

# Motivating the Social Value Contribution of Computing: A Values First Approach

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# Introduction

There are many factors that influence students' perception of computing.

Misconceptions of computing are common, with students seeing it as boring, tedious, irrelevant – and not relevant to society. [2, 3]

This also gives students attitudes and behaviours that lead them to contribute to society.

This working group seeks to change student perceptions of CS by demonstrating the social relevance of computing through assignments.

## Our contribution

- For first year CS instructors wishing to partake in, a number of barriers are present.
- Our working group is providing a bank of premade CSEd4SG first year assignments, so instructors can use or be inspired by existing work.
- Our bank of assignments also shows that doing this in first year is possible, with sufficiently low overhead and domain knowledge.

## Why first year?

Delaying the inclusion of CSEd4SG projects until the third or final year is problematic.

This means losing interested students to more “meaningful” majors in the first (or second) year

There is further evidence that coverage of such material is more effective when it is not segregated into separate courses.

# Approach

**Proposition:** for any given, non-theoretical Computer Science domain, topic (or even task), one should be able to articulate a useful CSEd4SG assignment

We provide **examples** of CSEd4SG assignments to show what is possible in this domain.

Each **case study** is described per Fincher and Petre's computer science project work practice bundle [1].

## Assignment details

The **assignments** cover all levels of “introductory computing” (CS0, CS1, CS2)

**Completion length varies** from 2 weeks to a month

**Style** includes stand alone assignments, series of assignments, and projects

**To facilitate** navigating the bank, we have put together a rubric table describing the assignments.

## Our rubric table

**Student directed:** how much control students have over the direction of the assignment

**Scaffolding:** is this a guided walk through some code, or an independent project?

**External domain knowledge:** do the students need to learn anything about biology/politics/etc?

**Contribution to society:** does the assignment actually make an impact on society?

**Coolness:** how engaged are the students?

**Explicit reflection:** do the students reflect on how this contributes to society?

# Red Cross Disaster Response

A new narrative for a traditional assignment: shortest path scheduling for disaster relief

This assignment shows how traditional assignments can be given meaningful narrative



# Voting systems

This assignment was built to have a social message

Students simulate Canadian elections under different voting systems.

They fill in the code for ballot counting of six voting systems and compare them.

The goal is for students to learn about how algorithms play a role in democracy.

The assignment gives practices with lists and dictionaries in Python.

# Ad-Hoc Emergency WI-FI Networking

**Social problem addressed:** Modern smartphones have wi-fi interfaces that can provide basic communication services for the people living in disaster areas.

**This exercise** solves one problem involved in the construction of an ad-hoc network of inexpensive base stations.

**CS problem involved:** link state routing.

# The assignments

## Science projects:

- Water pollution
- STD modelling
- Kiwi population simulation
- Nuclear power
- Radioactive mice
- Molecular modelling

## Humanitarian projects:

- *Red Cross Disaster Response*
- *Ad-Hoc Emergency WI-FI  
Networking*

## Social scientific projects:

- *Voting systems*
- Banana republic simulation
- Around the world

## Other projects:

- A mini package manager
- Social good scholarly work
- Social good website

# Feedback appreciated!

Coolness: how do we categorize assignments by it?

Is there any non-theory assignment could not be done with CSEd4SG?

Do you have any CSEd4SG assignments you want to add to the pile?

# Summary

**We have** started a bank of CSEd4SG assignments for introductory CS

**Our goal** is to convince first year students that computing is relevant to society, and to attract socially-minded students to the discipline

**We invite** you to join us! Use our assignments, create your own, and share them!

## References



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