Instructor Guide

It is important to note that other modules within this unit have already covered some information in this module. It is included in case you choose to only use this module from the unit. If you are using other modules from this unit, please feel free to omit information that has already been covered in your class.

GOAL

The goal of this module is not so much to provide syntax and how to code but more to provide information that shows why parallelism is an important tool in certain situations and in what situations it is important. It is designed to contain a large amount of discussion among students regarding whether or not parallelism might be useful in certain situations and to justify why it would or wouldn't be useful.

PUZZLE PROBLEM

If you are going to follow the examples and exercises in the presentation slides, you will need a puzzle for the puzzle problem on Slide 17. It can be the number of pieces that you desire and you can do any number of examples that you desire. A few examples might include:

1. Give 1 student 1 minute to do as much of the puzzle as possible
2. Bring up a second student so there are 2 students and give the 2 students 1 minute to do as much of the puzzle as possible. Leave all of the puzzle pieces in 1 pile that both students have access. Point out that, now that there is more than 1 person, they need to communicate
3. Bring up 2 more students so there are 4 students and give the 4 students 1 minute to do as much as of the puzzle as possible. Leave all of the puzzle pieces in 1 pile so that all of the students have access. Point out that, now that there are more and more people, it can be more difficult to communicate and people might get in each other's way
4. Divide the puzzle pieces into several piles and place those piles around the room. Maybe do 5 piles for the 4 students. Spread the students out in any configuration you want and give them 1 minute to do as much of the puzzle as possible. Point out that, now that the pieces are spread all across the room, they have to move to the puzzle pieces, which can be thought of as data, and the students must communicate much more between each other to get the pieces that they need

After doing the puzzle problem, have the students discuss the concepts that they learned and how they can be applied to parallel programming.

EXERCISES

There are numerous slides in the presentation that give examples (Slide 18 and on) of problems and ask the students to decide whether or not parallelism would be beneficial for the problem and why or why not. There is a variety of types of problems in there and it is up to the students to discuss and decide what they think is the correct answer. While some of the problems have pretty obvious answers, such as not using parallelism for the tip calculator because the problem is so simple that parallelism would slow it down, some of the problems are up for debate.

EXAMPLE PROGRAM: TIME TO SCIENCE WITH GALAXSEE

Whatever does not get completed in class in the allotted time is designed as homework. There is also a sample assessment that is available that asks the students questions about what they learned and asks them to reflect on the activity they just completed.

All of the steps for the assignment are in the Exercise Instructions guide that is provided with this document. In addition, there is a Sample Assessment document included that asks students questions about the activities they completed, as stated above.

Common Pitfalls for Students and Instructors

Depending on whether or not students have previous experience with writing and compiling a program, some may have trouble with using a command line, navigating to their program, requesting a node (or multiple nodes) on the supercomputer, and compiling and running their program. All of these instructions are provided, but some students may need additional help navigating through the exercise until they feel more comfortable using a supercomputer.