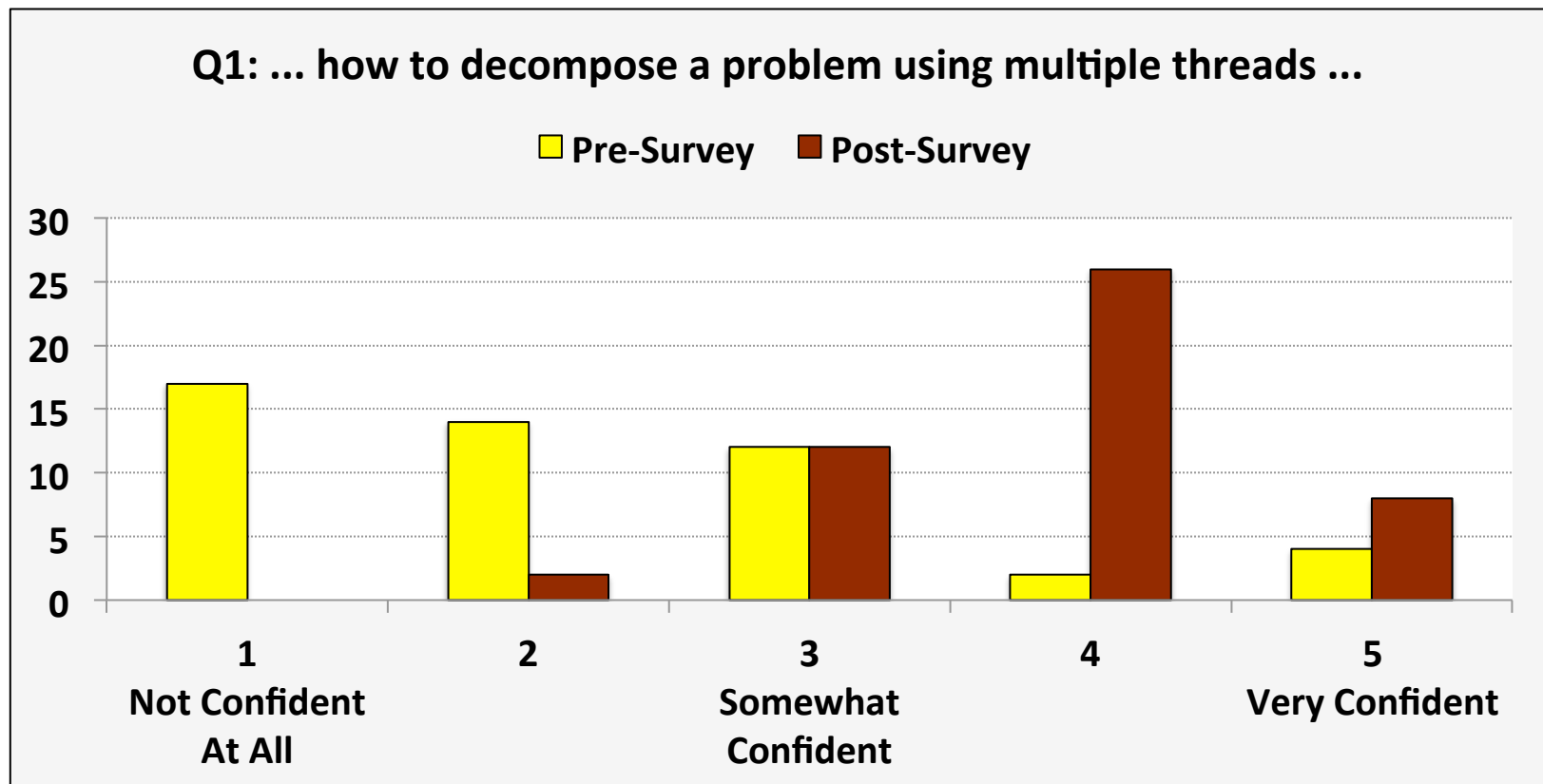# *Assessing the use of SBCs as a Teaching Tool*

Joel Adams, Calvin College
Richard Brown, St. Olaf College
Suzanne Matthews, West Point
Elizabeth Shoop, Macalester College

