

- **Questions**
- **Announcements**
- **Names**

Exercise: Guessing

- **With team, write pseudocode for guessing a number between 1 and 100. Be prepared why your approach the best way to solve the problem.**

Example: Multiplication

How would you multiply two numbers, using only the addition operator?

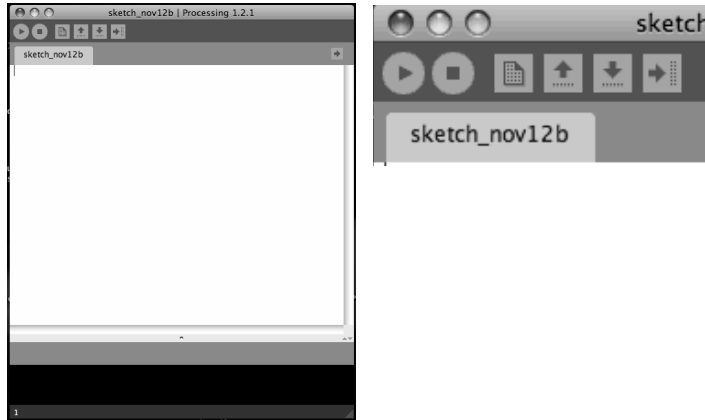
Concepts: iterations, efficiency

Algorithms are used to express solutions to computational problems.

- An algorithm is a precise sequence of instructions for a process that can be executed by a computer.
 - Sequencing, selection, iteration, and recursion are building blocks.
 - Different algorithms can be developed to solve the same problem.
- Algorithms are expressed and implemented using languages.
 - natural language, pseudo-code, and visual and textual languages.
 - better suited for expressing different algorithms.
 - can affect clarity or readability, but not whether solution exists.
- Algorithms can solve many, but not all, problems.
 - Many problems can be solved in a reasonable time.
 - Some need heuristic approaches to solve them in a reasonable time.
 - Some problems cannot be solved using any algorithm.
- Algorithms are evaluated analytically and empirically.
 - using many criteria (e.g., efficiency, correctness, and clarity).
 - algorithms for the same problem can have different efficiencies.

Processing

- Language for programming graphical and interactive computations



Some Processing code

```
void setup () {  
  size (480, 480);  
}  
void draw() {  
  if (mousePressed) {  
    fill (255, 0, 255);  
  } else {  
    fill (0, 255, 0);  
  }  
  rect (mouseX, mouseY, 50, 50);  
}
```

Processing Exercise

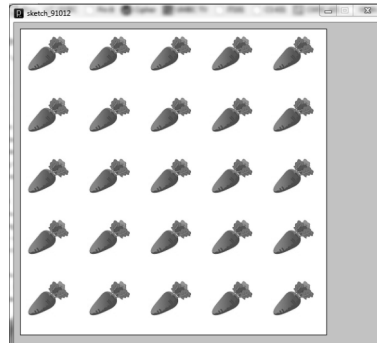
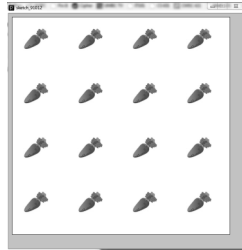
- **Break into groups of three (either within or across groups)**
- **Pick a computer; download Processing**
- **Complete tutorial 1**
 - One person types; the other two advise
 - When complete, demonstrate to course staff
- **Complete tutorial 2**
 - Swap roles (scribe, advisors)
 - When complete, demonstrate to course staff
- **Complete tutorial 3**
 - Swap roles (scribe, advisors)
 - When complete, demonstrate to course staff

Programming enables problem solving, expression, and knowledge creation.

- Programs are written to execute algorithms.
 - Requires an understanding of how instructions are processed.
 - Programs are executed to automate processes.
 - A single program can be run multiple times and on many machines.
 - Executable programs increase the scale of problems that can be solved.
- Programming is facilitated by appropriate abstractions.
 - Functions are re-usable programming abstractions.
 - Parameterization can be used to generalize a specific solution.
 - Data abstraction can separate behavior from implementation.
 - APIs and libraries simplify complex programming tasks.
- Programs are developed and used by people.
 - Developing programs is an iterative process.
 - Finding and eliminating errors is an essential part.
 - Documentation is necessary for developing maintainable programs.
 - Programs are evaluated for their correctness and style.

Assignment 3: Processing

- **Implement a program to help a user plan a garden, given**
 - Layout shape
 - Plant type
 - Number of plants



- **Appropriate collaboration: discuss, but write your own code**