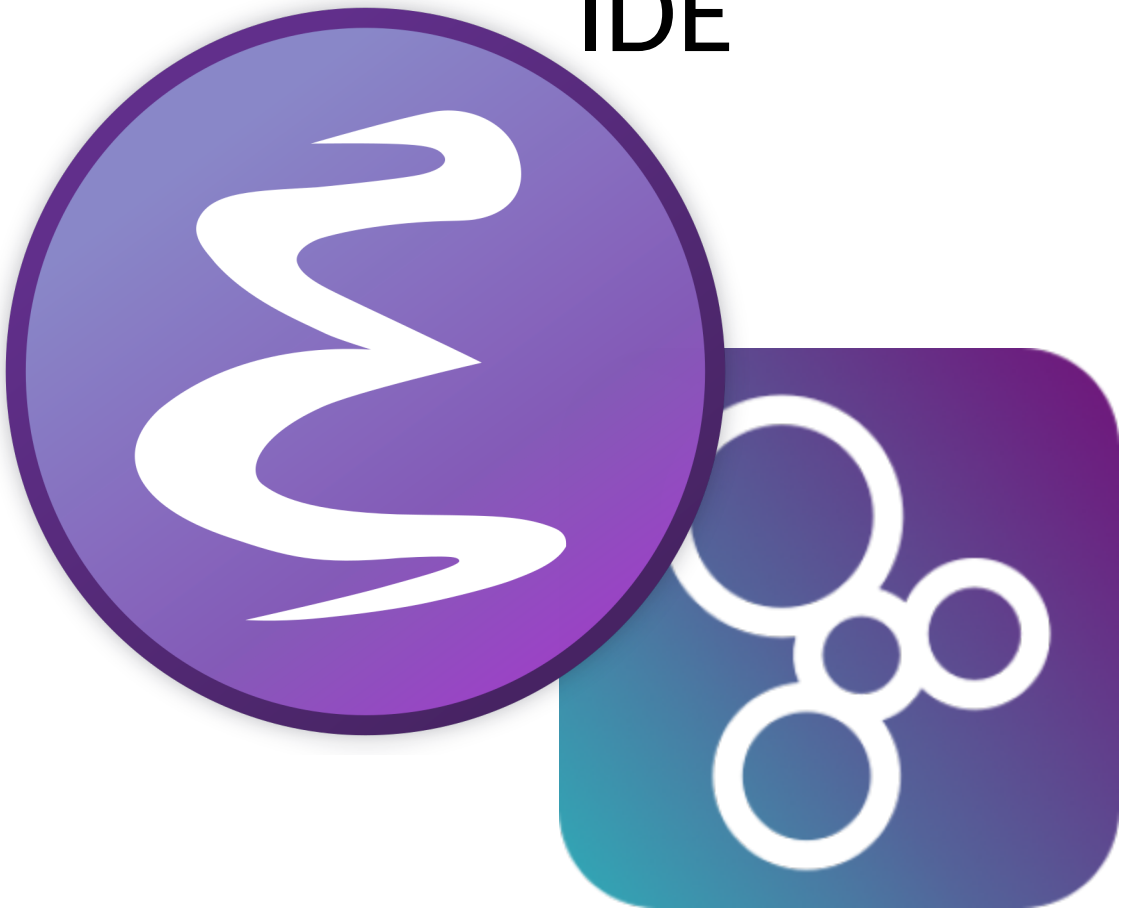
Migrating Overture to a different IDE



AARHUS UNIVERSITY

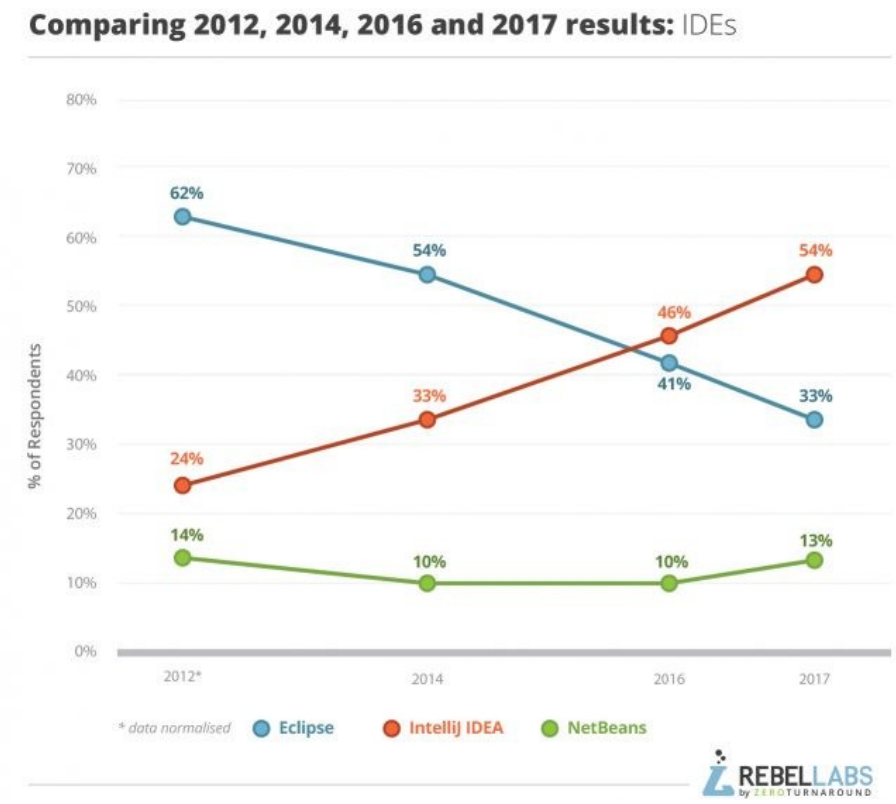
Peter W. V. Tran-Jørgensen, **Tomas Kulik**

Contribution

- **VDM-Mode for Emacs**
  - Syntax highlighting
  - Syntax validation
  - REPL
  - VDM Templates
  - Pretty printing
  - Packages accepted into MELPA

The need

- Eclipse usage is falling
- Pointed at 16th Overture workshop
- Emacs package as a case study



