

The Swimmy Friends Pet Store

Swapping two values in an array is a basic operation that helps illustrate how arrays store data. Each entry in an array can be viewed as an individual variable—it stores one piece of information. In order to swap the values contained in two different entries, additional (temporary) storage must be used. Specifically: 1) the data from one array entry is written to the temporary storage, 2) the data from the other array entry is written to the memory location of the first entry, and 3) the data from temporary storage is written to the second array entry.



CASEY'S FIRST DAY AT the Swimmy Friends Pet Store hadn't gone smoothly. Within fifteen minutes, he had accidentally allowed all thirty turtles to escape. He had then spent the next eight hours rounding them up. Although the turtles were slow, they scattered in different directions and hid under store shelves. No matter how nicely he asked, the turtles refused to come when he called them.

The day had concluded with a stern lecture from the manager. The manager reminded Casey that Swimmy Friends Pet Store had a reputation to maintain. It was, after all, the kingdom's finest aquatic pet store. Even the king had purchased his pet turtle at Swimmy Friends, and the king's gardener had purchased a large rock here just last week.

Casey sincerely hoped that his second day would go better.

"Casey, I have a job for you," called the manager as Casey

entered the store.

"Sure!" responded Casey eagerly.

"We're starting a promotion on tiger barbs this week," the manager explained. "I want to put them in the big tank at the front of the wall. Can you swap them with the neon tetras?"

Casey looked at the fish section. Large, torch-lit fish tanks lined the entire back wall of the store. At the front was the tank currently occupied by the neon tetras. Five tanks over, two dozen tiger barbs swam lazily around a small rock. Both tanks looked quite heavy.

"You want me to move the tanks?" asked Casey.

"Of course not!" the manager answered. "The tanks are full of water and weigh more than you. Just swap the fish. The temperature and pH are already identical."

Casey nodded. He walked over to the tiger barb tank and began trying to scoop up barbs in the net. The manager watched from the side.

"What are you doing?" the manager asked.

"Moving the tiger barbs over," responded Casey without looking up. The tiger barbs were fast, and Casey wasn't coordinated. He thrashed about with his little green net, hoping that he could catch one by luck.

"You do know that tiger barbs and tetras can't go in the same tank, right?"

"Uh-huh," responded Casey, still lost in concentration.

"So, what are you going to do with the tiger barb that you're having trouble catching?" prompted the manager.

"I'm going to put it—oh." Casey realized his mistake. There was no way he could transfer the tiger barbs over without first moving the tetras. And there was no way to transfer the tetras over without first moving the tiger barbs. The whole swap was deadlocked. His brain spun as he tried to come up with a solution.

The manager waited for Casey to see the solution. It wasn't a hard problem. Finally, after two minutes, the manager realized

that Casey wasn't going to figure it out.

"Use that empty tank as temporary storage," the manager prompted. "First, put the tetras in the empty tank. Second, move the tiger barbs to the old tetra tank. Third, move the tetras to the old tiger barb tank."

"But that means three sets of moving things. I know that I can do it in two." Casey responded. He was determined to prove that he was a good employee.

The manager sighed. "No. You can't. You need to use temporary storage. Otherwise, you'll end up putting tiger barbs in the tetra tank and causing problems."

Casey wanted to argue, but he couldn't think of a better solution. "Okay," he finally agreed.

The manager looked at Casey. While he was semi-confident that Casey could handle the fish swap, he worried about Casey doing something stupid later.

"Come find me when you finish," the manager instructed. "And stay away from the turtle tank," he added for good measure.



