems
     - experiment
     - combine results