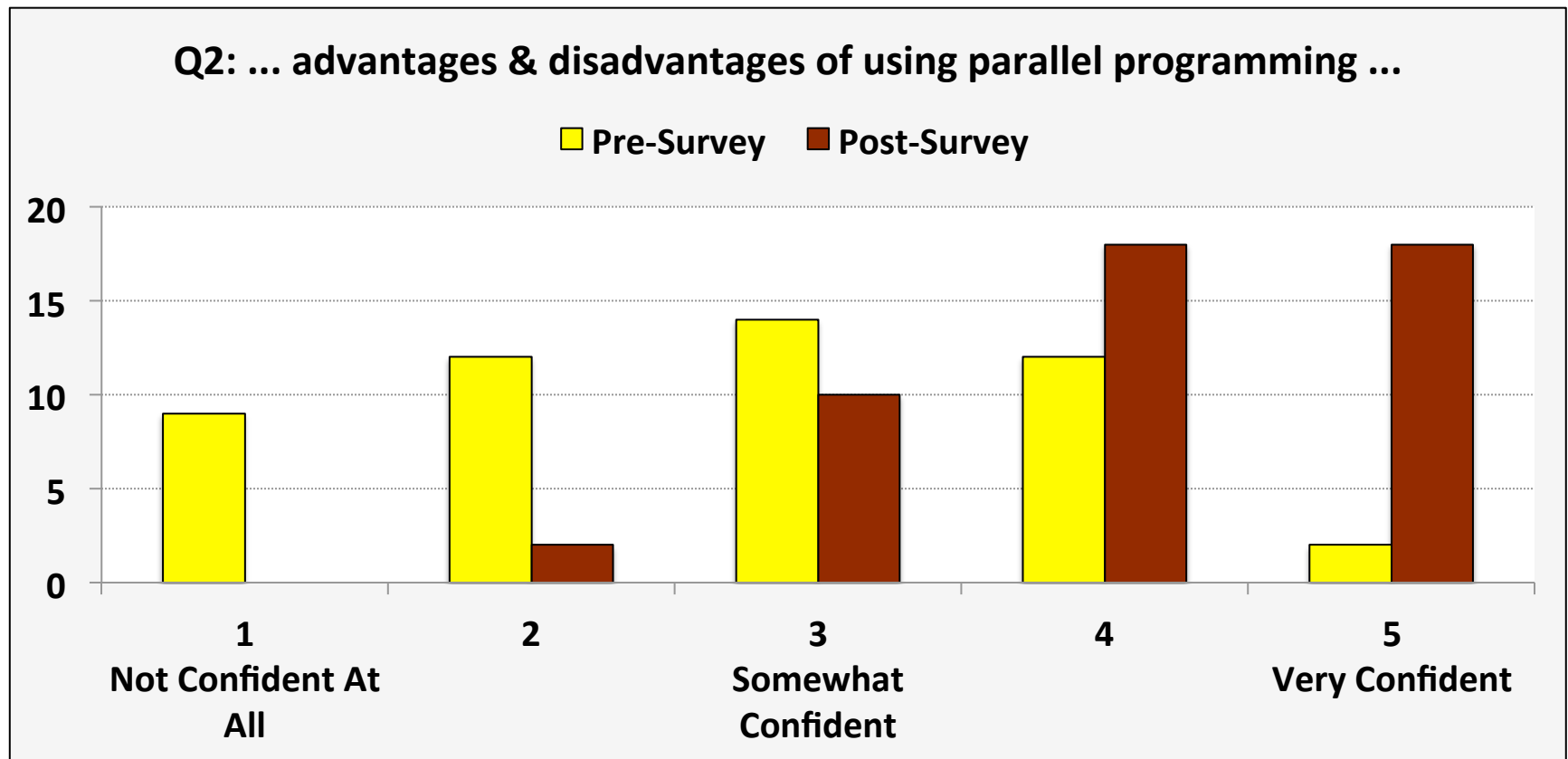# Pre- and Post-Survey Questions

1. How confident are you that you can describe how to decompose a problem using multiple threads and implement it using a parallel loop?

2. How confident are you that you could describe the advantages and disadvantages of using parallel programming on shared memory multicore machines to someone familiar with programming?

3. How confident are you that you can define speedup and describe it to someone familiar with programming?

4. How confident are you that you can describe what a race condition is and how to avoid it when writing parallel programs that use shared memory?

