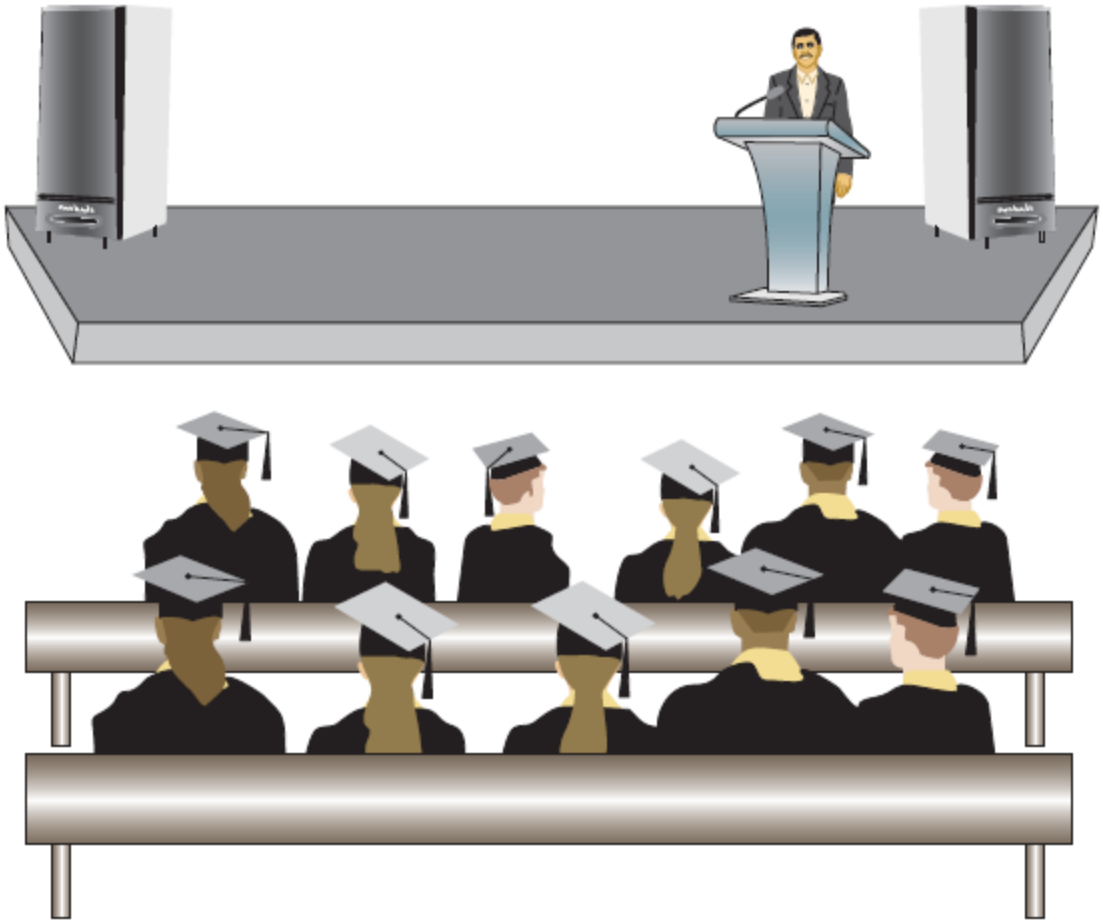
Story 9. Watsamattawith U?



Congratulations, graduating class . . . you collectively have a remarkable GPA.

Watsamattawith University (WU) is a fine institution, but a paradoxical place. They have comfortable dorm rooms, yet all the students sleep in class; their track team streaks from place to place, yet their cheeks are red with embarrassment as they lose every meet; every student is vegetarian, yet their dining facility is named Holstein Hall; and their student senate is called the House of Representatives. Go figure!

And go figure, indeed—for that is exactly what the registrar of WU did in computing the average GPA of the current graduating class. Every year she computes the average GPA of the male students, the female students, and then all the students from that graduating class.

This year she noticed something most peculiar. The average GPA of the male students in the current graduating class was higher than the average GPA of the male students from last year's graduating class, and the average GPA of the female students in the current graduating class was higher than the average GPA of the female students from last year's graduating class. Sounds great for the current graduates. Unfortunately, she discovered that the average GPA of the entire graduating class was actually lower than the average GPA of last year's class. What!?

Given that there were no errors in the registrar's computations, is it possible that such a phenomenon could occur or is this scenario so ridiculously impossible that merely asking the question deserves the response: Watsamattawith U?! If such a scenario is possible, explain how by describing an example where the GPAs of the males goes up, the GPA of the females goes up, but the GPA of all the students goes down. Otherwise respond with . . . well, you know.

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Nudges:

- The natural initial reaction to the question is *Watsamattahwith U?!* However, statistic issues often can be both subtle and counterintuitive. Suppose there are 300 students in each of the graduating classes. In last year's class, half were male and half were female.
- Suppose the average GPA of the men was 2.0 while the average GPA of the women was 3.5.
- Then the average GPA for last year's graduating class was 2.75—which is halfway between 2.0 and 3.5.

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Nudges:

- Can you create a graduating class of 300 students for which the average GPA of the men is 2.1, the average GPA for the women is 3.6, and yet the average GPA of the entire graduating class descended to 2.65?

Bonus Nudge:

- Answer—Yes, you can!