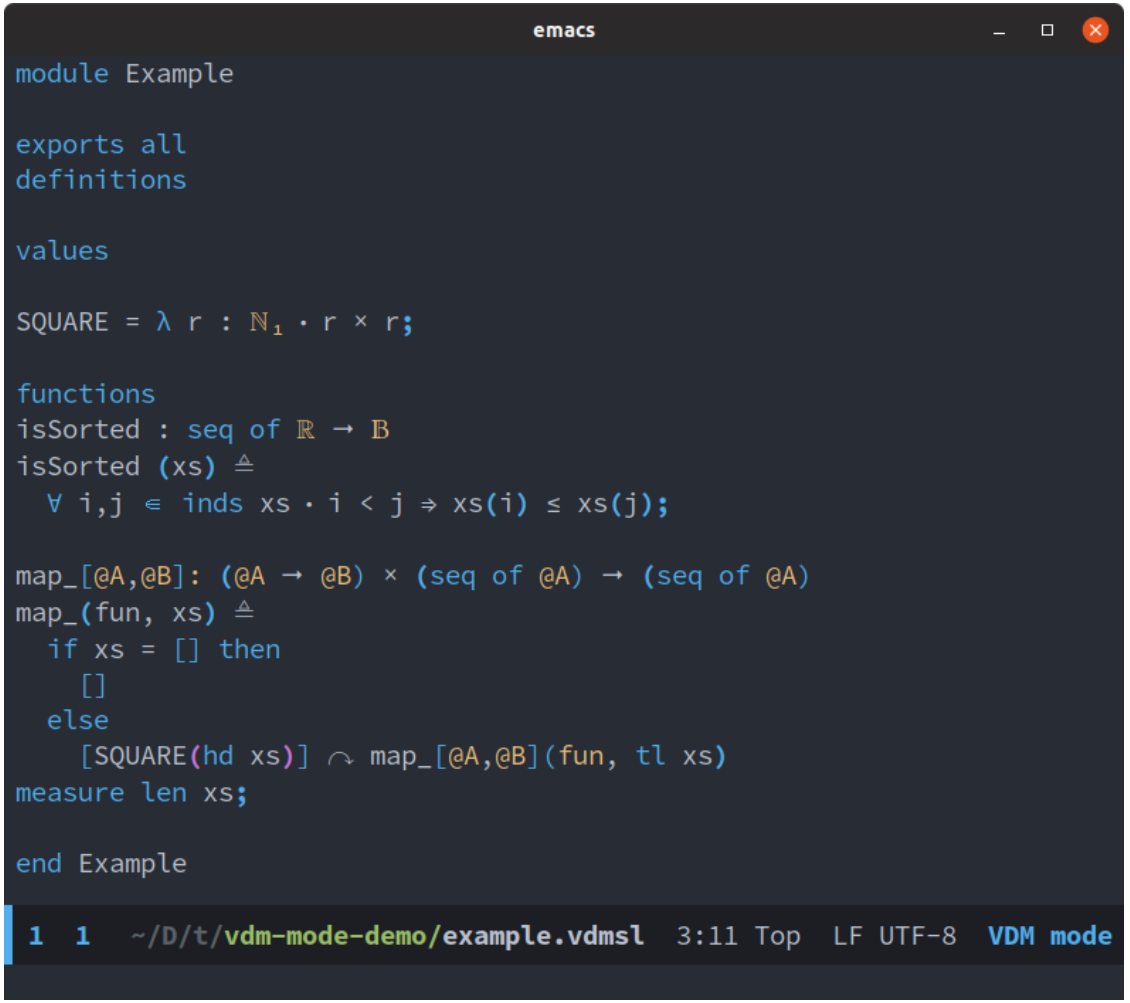
Why Emacs?

- Popular text editor
- Often used as IDE
- Massively extensible
- Use of third party packages
- **Less than 400 LoC**

Enabling Emacs packages

- **prog-mode**
  - Syntax highlighting and indentation rules
- **comint-mode**
  - REPL (interactive shell)
- **flycheck**
  - Syntax checking framework
- **yasnippet**
  - Template expansion system
- **prettify-symbols-mode**
  - Replacement of ASCII characters with Unicode

