Welcome to COMP 250
Introduction to Computer Science!

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Algorithms

• A systematic and unambiguous procedure that produces - in a finite number of steps - the answer to a question or the solution of a problem.
• Algorithms can be run on a computer, but they don’t have to:
  – Mayas had algorithms to predict solar eclipses centuries in advance
  – Egyptians had algorithms to build pyramids
  – Indians had algorithms for factorizing polynomials
  – Greeks had algorithms to build all kinds of geometric construction using only a compass and straight lines.

Compass and straight-line construction

• Problem: Angle bisection
  INPUT: An angle defined by three points AOB
  OUTPUT: A point C such that AOC = BOC
  • Algorithm:
    – Draw circle centered at O to find A’ and B’
    – Draw circles centered at A’ and B’ of the same radius to find C
    – Then AOC and BOC bisect AOB

Problem: Butterfly Origami
INPUT: 2:1 rectangle
OUTPUT: A butterfly

Problem: Chickpea cooking
INPUT: Ingredients (left)
OUTPUT: Yummy (but spicy!)
To think about…

• Think of three different ways to solve the following problem:
  PROBLEM: LIST INTERSECTION
• Input:
  – A long list of students taking COMP250
  – An long list of students taking MATH240
• Output:
  – How many students are taking both classes?
• Assume that you only have names, no ID number, and that comparing one name to another takes time because they are written in really small font