

# RESPECT the RECIPE: What Happened When Students New to Java Programming at a HBCU Were Given a Recipe to Code

## 1 Motivation

There are extremely low rates of participation by underrepresented groups in Computer Science. Learning to program (design and issue sequential commands to instruct a computer to solve a problem) can be challenging for many reasons and is often referred to as a large barrier to entry into the field.

Novice programmers focus simultaneously on learning how to design a program, converting that design into efficient working code, and communicating their conceptual ideas towards completion.

## 2 Hypothesis

Design Recipes have been used to counter these challenges, giving beginning programmers instructional steps towards designing, programming, and testing their code.

## 3 Research Questions

1. How can a Design Recipe be constructed to teach and guide students new to programming?
2. How will students use this 'Customized' Design Recipe?
3. How can this 'Customized' Design Recipe be used to assess students' design decisions and programming ability?

## 4 'Customized' Design Recipe

1. Understand the Problem
2. Determine Name of Class
3. Write Purpose Statement
4. Determine & Document Assumptions
5. Illustrate Final Program (in some way)
6. Work through & Document 3 Examples
7. Make Note of What Changes (from Example to Example)
8. List Steps Program Should Perform
9. Apply Programming Constructs to Steps in step 8 (Pseudo-Code)
10. (If Designing Methods), Highlight Actions
11. Repeat Steps 1-9 for each Action (Method)
12. Translate Pseudo-Code to Java Code, Line-by-Line
13. Insert Your Pseudo-Code Steps into Code as Comments
14. Test & Debug
15. Document Each Test Result



## 5 Initial Conclusion

- The Design Recipe helps students find a starting point when thinking of their solutions.
- Students can express themselves and their design decisions easier using the Design Recipe.

## 6 Next Steps

- Adapt for teaching "Objects First"
- Build Web-Interface to Support Student Response Submission, Save, & Export
- Conduct Qualitative Interviews with Students