# How Students "Measure Up": Creation of an Assessment Tool for CS1

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March 3, 2004

# Introduction

- CC2001 and previous curricula do not provide implementation instructions.
- Faculty innovate courses based on suggestions and their own interpretations.
- Investigations into the usefulness of these innovations most often use lab grade, overall course grade, resignation rate, or exam grades
  - Cooper, Dann, & Pausch, 2003; Decker, 2003; Ventura, 2003
- Problem: not proven reliable or valid.

# Reliability & Validity

- Reliability
  - "Degree of consistency among test scores"
- Validity
  - Reliability + Relevance

(Marshall & Hales, 1972)

# Goals of Research

- Create a reliable and validated assessment tool for CS1
  - Independent of objects-first, imperatives-first, or functional-first approaches.
  - Independent of any particular language.

# Motivation

- No such tool exists.
- Other tools are not validated or created for this purpose.
  - AP Exam
    - Not CC2001, specific language, prediction not assessment
  - GRE Subject Test & ETS Major Field Tests
    - End of 4-year undergraduate curriculum

# Previous Investigations

- Predictors Research
  - Kurtz, 1980; Mazlack, 1980
  - Leeper & Silver, 1982; Evans & Simkin, 1989
  - Hagan & Markham, 2000; Wilson & Shrock, 2001
  - Ventura, 2003
- ITiCSE 2001 Working Group
  - Tested programming skill
  - Too mathematical?

# Researcher's Previous Work

- Performance of Non-Majors
  - Used exam grades to assess mastery of material
- Analysis of AP Exam
  - Correlation for AP CS A Exam
  - No correlation for AP CS AB Exam

# Proposed Work

- Analysis of CC 2001 Programming-First Approaches
- Creation of Test
- Relevance Assessed by Community
- Field Testing
- Assessment of Reliability
- Assessment of Validity

# Open Issues

- Is this even possible/feasible/reasonable?
- Intersection of programming-first approaches too small
- Should have a language component\

- Current status: Final (?) draft of proposal to committee for defense this semester.

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