5. *Post-survey only*. To what extent did using an inexpensive multicore computer (e.g. the Raspberry Pi) to run parallel programs motivate you to learn more about parallel computing in the future?
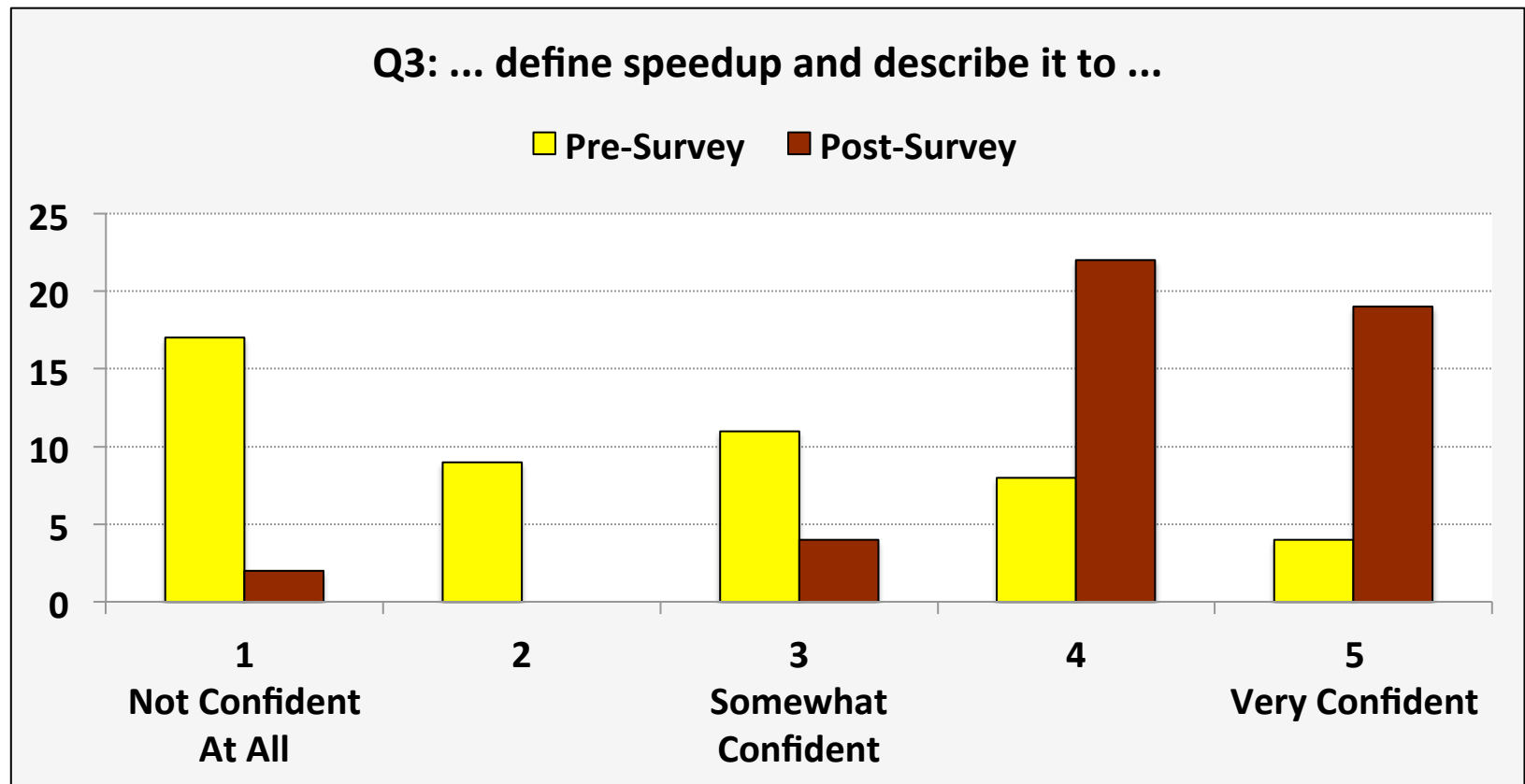
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Q1: Confidence in describing…

Q1: … how to decompose a problem using multiple threads …

☐ Pre-Survey ☐ Post-Survey

Pre: n = 49, x̄ = 2.22; Post: n = 48, x̄ = 3.83; *p = 1.41e-11*

Q2: Confidence in describing ...

Q2: ... advantages & disadvantages of using parallel programming ...

