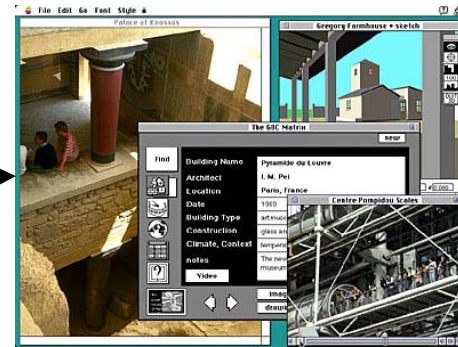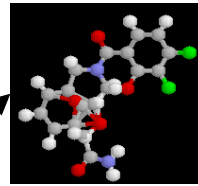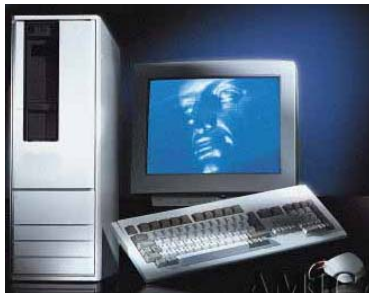# A High-Level Model For Software Development

What is involved in the process of designing, writing and maintaining computer programs?

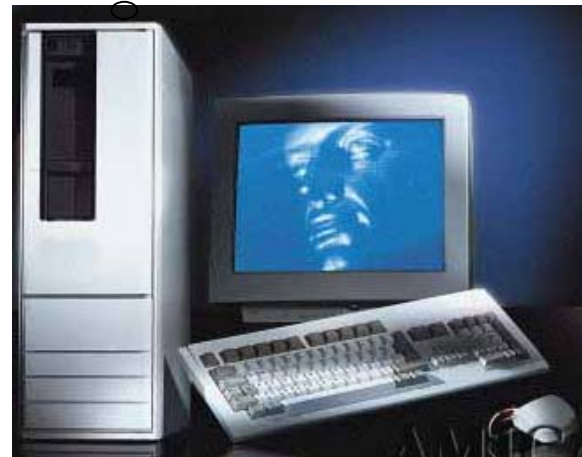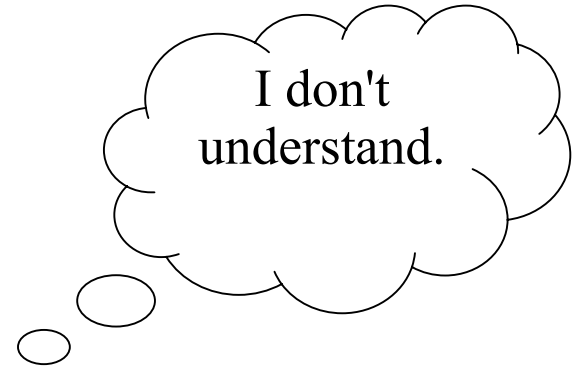# What Is Computer Science?

Review: Solving problems with the computer

Limitation: The Computer Is Not Very "Smart"

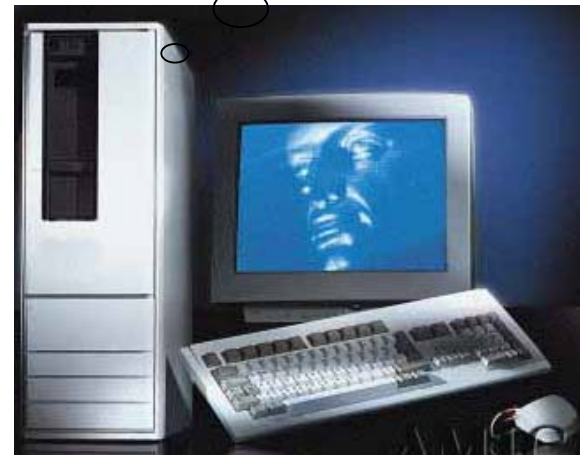My taxes returns are being audited. Help me!

