UNIVERSITY OF SOUTH FLORIDA

Defense of a Master's Thesis

On Automation of Code Transformations for Concept Inventory
Misconceptions
by
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For the MSCS degree in Computer Science and Engineering

Identifying common misconceptions held by novice programmers is a primary goal of the Computing Education Research agenda. This thesis proposes to formalize such misconceptions through program transformations. We first describe the implementation of the EvoParsons system, that allows students to practice programming skills with the help of so-called Parsons puzzles. This software serves as a tool for gathering data on how students interact with such puzzles. Our first contribution is to improve the current implementation in various ways that are discussed in chapter 3. We then review and compare several code-transformation tools and show how they might be leveraged to model program transformations. We particularly focus on the improvement they provide, in terms of expressiveness, when compared to the regular expressions that were used in initial version of the EvoParsons system. Our second contribution is to implement code transformations modeling novice programmers' misconceptions that have been identified in the Computing Education research literature. We particularly focus on the misconceptions that require increased expressiveness and cannot be modelled by regular expressions. Our third contribution is to provide a proof of concept implementation of an automated system to synthesize code transformations by leveraging both Evolutionary Computation and Meta-Programming techniques.

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11:00 AM
ENB 313

THE PUBLIC IS INVITED

Examining Committee

Alessio Gaspar, Ph.D., Major Professor
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