

# On the Interactions Between High-Level Task-thinking and Low-Level Implementation-thinking in Novice Programmers

*Francisco Enrique Vicente Castro and Kathi Fisler*

Compute the average  
of the non-negative  
numbers in a list

# On the Interactions Between High-Level Task-thinking and Low-Level Implementation-thinking in Novice Programmers

*Francisco Enrique Vicente Castro and Kathi Fisler*

Sounds like a  
for loop ...

Thinking in code  
(low-level)

• Compute the average  
of the non-negative  
numbers in a list •

Should sum  
and count ...

Thinking in tasks  
(high-level)

# On the Interactions Between High-Level Task-thinking and Low-Level Implementation-thinking in Novice Programmers

*Francisco Enrique Vicente Castro and Kathi Fisler*

Sounds like a  
for loop ...

Thinking in code  
(low-level)

• Compute the average  
of the non-negative  
numbers in a list •

Should sum  
and count ...

Thinking in tasks  
(high-level)

*People move between these two levels while coding*

*What do these transitions look like in novice programmers?*

## *What do these transitions look like in novice programmers?*

Two programming problems: one within and one just beyond what students have seen so far

Talk alouds with students from two universities that use the same curriculum (How to Design Programs)

## *What do these transitions look like in novice programmers?*

Two programming problems: one within and one just beyond what students have seen so far

Talk alouds with students from two universities that use the same curriculum (How to Design Programs)

Once students enter low-level mode, they rarely return to thinking in tasks, even when code isn't working

Students who started in tasks make more progress than those who work entirely in code

# *What do these transitions look like in novice programmers?*

Two programming problems: one within and one just beyond what students have seen so far

Talk alouds with students from two universities that use the same curriculum (How to Design Programs)

Once students enter low-level mode, they rarely return to thinking in tasks, even when code isn't working

Students who started in tasks make more progress than those who work entirely in code

Differences across the universities, based on content emphasis

**Come see our poster for details!**