I don't understand.

The Computer Must Be Told Exactly What To Do

Print my 1999 tax return.

Print my 2000 tax return.

:   :   :   :

0010001000
01000000
1000000..

Software: The instructions that tell the computer what to do to.

A Model For Creating Computer Software

Specify the problem

Develop a design

Implement the design

Maintain the design

Specifying The Problem

Determining what problem will be solved by the software

Bringing up important issues

Develop A High-Level Design

How to solve this problem? (algorithm)

Check the algorithm

Can be specified through flowcharts and pseudo-code (next section of notes)
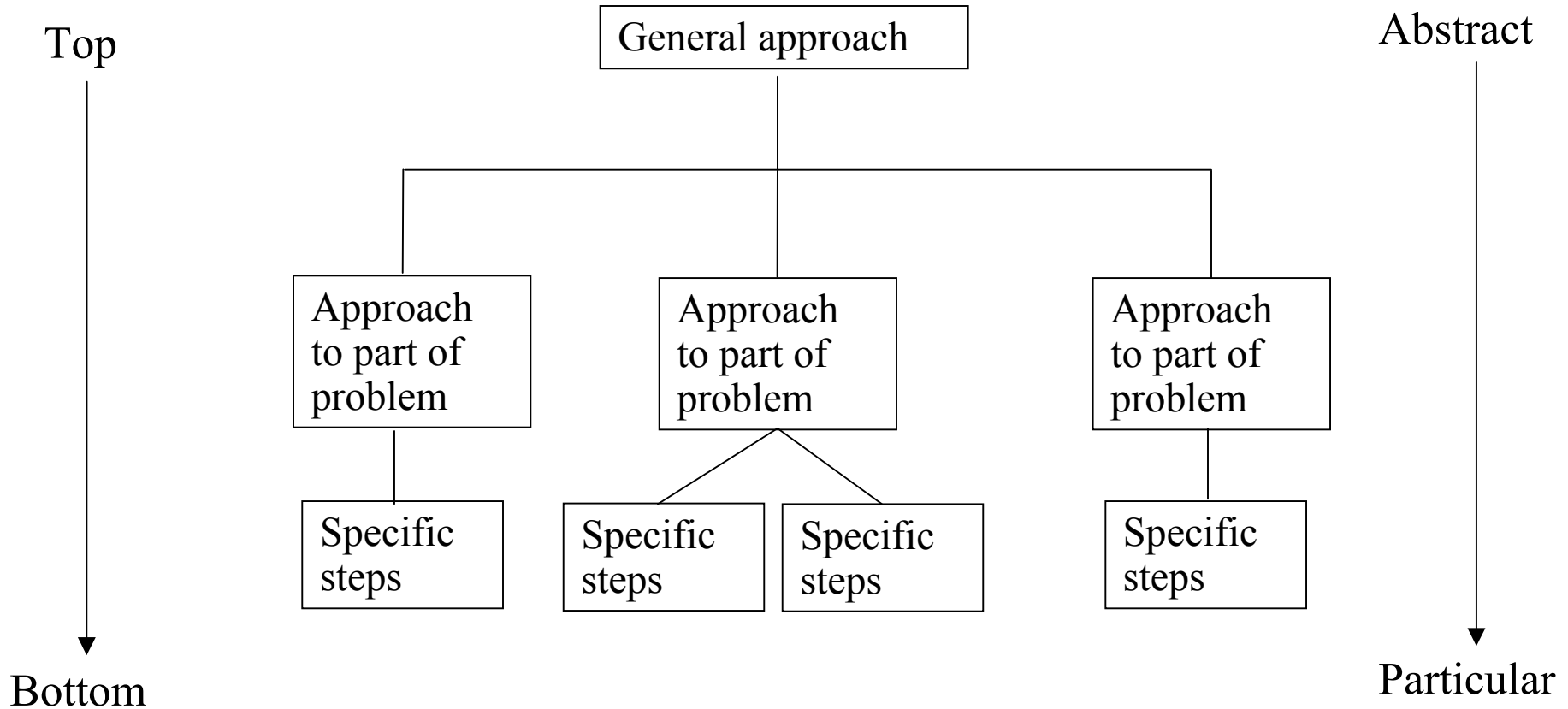
Developing An Algorithm: Top-Down Approach

