Seeking evidence for basing the CS theory course on non-decision problems

SIGCSE 2017 lightning talk
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Which is more “useful”: program A or program B?

**Input:** Input to both programs is a roadmap and a list of cities:

**Output:**

Program A outputs

- “yes” if there’s a driving route that visits each city and takes less than 100 hours
- “no” otherwise

Program B outputs

- a description of a suitable route if there’s a driving route that visits each city and takes less than 100 hours
- “no” otherwise
Which is more relevant for teaching: program A or program B?

Program A outputs

- "yes"
- "no"

Program B outputs

- a description of a suitable route
- "no"
Which is more relevant for teaching: program A or program B?

Program A outputs

- “yes”
- “no”

Program B outputs

- **a description of a suitable route**
- “no”

- **Decision problem.**
- **Non-decision problem.**
Which is more relevant for teaching: program A or program B?

Program A outputs

- "yes"
- "no"

- Decision problem.
- Existing theory-of-computation courses usually focus on decision problems.

Program B outputs

- a description of a suitable route
- "no"

- Non-decision problem.
Which is more relevant for teaching: program A or program B?

Program A outputs

- “yes”
- “no”

• Decision problem.
• Existing theory-of-computation courses usually focus on decision problems.

Program B outputs

- a description of a suitable route
- “no”

• Non-decision problem.

• This talk points to a way to teach the theory-of-computation course using non-decision problems.
• Students may achieve better learning because the content is perceived as relevant and practical.
Interested in a practical and relevant CS theory course? Get in touch!

Ways you can help and/or benefit:

1. Teach your theory course using the free beta version of a new textbook from Princeton University Press:

   *What Can Be Computed?: A Practical Guide to the Theory of Computation*
   
   • Covers undergraduate computational and complexity theory using real Python programs and focusing on practical non-decision problems

2. Participate in an empirical analysis of student learning via this practical approach to CS theory. Collaborators and co-authors are needed!

How? Contact John MacCormick, jmac@dickinson.edu