

# Computer Science 1000: Part #1

## Introduction

WHAT IS COMPUTER SCIENCE?

WHAT IS AN ALGORITHM?

THE STRUCTURE OF THIS COURSE

# What is Computer Science?

- Is Computer Science ...
  - ... the study of computers?
  - ... the study of how to write computer programs?
  - ... the study of the uses and applications of computers and software?
  - ... all of the above?
- It's actually all of the above, and much more.

## What is Computer Science? (Cont'd)

According to Gibbs and Tucker (1986), the fundamental task of Computer Science is the design and development of algorithms for solving important problems. This includes:

- Studying the behaviour of algorithms to determine if they are correct and efficient;
- Designing and building computer systems hardware that is able to execute algorithms;
- Designing programming languages and translating algorithms into these languages so that they can be executed by the hardware; and
- Identifying important problems and designing correct and efficient algorithms to solve these problems.

# What is an Algorithm?

- An **algorithm** is ...
  - ... a well-ordered sequence ...
  - ... of unambiguous and effectively computable operations ...
  - ... that always produces a result ...
  - ... and halts in a finite amount of time.
  
- Let's develop an algorithm for shampooing your hair.

## What is an Algorithm? (Cont'd)

Is this an algorithm for shampooing your hair?

<b>Step</b>	<b>Operation</b>
-------------	------------------

- |   |                  |
|---|------------------|
| 1 | Wet your hair    |
| 2 | Lather your hair |
| 3 | Rinse your hair  |
| 4 | Repeat           |

## What is an Algorithm? (Cont'd)

Is this an algorithm for shampooing your hair?

<b>Step</b>	<b>Operation</b>
-------------	------------------

- |   |                          |
|---|--------------------------|
| 1 | Wet your hair            |
| 2 | Repeat steps 3 through 4 |
| 3 | Lather your hair         |
| 4 | Rinse your hair          |

## What is an Algorithm? (Cont'd)

Is this an algorithm for shampooing your hair?

<b>Step</b>	<b>Operation</b>
-------------	------------------

- |   |  |
|---|--|
| 1 | Wet your hair  |
| 2 | Set the value of WashCount to 0                                |
| 3 | Repeat steps 4 through 6 until the value of WashCount equals 2 |
| 4 | Lather your hair   |
| 5 | Rinse your hair  |
| 6 | Add 1 to the value of WashCount                                |
| 7 | Stop, you have finished shampooing your hair                   |

## What is an Algorithm? (Cont'd)

Is this an algorithm for shampooing your hair?

<b>Step</b>	<b>Operation</b>
-------------	------------------

- |   |  |
|---|--|
| 1 | Wet your hair                                |
| 2 | Lather your hair                             |
| 3 | Rinse your hair                              |
| 4 | Lather your hair                             |
| 5 | Rinse your hair                              |
| 6 | Stop, you have finished shampooing your hair |



# What is an Algorithm?

## Why Bother?

IF WE CAN SPECIFY AN ALGORITHM  
TO SOLVE A PROBLEM,  
WE CAN AUTOMATE ITS SOLUTION!!!

# The Structure of this Course

- Level 1 The Algorithmic Foundations of Computer Science  
[Weeks 1 and 2]
- Level 2 The Hardware World [Weeks 3–5]
- Level 3 The Virtual World [Weeks 6, 7, and 13]
- Level 4 The Software World [Weeks 9–11]
- Level 5 Applications [Week 12]

# Welcome to Computer Science Boot Camp



**“ARE YOU READY???”**