Introducing computer science in a summer program
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Web pages

Course home	`http://www.cs.cmu.edu/~cburch/pgss01/`
Textbook home	`http://www.cs.cmu.edu/~cburch/survey/`

Schedule of topics

Week 1
1. Introduction, algorithms, pseudocode & flowcharts
2. Programming overview, variables, objects
3. Arithmetic expressions
4. Loops, strings

Weekend: Assignment 0

Week 2
1. If statement
2. Arrays
3. Class methods
4. Recursion

Weekend: Assignment 1

Week 3
1. Game playing
2. Internet, IP
3. TCP, HTTP, SMTP
4. Big-O notation

Weekend: Assignment 2

Week 4
1. Divide and conquer, mergesort, multiplication
2. Dynamic programming, Fibonaccis, all-pairs paths, game trees
3. Topics
4. Conclusion, quiz

Assignments

	Written portion	Programming portion
0.	Suppose you have a deck of cards, numbered 1 through 52, but one is missing. Invent, describe, and compare two algorithms for determining which card is missing.	Given a Logo-like robot class, write a program that reads a number r from the user and draws a circle approximately of radius r.
1.	Draw a recursion tree illustrating how the computer would execute a paint-bucket algorithm on an image. I give recursive pseudocode for the algorithm and a picture of the image.	I give rules governing the simulation of a forest preserve containing panthers, deer, and forage. Write a program that reads a number n from the user and determines how long the preserve lasts if it begins with n deer. Use this program to determine the best number of initial deer. (Ambitious students include age groups in their simulation.)
2.	Draw and evaluate a game tree for a particular tic-tac-toe board; give some big-O bounds for three different code segments.	Write a Go Fish client implementing a Go Fish strategy. I provide a library class for network communication, set up a Go Fish server, and describe the communication protocol. (Ambitious students attempt to write the winning strategy.)