

Welcome to COMP 250 Introduction to Computer Science!

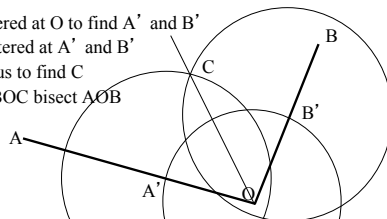
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Algorithms

- 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

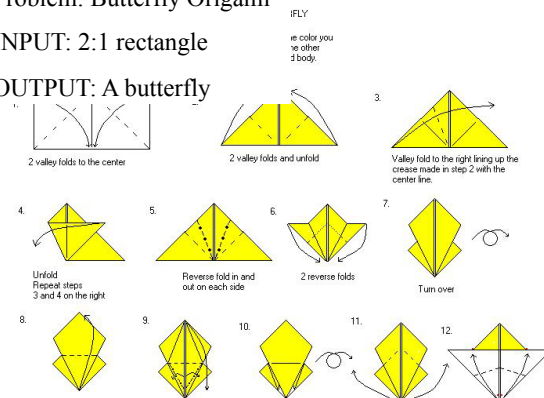
- Problem: Angle bisection
INPUT: An angle defined by three points AOB
OUTPUT: A point C such that $\angle AOC = \angle BOC$
- Algorithm:
 - Draw circle centered at O to find A' and B'
 - Draw circles centered at A' and B' of the same radius to find C
 - Then AOC and BOC bisect AOB



Problem: Butterfly Origami

INPUT: 2:1 rectangle

OUTPUT: A butterfly



Indian Chickpeas

From: demers@ere.umontreal.ca (Demers Serge)
Date: Sun, 12 Sep 93 14:20:01 -0400

Here is one of our favorite "vegetarian dish".
We always include it to our menu for an indian dinner.

250 gr of chickpeas (1 cup)
2 Tbsp vegetable oil
1 onion chopped
2 cm cinnamon stick
4 cloves
2 garlic cloves, squashed
2 cm fresh ginger, chopped
1 green chilli pepper, finely chopped
2 tsp ground coriander
3/4 cup of chopped tomatoes (from a can)
1 tsp garam massala
1 Tbsp cilantro, chopped

Problem: Chickpea cooking

INPUT: Ingredients (left)

OUTPUT: Yummy (but spicy!)

Soak chickpeas overnight, rinse, cook in water until tender. Drain. KEEP THE COOKING LIQUID!

In a frying pan heat the oil, fry onion until golden. Add cinnamon and cloves, cook a few seconds. Add garlic, ginger, chilli pepper ground coriander and cook 5 minutes, stirring. Add tomatoes, with the juice and cook until all liquid has evaporated.

Add the chickpeas to the pan, mix well, cook 5 minutes. Pour the cooking liquid of the chickpeas and simmer for 25 min until all the liquid is gone.

Sprinkle with the garam massala and cilantro.

Can be served hot or cold.

To think about...

- Think of three different ways to solve the following problem:
PROBLEM: LIST INTERSECTION
- Input:
 - A long list of students taking COMP250
 - A 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 hand-written