Design Programming

DECO1012
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Introduction to Design Programming
Timetable

- Lectures: Tuesdays 2–3pm in ALT1
- Labs: Tuesdays 3–5pm in 262
- Assignments:
  - Weeks 3–5: Generating form and structure
  - Weeks 6–8: Animation and interaction
  - Weeks 9–13: Simulation and synthesis
Lecture Topics

› Introduction

› Programming
  › Drawing with code

› Functions
  › Animation and interaction

› Objects
  › Simulation and synthesis
Resources

› Unit of Study Web Page
  › http://www.arch.usyd.edu.au/~rob

› Processing Web Site
  › http://www.processing.org/

› Processing by Casey Reas and Ben Fry
  › Copies available for short-term loan in the library and to buy at the Co-op Bookstore on campus
Processing
A Programming Handbook for Visual Designers and Artists

Casey Reas
Ben Fry

Foreword by John Maeda
Why are you here?
Design Programming?

‣ Design Computing is...
  ‣ Doing creative things using computers
  ‣ Doing creative things with computers
  ‣ Getting computers to do creative things

‣ Design Programming...
  ‣ gives you the skills to be creative with computers, and
  ‣ (hopefully) to get computers to do creative things...
Why do designers program?

- Designing interactive products
  - Computer/video games
  - Multimedia authoring, e.g., DVDs
  - Web sites, e.g., using Javascript or Flash
Soda

www.sodaplay.com
Why do designers program?

- Exploring possible designs
  - Write software to explore the space of possible designs based on a set of rules
Jared Tarbell

www.complexification.net
Martin Wattenberg
turbulence.org/Works/song/
Why do designers program?

› MOST IMPORTANTLY: TO BE CREATIVE
  › Learning to program is like learning to draw, paint, sculpt, write, sign...
  › Programming gives you new ways to express yourself creatively
  › Programming gives you ways to escape the confines of packaged software
What is Computer Programming?
What is Computer Programming?

Computer programming is the process of describing all of the steps that a computer must perform to complete a task.
Computers are Stupid

Unfortunately, computers are REALLY STUPID and describing the steps that a computer must perform requires much more detail than it would to describe the steps to another person.
Making Toast

Imagine trying to describe how to make toast to a robot...

1. Locate a loaf of bread
2. Take one slice of bread from the loaf
3. Locate a toaster
4. Insert slice of bread in toaster
5. Turn on the toaster
6. Push down the slider on toaster
7. Wait until the toast pops up
8. Remove the piece of toast from the toaster
Things to Note about Making Toast

‣ The order of the steps to perform is just as important as the steps themselves
  ‣ e.g. the toaster must be turned on before the slider is pushed down

‣ The steps rely upon some material to work with, e.g. a loaf of bread

‣ The robot can call upon other devices to do some of the work, e.g. the toaster
Algorithms

‣ An algorithm is a sequence of steps that must perform to accomplish a task
‣ e.g., a recipe for making toast

‣ An algorithm isn’t the same as a computer program, they are often expressed at a higher level than a computer can execute

‣ Algorithms are useful for describing how computer programs work (or should work)
Computer Speak

‣ Program
  ‣ An implementation of an algorithm as a sequence of instructions

‣ Instruction
  ‣ A very small step in a program that a computer is capable of performing
Computer Speak

› Function
  › A piece of a computer program that performs a significant task

› Data
  › The material that a computer program works with, e.g., numbers, text, images, etc.
Steps in an Algorithm

‣ Statements
  • A combination of instructions that perform an action, e.g., insert slice of bread in toaster

‣ Sequences
  • A list of statements to be performed in order, e.g., insert slide of bread in toaster; turn on the toaster
Steps in an Algorithm

- **Conditionals**
  - A way to choose between alternative sequence, e.g., if loaf is unsliced then locate knife; use knife to cut slice of bread

- **Loops**
  - A sequence of instructions that is repeated, e.g., while number of slices of bread is less than slots in toaster
Making More Toast

1. Locate a loaf of bread
2. Locate a toaster
3. While number of slices of bread is less than slots in toaster
   1. If loaf is unsliced
      1. Locate a knife
      2. Use knife to cut slice of bread
   2. Take one slice of bread from the loaf
4. Insert slice(s) of bread in toaster
5. Turn on the toaster
6. Push down the slider on toaster
7. Wait until the toast pops up
8. Remove the piece(s) of toast from the toaster
9. Repeat steps 1-9 until enough toast is made
Making More Toast

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Questions?