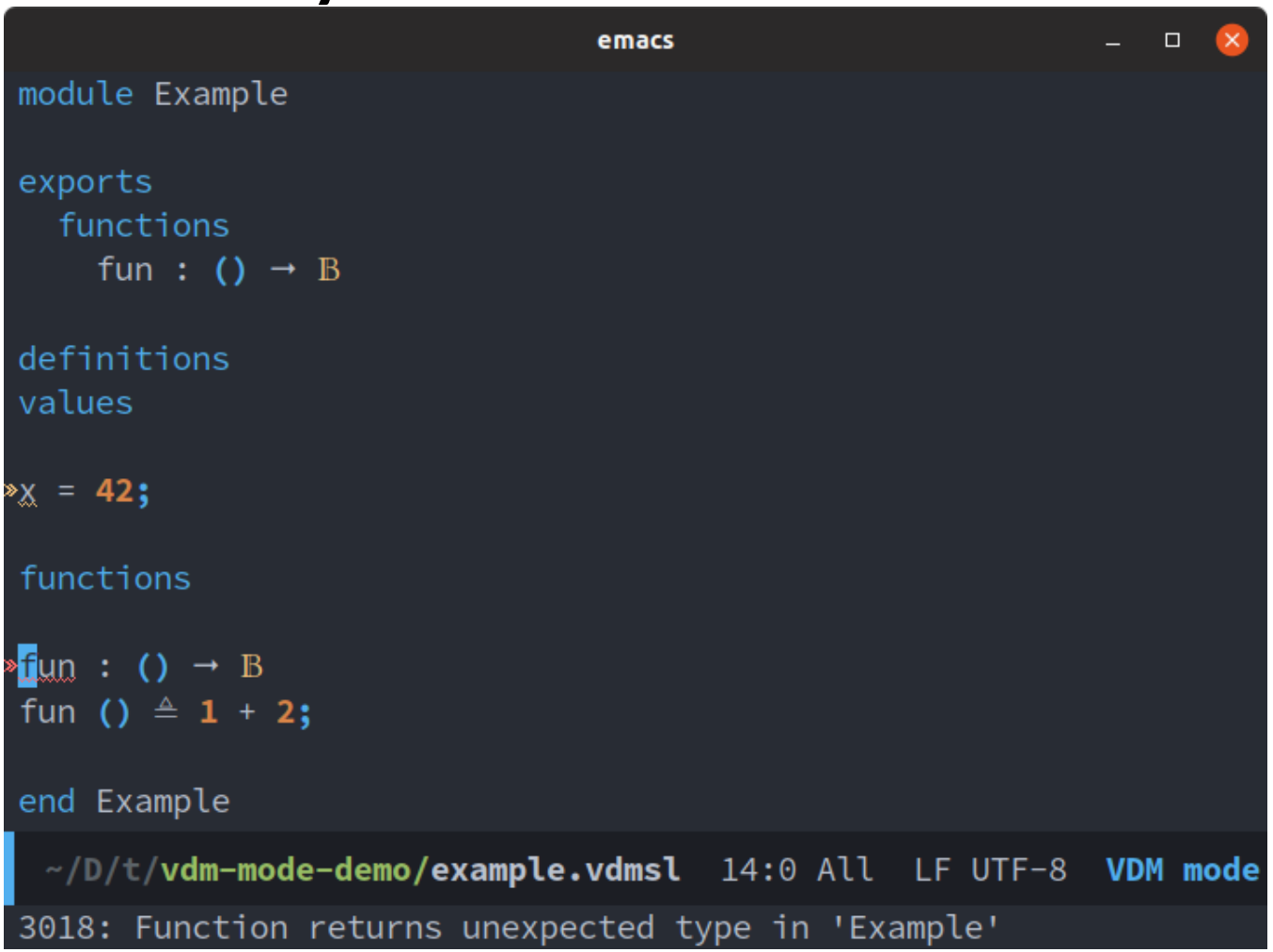
Syntax highlighting



Syntax highlighting

- **vdm-mode derived from prog-mode**
  - Keyword, type, value highlighting
  - Pretty printing of characters
  - Characters saved as ASCII representation
  - Detection of VDM dialect
- **Comparable to Overture**

