Teacher: Jessica Novillo Argudo
Unit Plan: Ethics in Computer Science
Lesson: Bias in algorithms
Grade: 12th Grade
Date: Spring 2023

Overall Objectives of Lesson:

- Students will learn the definition of algorithm and algorithmic bias.
- Students will explore examples of algorithmic bias in society.
- Students will identify the bias in a simple algorithm developed in Python.
- Students will modify a Python algorithm to eliminate the existing bias.

Standards

9-12.IC.3: Debate issues of ethics related to real world computing technologies.

9-12.CT.7: Design or remix a program that utilizes a data structure to maintain changes to related pieces of data.

Content-specific vocabulary:
Algorithm
Algorithmic bias

Assessments

1. Participation
2. Observation of the students' programming skills
3. Exit Slip

Materials/Resources

Projector
Computers
Slides
Exit Slip
Programming language Python
GitHub: https://github.com/jnovillo/cs_lessons

Sequence of Lesson Plan

Time Allotment 5 minutes	**Anticipatory Set - Warm-up** The teacher asks students: What is an algorithm? Students share their ideas. The teacher defines "algorithm" and gives examples. **Algorithm:** An algorithm is a set of instructions that a computer follows. The teacher asks students to go to Google Images https://images.google.com/ and search for "professor". The teacher asks the students to make groups of 2 or 3 and answer the following questions: - Who do you see? [Actors, stereotypes, white males mostly, no diversity] - Who did you expect to see? Who is missing? [More women, more people of color, more diversity, real-life professors] - How does the information provided by these images influence you? [Professors all dress alike in suits and ties. Professors are easily identified by how they dress. Reinforces stereotypes] - Does this tell us anything about how the population is represented or misrepresented? [Population is misrepresented; most professors do not dress this way. There is more diversity in real life] The teacher asks students to share their responses.
18 minutes	**Lesson** **Note:** The teacher uses slides for this lesson. The teacher defines bias. **Bias:** Prejudice in favor of or against one thing, person, or group compared with another, usually in a way considered to be unfair. The teacher explains the problems with algorithms and defines algorithmic bias. **Algorithmic bias:** Create outcomes based on preference for someone or a group of people over another. The teacher explains the sources for bias in algorithms. The teacher provides examples of bias in algorithms: Amazon’s recruiting algorithm biased against women, Mortgage algorithms and Predictive policing algorithm. The teacher asks the students: Have you seen any algorithm bias in the applications you

	use every day? [Facebook, music recommendation algorithms, healthcare systems]
15 minutes	**Practice** The teacher introduces the practice exercise. The teacher gives a python script to the students and asks them to identify the bias in the algorithm. The teacher asks the students why there is bias in the algorithm and how can they make it fair? [Yes, players are selected based on donation and not ability. Selecting players based on their overall rating would be fair] The teacher gives the directions to modify the python script to make the algorithm fair. Students work in pairs on the assignment.
2 minutes	**Closing** Students complete the Exit-Slip