□ Pre-Survey ■ Post-Survey

Pre: n = 49, $\bar{x}$ = 2.71; Post: n = 48, $\bar{x}$ = 4.08; *p = 2.85e-9*

Q3: Confidence that you can …

Q3: … define speedup and describe it to …

☐ Pre-Survey ■ Post-Survey

| | 1 Not Confident At All | 2 | 3 Somewhat Confident | 4 | 5 Very Confident |

Pre: n = 49, $\bar{x}$ = 2.45; Post: n = 47, $\bar{x}$ = 4.19; *p = 3.71e-10*

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Q4: Confidence that you can …

Q4: … describe what a race condition is …

☐ Pre-Survey ■ Post-Survey
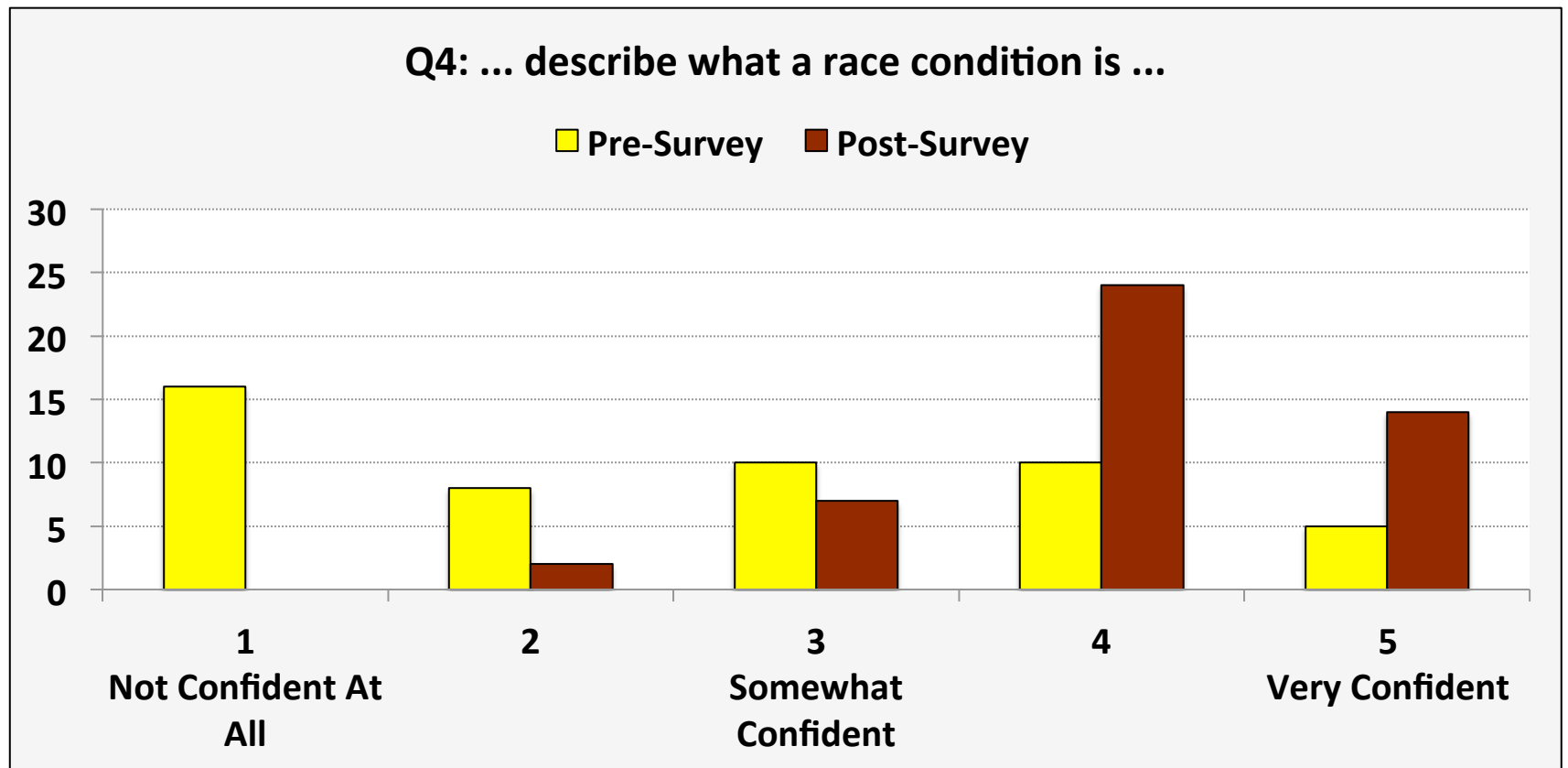
Pre: n = 49, x̄ = 2.59; Post: n = 47, x̄ = 4.06; *p = 4.95e-8*