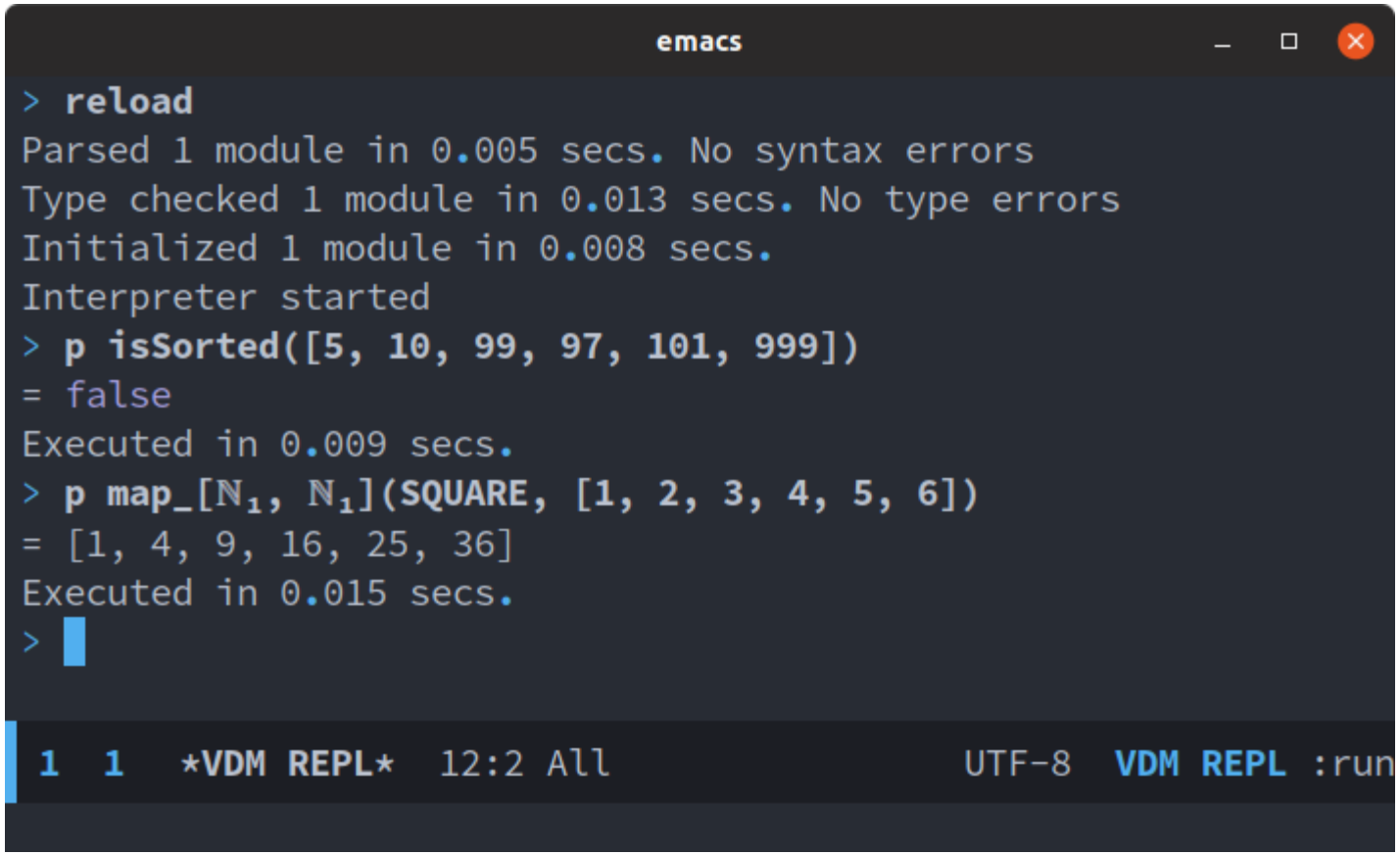
Syntax validation



Syntax validation

- **Based on flycheck**
  - Errors
  - Warnings
  - In margin and echo area
  - Interactive list of errors
  - Errors as pop ups

