LESSON PLAN

Wage Gap

Title	Wage Gap: Real World Application of Loops and Branches
Course	Courses in Computer Science and Engineering
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Time duration	The assignment includes articles and set of questions to be completed outside of class time, followed by a 10-15 minute in-class discussion.
Overview	This activity is designed to explore gender bias in engineering fields focusing on wage gap.
Objective	• Develop awareness about gender bias in engineering fields • Calculate Pay Gap and Earnings Ratio, which are commonly used to measure pay equity
Materials	Student Handout (see last page/attachment) Online article and questions found in attachment. https://www.forbes.com/sites/tanyatarr/2018/04/04/by-the-numbers-what-pay-inequality-looks-like-for-women-in-tech/#4033699260b1 http://fortune.com/2017/02/28/intel-pay-women-minorities-2017/
Procedures	Students read articles and complete a set of questions outside of class time, followed by a 10-15 minute in-class discussion.
Discussion Guide	Start the discussion by reviewing the premise of the assignment:

The students read two articles about gender discrimination in engineering workplaces. They were asked to calculate wage gap between men and women.

1. Ask the students to read two articles
2. Ask the students to use MATLAB to write a code which can determine the actual difference in salary between men and women, the Earnings Ratio, and Pay Gap each year between 2018 and 2028
3. Ask the students to use MATLAB to write a code which can determine the actual differences in salary between men and women, the Earnings Ratio, and Pay Gap each year between 2018 and 2038.

Students were then asked to apply their codes to specific scenarios with the different raise rate, starting salaries, and promotion.

1. Ask the students to calculate the salaries of the man and women in the two specific scenarios by using their codes.

Modifications

This activity can be modified and adapted to fit different curricular needs. For example, it may help to bring in your own personal examples of how diversity resulted in a better product or process, or you may follow up the in-class discussion with further reflection questions.

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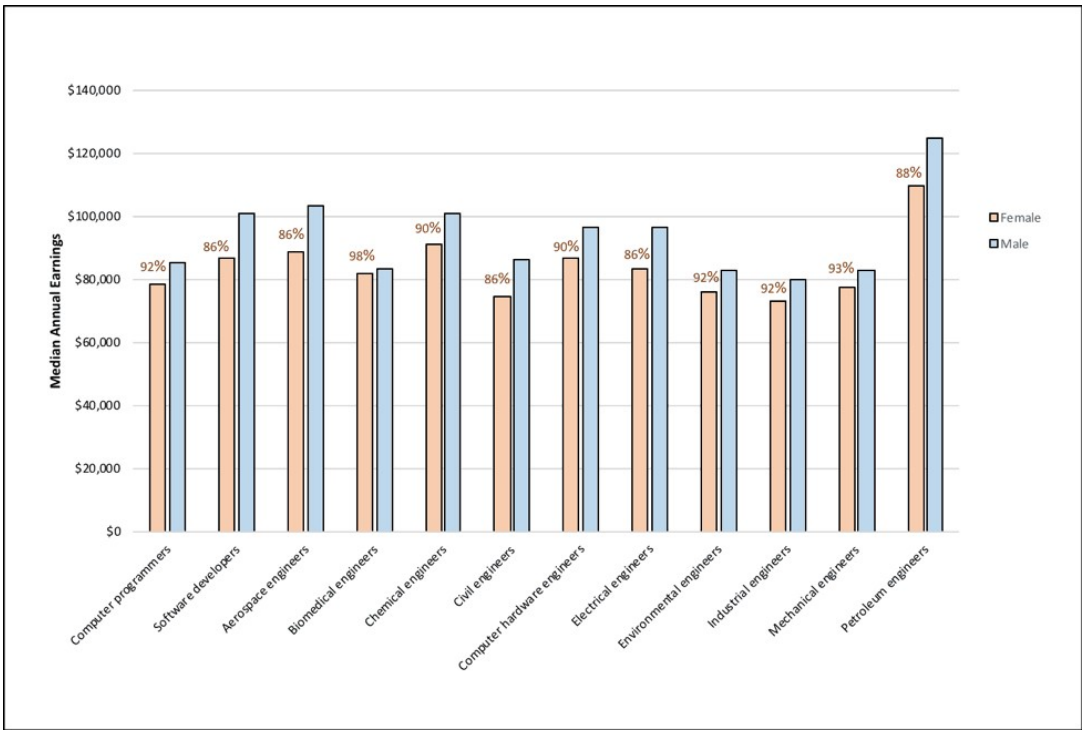
Online Activity

Since 1960 the pay gap between men and women has been decreasing; however, as recent as of 2016 men working fulltime in the United States earned on average 20% more than females. In the United States women and men are predicted to reach pay equity in year 2059.

