

PB&J in Parallel

Course Level:

CS0

PDC Concepts Covered:

PDC Concept	Bloom Level
Serial vs Parallel	K
Congestion	K

Tools Required:

1. 2 Jars of Peanut Butter
2. 2 Jars of Jelly
3. 2 Loaves of bread
4. 5-7 plastic knives

Introduction:

A single student competes against a team of four in making peanut butter and jelly sandwiches for their classmates. Constraints added to the problem allow the showcasing for several important concepts.

Activity Description:

In this exercise, a single student is competing against a larger group of their classmates. While we would expect the larger team to demonstrate the speedup concept, in this exercise a constraint is attached to this scenario in that while each student is presented with a knife to use, both teams only have access to a single jar of peanut butter and jelly.

By limiting access to these ingredients, we can introduce more complicated concepts. While synchronization and speedup are still present in this exercise, We are now able to show the concepts of bottlenecks, deadlocks, and race conditions, since the team will have to plan and work around this mutual exclusion restriction if they wish to take full advantage of their team size.

Important Points:

By observing how the larger group overcomes the challenge presented by the constraints, discussions into the detection and prevention of similar restrictions are possible.

Extensions:

Add more students to the larger group. At some point adding more students actually results in a slower time. This will highlight the limitations of parallelism and the concept of load balancing.