

From Construal to Algorithm (and back again)

Compare the earlier slide set 'From Program to Construal'

From an abstract perspective there is little to distinguish algorithm and program. From a practical perspective there may be a great difference (e.g. implementing an iteration by a loop in a procedural language or by recursion in a functional language). What differences can you think of here?

1

Software and EM

A significant feature of the EM perspective on computing that is especially important for software development is the relative ease of moving in either direction between algorithm (program) and construal.

Construal \longleftrightarrow **Algorithm**

2

What knowledge do you need to
construct an algorithm?

3

Some Examples

Solution of a [quadratic equation] problem:

“do this, then that and that And that number is the answer. **This is the procedure.**”
(Babylonian 2000BC)

[D. Knuth Ancient Babylonian Algorithms in ACM Communications 1972]

Making a cup of tea : think of ‘standard’ steps in terms of agencies of person, mains water, electricity, dependencies of capacity of kettle, how many cups etc. Observables?

4

Kinds of knowledge

Knowledge of resources

values, registers, data structures, kettles, teabags

Knowledge of what to do with resources and how

storing values, operations, opening lid, turning tap

Both kinds of knowledge arise in construal, are naturally formulated in ODA terms, allow exercise of agency and lead to actions in an algorithm

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Construal and program

“EM construals embody counterparts of patterns of observation, dependency and agency that are experienced in the application domain. Identifying and engineering such patterns, which are more primitive than the comprehensive behaviours to be preconceived in conventional programming, is the basis for an alternative mode of software development.” (WMB’s orientation paragraph in session 1)

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Two directions

Repetition and familiarity of a construal and its patterns of behaviour leads to commitment, 'embodiment', abstraction and algorithm.

Algorithm confronting breakdown, interference or new phenomena, leads back to construal.

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