

Lottery and the Wealth Gap

Stephanie Lin
University of Illinois
Urbana-Champaign
Champaign, Illinois, United States
stephwalin@gmail.com

Kaitlyn Zeichick
Scripps College
Claremont, California, United
States
kaitlyn@zeichick.com

Colleen Lewis
University of Illinois
Urbana-Champaign
Champaign, Illinois, United States
colleenl@illinois.edu

Course CS1

Programming Language Python

Knowledge Unit Programming Concepts

CS Topics III. Control Structures and Control Flow; IV. Functions / Procedures / Methods; VI. Collections / Data Structures)

SYNOPSIS

This assignment helps students gain experience and proficiency with lists, loops, and random number generators. Students will learn how to think through and write branching logic, plot data, and modularize their code. Through this assignment, students will learn how the lottery contributes to a growing wealth disparity by redistributing money from low income families to middle and high income students in the form of scholarships. With this basic simulation, students can visualize and learn about the mechanisms that cause the wealth gap to widen. This handout is based on a math assignment by Justin Allman [1].

KEYWORDS

Lists, Loops, Random Number Generators, Plotting, Graphing, Data Structures

ACM Reference Format:

Stephanie Lin, Kaitlyn Zeichick, and Colleen Lewis. July 2022. Lottery and the Wealth Gap. In *ACM EngageCSEdu*. ACM, New York, NY, USA, 2 pages. <https://doi.org/10.1145/3488379>

1 ENGAGEMENT HIGHLIGHTS

This assignment provides meaningful and relevant content by incorporating the important issue of the link between lotteries and the wealth gap. It also avoids stereotypes by explicitly addressing that people in poverty tend to gamble more often not out of ignorance, but because gambling

facilities are more likely to be placed in poorer neighborhoods, thus increasing likelihood of lottery participation and gambling addiction in those areas. Instructors are encouraged to facilitate individual reflection and group discussion regarding this central or any related topics.

2 RECOMMENDATIONS

This assignment requires students to have experience with lists, loops, and writing functions in Python. The level of difficulty can be changed by adding or removing starter code, helper functions, and guiding comments. To evaluate student work, some of the resulting plots may require manual validation. This assignment is ideal in a lab/group setting to encourage discussion and reflection, and can be implemented as a partner coding activity. Students are encouraged to follow the provided starter code scaffolding, but there are many possible solutions, augmentations, and alterations that can be made to include more robust information if desired. This handout can also be assigned as a machine problem for one week.

3 RESOURCE DETAILS

3.1 Introduction

This assignment demonstrates how the lottery contributes to a growing wealth disparity by redistributing money from low income families to middle and high income students in the form of scholarships. Specifically, profits from lottery ticket sales in Georgia are partially allotted to the state education budget, with the remainder dedicated to the jackpot [5]. The issue arises within Georgia's scholarship system, in which lottery funds are awarded to students who complete a number of advanced classes and achieve above a certain SAT score [4]. This merit-based system creates an uneven playing field — students from lower income families have fewer resources to pursue supplementary lessons and extracurricular activities, putting them at an educational disadvantage for receiving merit-based scholarships [2, 6, 8, 9]. Additionally, low income populations tend to play the lottery more, yet they receive scholarships less often than their high-income counterparts [3, 7, 10].



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ACM EngageCSEdu, July 2022.

© 2022 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-9447-5/22/07.

<https://doi.org/10.1145/3488379>

Students will create a simulation based on a real Georgia lottery game called "Fantasy 5" to learn about the mechanisms that cause the wealth gap to widen. The functions will allow students to explore and evaluate the lottery's profitability and effect on low income populations. The deliverables include a set of functions designed to be written by CS1 students who have been introduced to function writing, lists, loops, and branching logic in Python. The handout aims to exercise various data-driven skills, such as plotting data and logging meaningful print statements.

3.2 Implementation Guidelines

Students are given the starter code in `LotteryAndWealth.py` and must finish writing all specified functions in the assignment handout. Logic questions throughout the handout serve as comprehensions checks where students may review their understanding of the code and/or touch base with an instructor if they are confused. Finally, after finishing the coding portion, students should write short answers to or discuss the follow-up questions at the end of the handout.

3.3 Marking Guidelines

No rubric, autograder, or solution code is provided. Instructors may choose to implement an autograder for student-written functions or opt for an interactive, discussion-based approach that involves discussing the final product (a graphical visualization of the wealth gap) as evidence of satisfactory completion. Instructors are encouraged to place value on discussion of the follow-up questions. Instructors are welcome to email the assignment authors for our basic solution code.

3.4 Extensions and Modifications

The given starter code uses ample comments to scaffold and guide how students should complete the functions. To make this assignment more difficult or allow for more coding freedom, instructors can opt to remove these structural comments. Additionally, removing portions of the starter code, namely the provided helper functions for plotting, can also provide students with the opportunity to learn to write code that plots the patterns.

3.5 Pitfalls

The current version of the assignment starter code contains comments designed to guide the student problem solving in a particular direction. However, the specificity of this scaffolding may be a restricting factor, and instructors may find it advantageous to remove the comments altogether to allow students free rein to generate their own algorithms.

4 MATERIALS

- **Assignment handout:** Lottery and the Wealth Gap.docx
- **Starter code:** LotteryAndWealth.py

5 ACKNOWLEDGMENTS

This assignment is based on a math assignment by Justin Allman [1]. Extra thanks to Fiona Callahan and Henry Sojico for their help crafting the handout and starter code.

REFERENCES

- [1] Justin Allman. 2005. Who Does the Lottery Benefit? (Oct 2005). www.radicalmath.org/docs/Lottery_Allman.pdf
- [2] Elizabeth Caucutt. 2019. The real reason why poor kids perform worse in school — and in life. (Mar 2019). <http://www.washingtonpost.com/posteverything/wp/2015/04/28/the-real-reason-why-poor-kids-perform-worse-in-school-and-in-life/>
- [3] Alvin Chang. 2016. 4 ways the lottery preys on the poor. (Jan 2016). <http://www.vox.com/identities/2016/1/13/10763268/lottery-poor-prey>
- [4] Georgia Student Finance Commission. 2021. Initial Academic Eligibility for the HOPE Scholarship. (2021). <http://www.gafutures.org/hope-state-aid-programs/hope-zell-miller-scholarships/hope-scholarship/eligibility/>
- [5] Georgia Lottery Corporation. 2021. About Us. (2021). <http://www.galottery.com/en-us/about-us.html>
- [6] Stand Together Foundation. 2021. Break the Cycle of Poverty. (May 2021). <https://standtogetherfoundation.org/>
- [7] Donald E Heller and Patricia Marin. 2004. State merit scholarship programs and racial inequality. *Civil Rights Project at Harvard University (The)* (2004).
- [8] Julia B Isaacs. 2012. Starting School at a Disadvantage: The School Readiness of Poor Children. The Social Genome Project. *Center on Children and Families at Brookings* (2012).
- [9] Rick Seltzer. 2016. HOPE for Whom? (Sep 2016). <http://www.insidehighered.com/news/2016/09/16/report-finds-georgias-hope-programs-miss-many-students>
- [10] Lyna Wiggins, Lia Nower, Raymond Sanchez Mayers, and N Andrew Peterson. 2010. A geospatial statistical analysis of the density of lottery outlets within ethnically concentrated neighborhoods. *Journal of Community Psychology* 38, 4 (2010), 486–496.