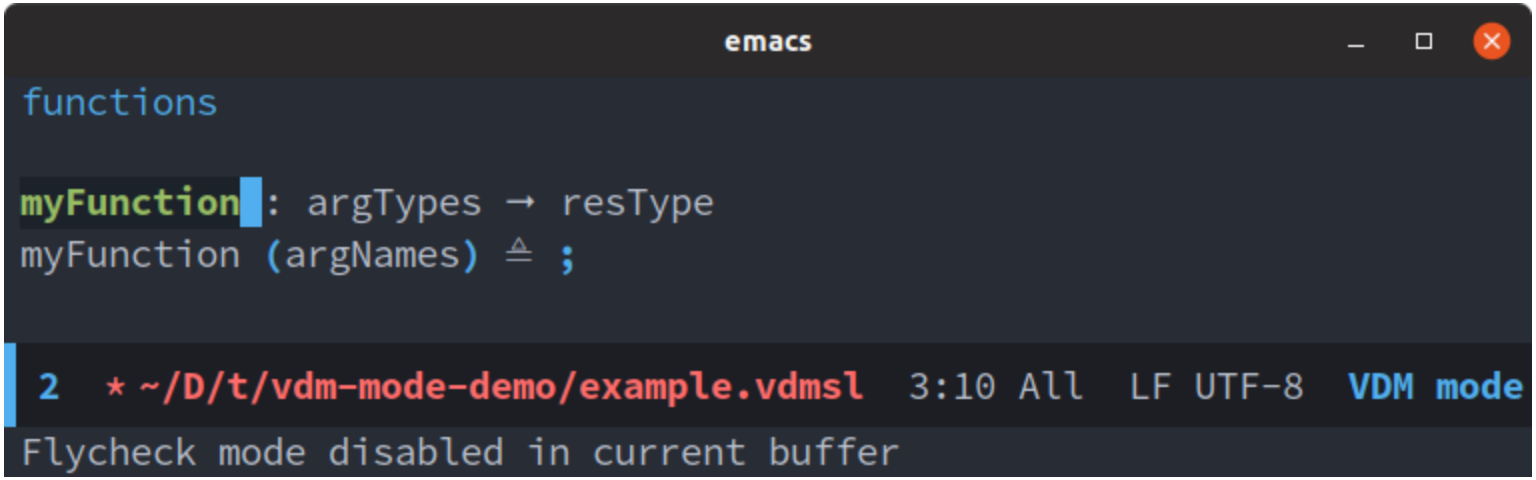
The REPL


emacs
> reload
Parsed 1 module in 0.005 secs. No syntax errors
Type checked 1 module in 0.013 secs. No type errors
Initialized 1 module in 0.008 secs.
Interpreter started
> p isSorted([5, 10, 99, 97, 101, 999])
= false
Executed in 0.009 secs.
> p map_[N₁, N₁](SQUARE, [1, 2, 3, 4, 5, 6])
= [1, 4, 9, 16, 25, 36]
Executed in 0.015 secs.
>
1 1 *VDM REPL* 12:2 All UTF-8 VDM REPL :run

The REPL

- **vdm-comint based on comint**
  - Run VDM in REPL-like fashion
  - Send parts of the model directly to the REPL
  - Load files associated with current VDM project

VDM templates



VDM templates

- **vdm-snippets based on yasnippet**
  - Generation of skeleton of VDM syntax
  - Function template expansion
  - Operation template expansion
  - Module template expansion
  - Class template expansion
- **Generate and fill in placeholders**

What did it take?

- Surprisingly little:

File	Blank	Comment	Code
vdm-mode.el	38	61	145
vdm-comint.el	30	35	102
vdm-mode-util.el	18	23	57
flycheck-vdm.el	15	32	32
vdm-snippets.el	14	25	13
SUM	115	176	349

How does it compare?

Features	Overture	Emacs packages
Syntax highlighting	✓	`vdm-mode`
Symbol prettyfication	÷	`vdm-mode`
Syntax validation	✓	`flycheck-vdm`
Evaluation	✓	`vdm-comint`
Debugging	✓	`vdm-comint`
POG	✓	`vdm-comint`
LaTeX report generation	✓	`vdm-comint`
Combinatorial testing	✓	`vdm-comint`
Code generation	✓	÷
Auto completion (limited)	✓	`company-mode` (simple, non-semantic)
Template expansion	✓	`vdm-snippets`
Standard library import	✓	÷ (must be added manually)

Conclusion and future plans

- Basic VDM features in few LoC
  - Syntax highlighting (145)
  - Syntax validation (32)
  - REPL (102)
  - Template expansion (13)
- Much more work required to reach full IDE
- Language Server Protocol (LSP)
  - Increase uptake of Overture

Where to find?

- Github:
- https://github.com/peterwvj/vdm-mode