

Model-Driven Development and the Future of Software Engineering Education

A. J. Cowling

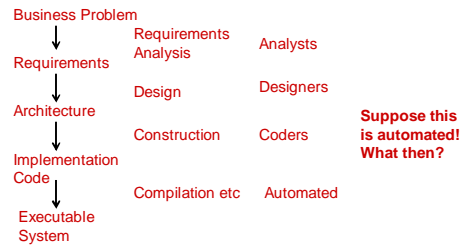


Department of Computer Science
University of Sheffield



The Development Process

Products Processes People Change?



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Timescales (1)

For This Change

- n It is an active research area:
 - Model-Driven Development;
- n Some systems exist already, for limited domains:
 - Itanium Appcelerator;
- n The general problem is a complex one, so
 - general systems may be some years away – perhaps 2020?
- n But the economic benefits from them will be huge.

A Prediction

- n For our current undergraduates, before the ends of their careers,
- n The activity of writing conventional program code will become as rare and exotic as writing large pieces of code in assembly language is now.

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Timescales (2)

An Historical Analogy

- n Development of problem-oriented languages;
- n Automating the production of executables:
 - ie the process of compilation, etc.

Timeline

- 1958 to 1960 – First versions of Algol, Cobol and Fortran;
- 1964 – Compilation methods well-established:
 - eg Randell & Russell, “Algol 60 Implementation”;
- 1968 – ACM’s Curriculum 68:
 - assumed that problem-oriented languages would be used,
 - and assembly language programming covered later;
- 1973 – C used to implement almost all of unix:
 - so all application domains now covered.

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Impact on the Curriculum (1)

For the SE 2004 SEEK

- n Some knowledge areas will be relatively unaffected:
 - they are effectively independent of this activity;
 - eg Software Evolution (EVO), Mathematical & Engineering Fundamentals (FND), Software Management (MGT), Professional Practice (PRF), Software Process (PRO), Software Quality (QUA);
- n But, almost one third is Computing Essentials (CMP):
 - mainly CS concepts – programming, OS, databases, etc,
 - and construction activities, from a programming perspective,
 - this will change significantly.

For the CS Body of Knowledge

- n This change will have even bigger effects than for SE.

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Impact on the Curriculum (2)

For the SE 2004 SEEK (continued)

- n The focus will have to become models of software structures:
 - as in Software Modeling & Analysis (MAA),
 - which currently says little about actual models,
 - but may need to cover relationships between models and code;
- n The associated process activities will be affected:
 - they will need to take model-centric approaches,
 - which currently they hardly do,
 - eg Software Design (DES),
 - and Software Validation & Verification (VAV), which has some very code-centric units.

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Impact on the Curriculum (3)

For the SE 2004 Introductory Courses

- n How much programming will SE101 or SE102 need?
 - arguably, none!

For the SE 2004 Core Courses

- n Currently two sets of courses, with different approaches:
 - one top-down, the other bottom-up;
- n Will the bottom-up approach still be valid?
 - arguably not!

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Conclusions

This Change is Coming

- n Bits of it have happened already;
- n We can not predict how quickly it will mature;
- n When it does, its impact will be very rapid:
 - as with the adoption of problem-oriented languages;
- n And it will be very significant for SE education.

Likely Impacts

- n Some parts of the SE 2004 SEEK may not need to change much;
- n Programming-related parts will change substantially:
 - Reflecting even bigger changes for the CS curriculum;
- n Other parts will become much more model-centric;
- n The approaches of the courses will change substantially.

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The End

Thanks for your attention!!

Questions and Discussion to follow.

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