Top

Abstract

General approach

Approach to part of problem

Approach to part of problem

Approach to part of problem

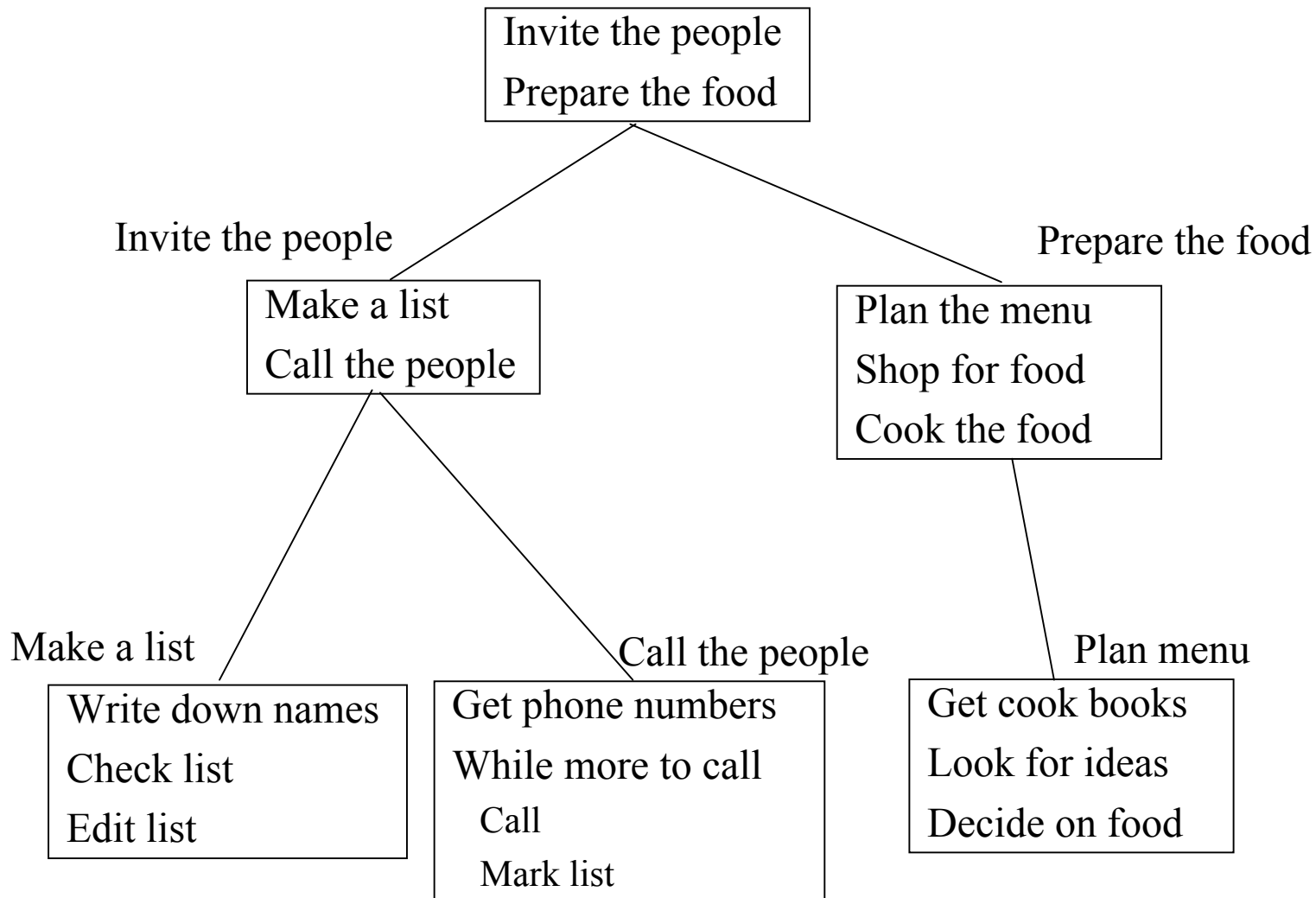Specific steps

Specific steps

Specific steps

Specific steps

Bottom

Particular

Figure extracted from Computer Science
Illuminated by Dale N. and Lewis J.

Top Down Approach: A Real Life Example

Invite the people
Prepare the food

Invite the people

Make a list
Call the people

Prepare the food

Plan the menu
Shop for food
Cook the food

Make a list

Write down names
Check list
Edit list

Call the people

Get phone numbers
While more to call
   Call
   Mark list

Plan menu

Get cook books
Look for ideas
Decide on food

James Tam

Implement The Design

Translating the high level to design to an actual programming language (e.g., Pascal)

Test the program design