Q5: To what extent did using …

Q5: … Raspberry Pi … motivate you to learn more …

■ **Post-Survey**
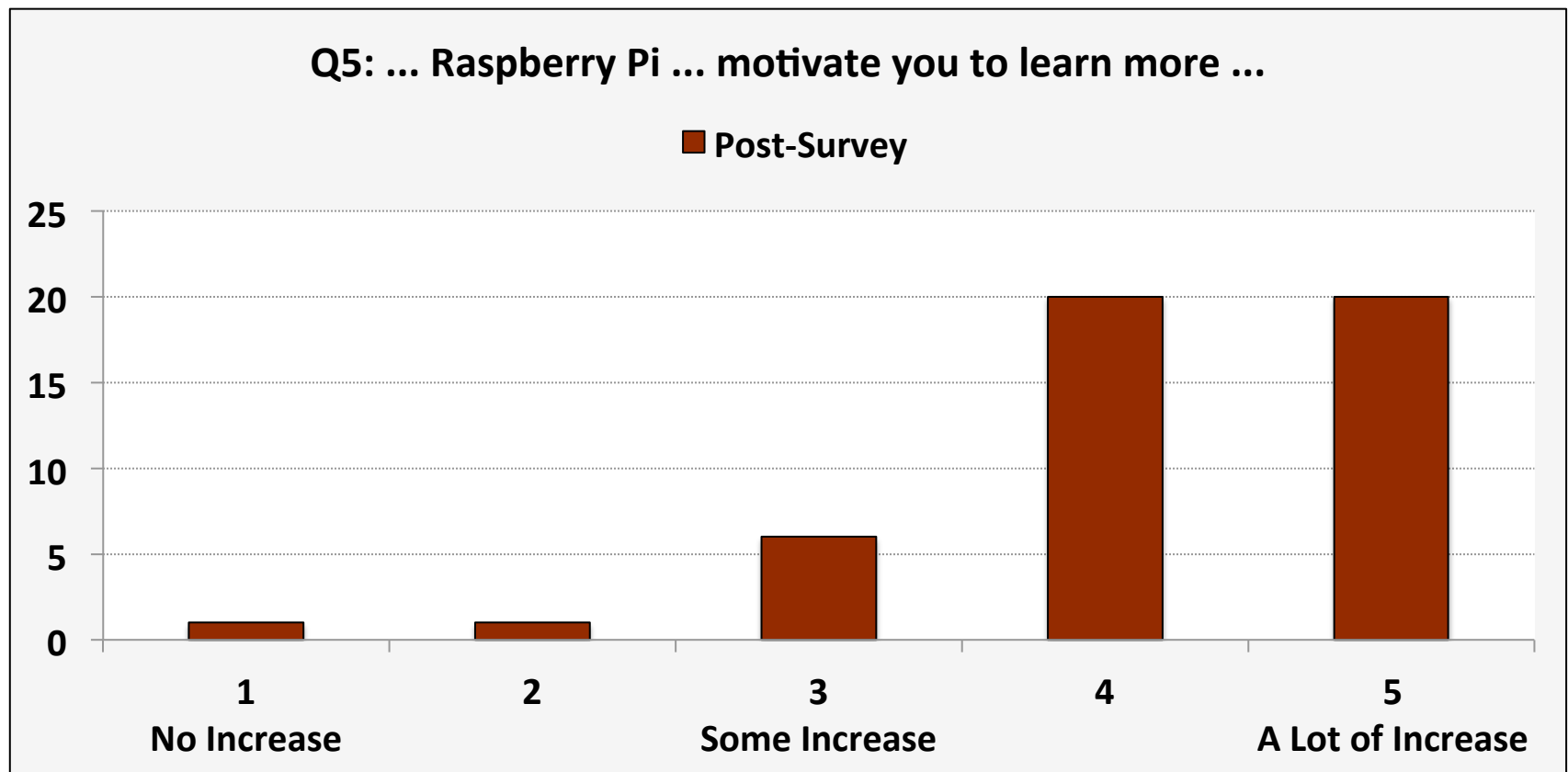
Post: n = 48, x̄ = 4.19

Open-Ended Comments

- *I love microcontrollers, but this is my first time using a Raspberry Pi... I'm more motivated to use a Raspberry Pi...*

- *I enjoyed programming on the Pi and have gained more of an enthusiasm with it.*

- *It's fun to see it work on a small machine and get to play with the tech I keep hearing about (raspberry pi).*

- *Not having to have an expensive computer to try this stuff on is really motivating.*

- *Awesome seeing how easy this was to teach.*

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Open-Ended Comments

- *I learned more about the type of devices that are capable of parallel programs. I would like to look at parallel computing on a super computer.*

- *I think it is great for education.*

- *I always thought that you need expensive HPC to do parallel programs.*

- *I have been interested to learn about this for a long time but never knew where to begin.*

- *I'll probably try to get my own Raspberry Pi to practice more and write my own code for it.*