Bidirectional model transformations

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(The quotation marks are because technology here has two roles:

1. motivation
2. illustration

There will be tools, but I'm not really presenting technology, as such.)

Model transformation

$$T : M \longrightarrow N$$

not enough.

Bidirectional model transformation

$$T : M \longleftrightarrow N$$

better.
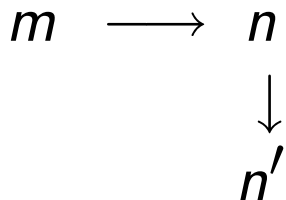
Why? How? And what does this mean anyway?

m

$$m \quad \longrightarrow \quad n$$

$$m \longrightarrow n$$
$$\downarrow$$
$$n'$$

$$m \longrightarrow n$$
$$\downarrow \qquad\qquad \downarrow$$
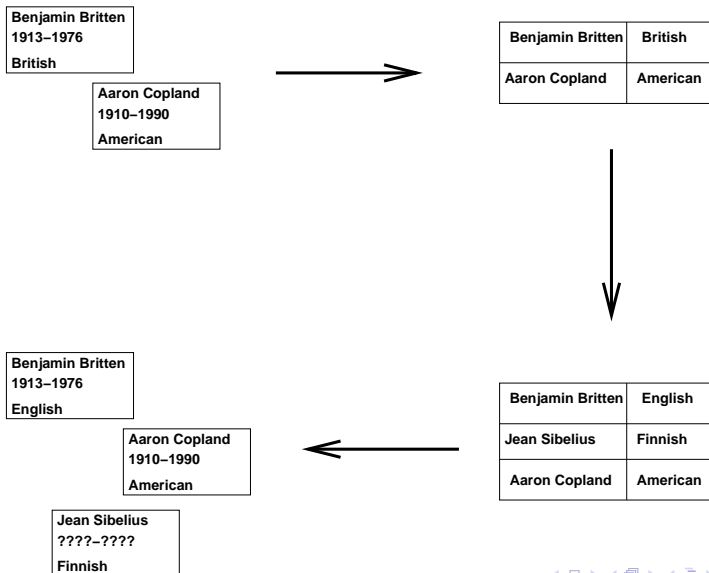$$m' \longrightarrow n'$$

A bidirectional transformation can't (always) be just a bijective function.

Why not?

Mathematically: because the consequence – that the domain and codomain would have the same cardinality – is obviously false.

From point of view of tools: because to know how to propagate a change you have to know something about *both* models.

| Benjamin Britten | British |
| Aaron Copland | American |

Benjamin Britten	English
Jean Sibelius	Finnish
Aaron Copland	American

Benjamin Britten
1913–1976

British

Aaron Copland
1910–1990

American

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English

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Jean Sibelius
????–????

Finnish

Plan for Wednesday talk

- ▶ Model Driven Development context
- ▶ Overview of OMG Queries, Views and Transformations standard
- ▶ Tools exploration
- ▶ Suggested approach to clarifying what makes sense

Technology: ModelMorf

Ref: *Bidirectional model transformations in QVT: semantic issues and open questions*, S., to appear in MODELS'07

Plan for Friday talk

Harmony: a bidirectional programming language from Benjamin Pierce and colleagues at Penn.

- ▶ Setting, and discussion of relation to model transformations
- ▶ Introduction to the language
- ▶ (Issues of ordered data, and relation to the models world)
- ▶ Ongoing work

Technology: Harmony (Boomerang)

many papers by Harmony group, e.g. *Resourceful lenses for ordered data*, Bohannon, Foster, Pierce, Schmitt.

The Laboratory for Foundations of Computer Science in the School of Informatics at the University of Edinburgh is about to advertise a Lecturership/Readership in Software Engineering (possibly headlined Complex Systems Engineering).

We want someone with *both* a strong record of working with large systems (directly or as research collaborator) *and* ability to talk with LFCS.

Informatics at Edinburgh is a fantastic place to work!

See `http://www.inf.ed.ac.uk` in the next couple of weeks, and/or email me.