Balance of this course (and the next course, CPSC 233)

Maintaining The Design

Modify the program according to changing needs and problems that have been found
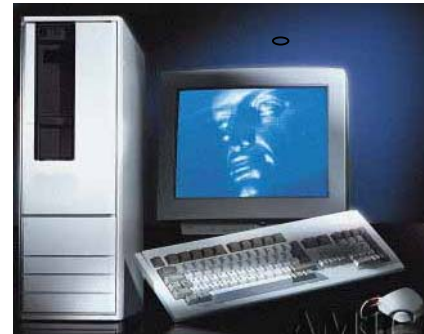
Some in CPSC 233 (more in CPSC 333)

Why Bother With Computers: Speed

Did we start yet?

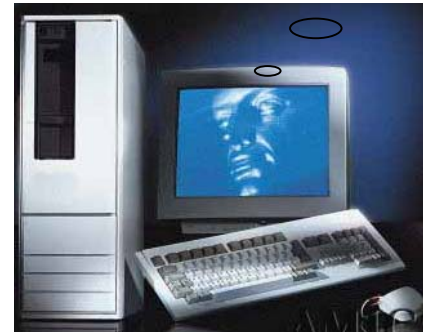Start!

Done!

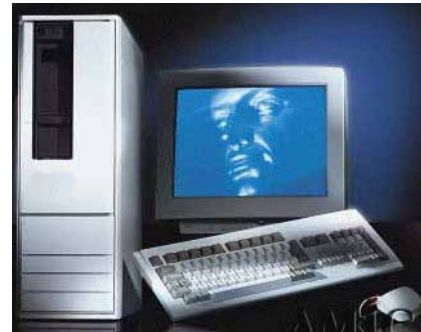# Why Bother With Computers: Repetition

Repetition

…999, 1000, 1001, 13…

Repeat a billion times
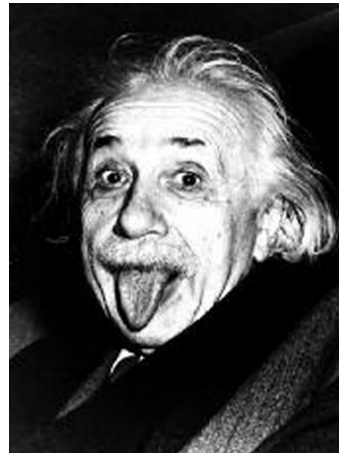
No problemo!

Why Bother With Computers: Repetition

Repetition

Oops!

Why Bother With People?

Creativity

Intelligence

Summary

What are the major steps involved in creating software
- Specification
- Design
- Implementation
- Maintenance

What are the strengths of computers vs. people