In tech fields, where computer scientists are commonly hired, when men and women with identical credentials are hired for exactly the same positions, men on average earn 4% more than women. While the pay gap is common, the good news is a few companies who hire engineers are starting to achieve 100% equality in pay! The gender wage gap also varies by discipline, as shown in the figure below.



Source: U.S. Census Bureau. 2016 American Community Survey 5-year estimates: Tables B24122 and B24123. Data retrieved from www.factfinder.census.gov

Read the following articles:
https://www.forbes.com/sites/tanyatarr/2018/04/04/by-the-numbers-what-pay-inequality-looks-like-for-women-in-tech/#4033699260b1

http://fortune.com/2017/02/28/intel-pay-women-minorities-2017/

Specifically, the expecting starting annual salary for a male engineer is $66,097 (average across all disciplines), and the expected starting salary for engineers who are female is $63,554.

Pay Gap and Earnings Ratio are two terms are commonly used when discussing pay equity, shown in equations below.

$$Earnings\ Ratio = \frac{Women's\ median\ earnings}{Men's\ median\ earnings}$$

$$Pay\ Gap = \frac{Men's\ median\ earnings - Women's\ median\ earnings}{Men's\ median\ earnings}$$

Complete PARTs A and B in a single script (.m) file, to be uploaded to eCampus.

PART A

Assuming a woman and a man each start at the above salaries, and each earn 5% raises annually, how will the Earnings Ratio and Pay Gap be affected? Use MATLAB to write a code, employing at least one loop to determine the actual difference in salary between men and women, the Earnings Ratio, and Pay Gap each year between 2018 and 2028. The output should be a neatly formatted table in the command window with the heading shown below. Also using the fprintf function display in the command window the total difference in pay between a man and a woman over the 20-year period.

Year	Average Men's Salary	Average Women's Salary	Difference in Annual Salary	Earnings Ratio	Pay Gap

The code should also generate a single plot comparing the annual earnings of the man and the woman. Be sure to include a legend, title, and appropriate axis labels.

PART B

Data shows that men are more frequently promoted, and the majority of upper-level positions are held by men. Promotions commonly are accompanied by raises. It is also common for raises to be based on merit and some merit measurement metrics have been shown to be advantageous to men compared to women. Use MATLAB to write a code, employing at least one loop to determine the actual difference in salary between men and women, the Earnings Ratio, and Pay Gap each year between 2018 and 2038.

The program should request the user input (1) the number of years prior to a promotion for a woman, (2) the number of years prior to a promotion for a man, (3) the annual

merit raise percentage for a woman, and (4) the annual merit raise percentage for a man. The output should be a neatly formatted table in the command window with the heading shown below. Also using the fprintf function display in the command window the total difference in pay between a man and a woman over the 20-year period.

This program will be used to analyze scenarios outlined in part C.

Year	Average Men's Salary	Average Women's Salary	Difference in Annual Salary	Earnings Ratio	Pay Gap

The code should also generate a single plot comparing the annual earnings of the man and the woman. Be sure to include a legend, title, and appropriate axis labels.

PART C

Use the program developed in Part B to evaluate the following situations:

A) A man receives an annual merit raise of 5% and a woman receives an annual merit raise of 3%, the starting salaries are the same as Part A. Assume no promotions occur during the 20-year period being examined, have the user input 21 for the years prior to promotion for each individual.

B) A man is promoted after 5 years of service and a woman is promoted after 7 years of service. Assume that the man and the woman start at the salaries from Part A, they each earn 5% merit raises per year, except the year of their promotion where they receive a 10% raise.

PART D

Please respond to the following prompt:
How problematic is the entry-level wage gap on a woman's lifetime earning potential? Based on the examples of companies that have successfully closed the gender wage gap and your own ideas, what can be done to mitigate existing gender wage gaps?

Common Reflection Questions for All Activities

1. Will what you learned from this activity affect the way you work in teams for future engineering projects? Please Explain why or why not.

2. What did you learn from this activity?

3. What did you like about this activity?

4. What would you suggest to improve this activity?