

# Reading, Writing and Watching: a Task-Based Analysis and Review of Learners' Programming Environments

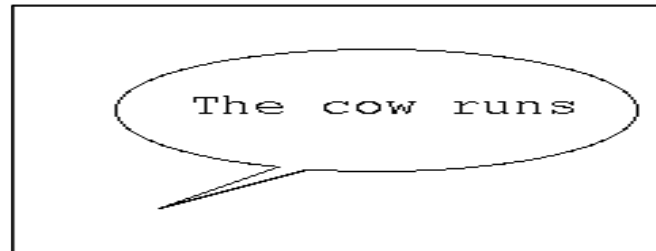
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# Overview

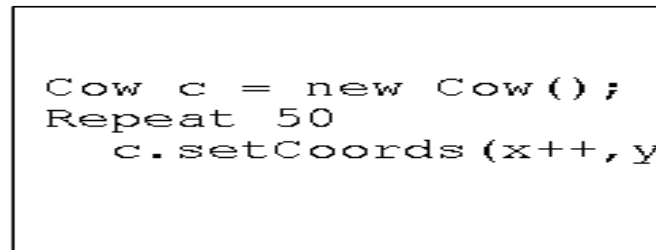
- Reading, Writing and Watching
- Gulfs of Expression, Representation and Visualisation
- Current Systems

# Reading, Writing and Watching

**Writing (expressing  
the program)**



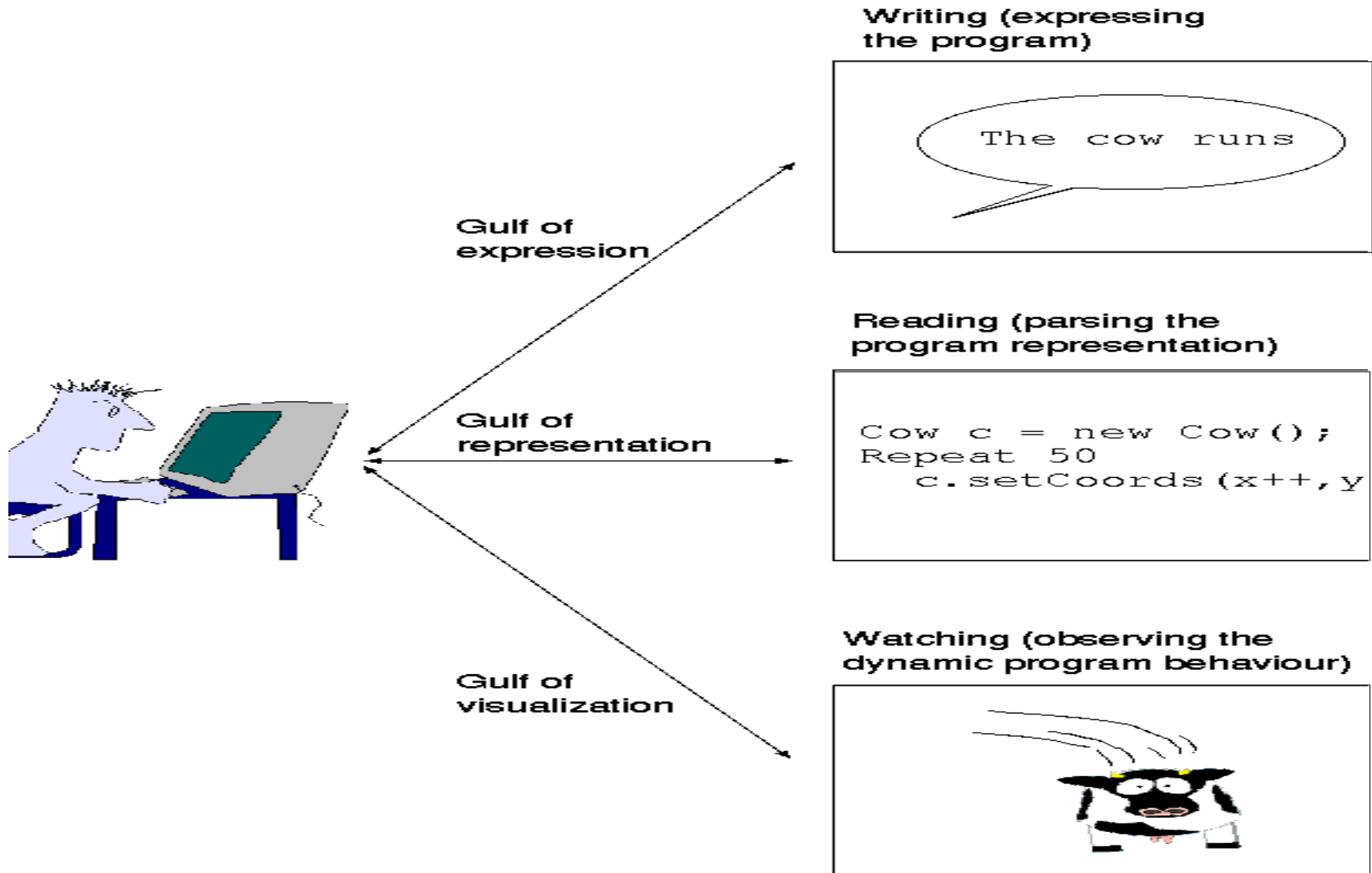
**Reading (parsing the  
program representation)**



**Watching (observing the  
dynamic program behaviour)**



# Gulfs of Expression, Representation and Visualisation



# Current Systems

- Domain Centred
  - many systems
- Writing Centred
  - many systems
- Reading Centred
  - few systems
- Watching Centred
  - few systems

# Summary

- Watching is a fundamental activity which is poorly supported in current systems.
- Various mismatches in symbol sets (gulfs) exist in current tools which should be carefully examined.