Data Races

Course Level:
CS1/CS2

PDC Concepts Covered:

PDC Concept	Bloom Level
Data Races	

Programming Knowledge Prerequisites:
Basic knowledge of computer memory

Tools Required:
Internet Connection
Edit access to supplied spreadsheets in a shared environment (such as a google drive).
Timer (optional)

Introduction:

The main goal of this module is to introduce the basic concept of a data race through a visual interaction. This is done by having each student fill an array of cells in a shared spreadsheet. The color of a cell is based on the last person who modified it.

Activity Description:

1. Pair up students
2. Copy Sheet 1 so that each pair of students has access to a copy. ***Figure 1.***
3. Let each student pick either the row or column and a color.
    a. Alternately, assign a color for each row and column on a sheet.
4. Each student begins in the indicated cell.
5. When you signal, each student attempts to fill their row or column with their color cell by cell in the direction of the arrow.
    a. Filling cell by cell helps demonstrate sequential memory writes, but if a student uses the drag functions to fill their area it is not an issue.
6. The color of the overlapping cells will change depending on who fills them last (Example result in ***figure 3***.)
    a. You may repeat this giving one student a delay before starting.
7. Split students into groups of up to 4 and follow steps 1 through 5 for sheet 2. Once again the overlapping cells color will depend on who modified it last. ***Figure 2.***

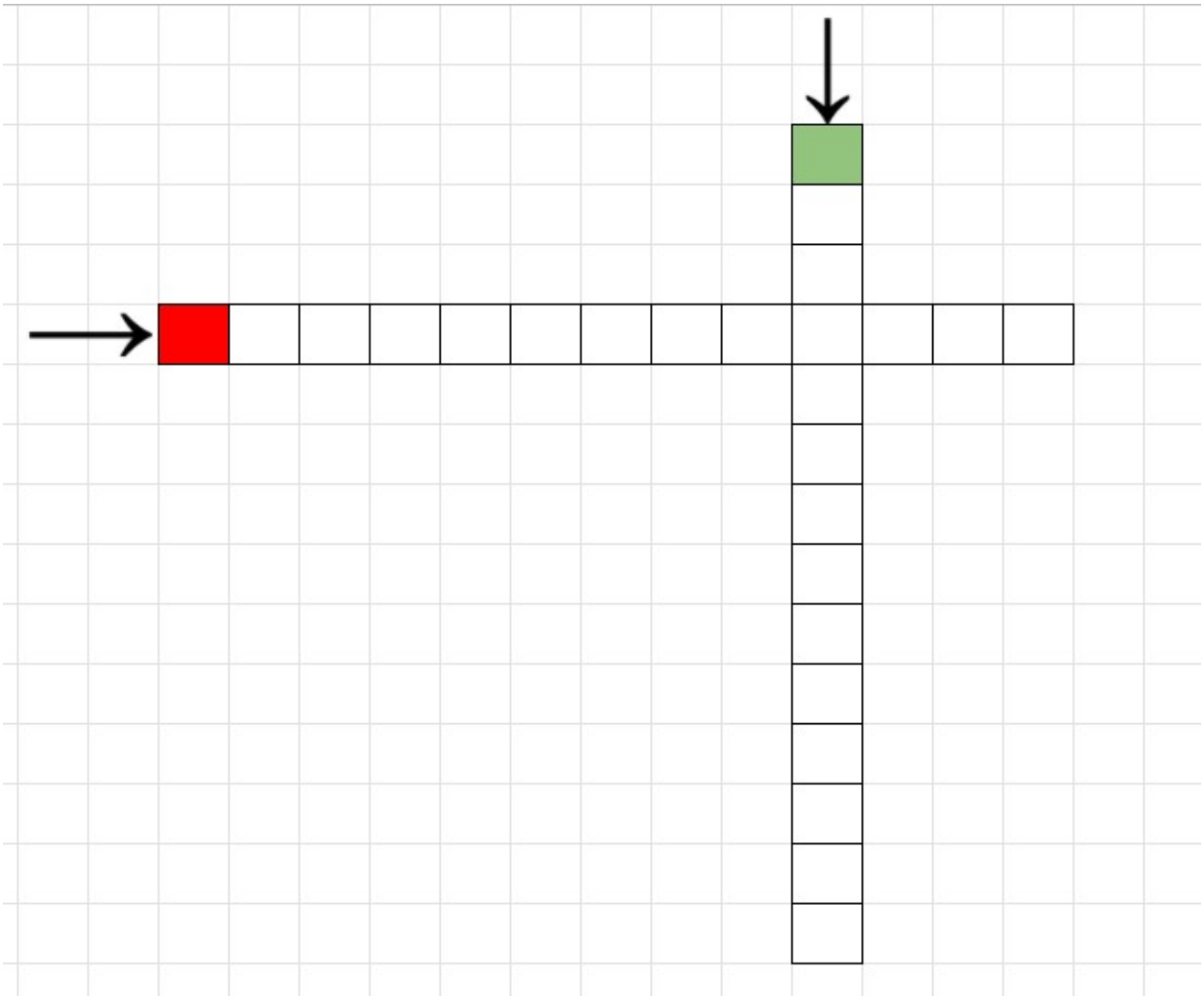

Figure 1: Two Person Race

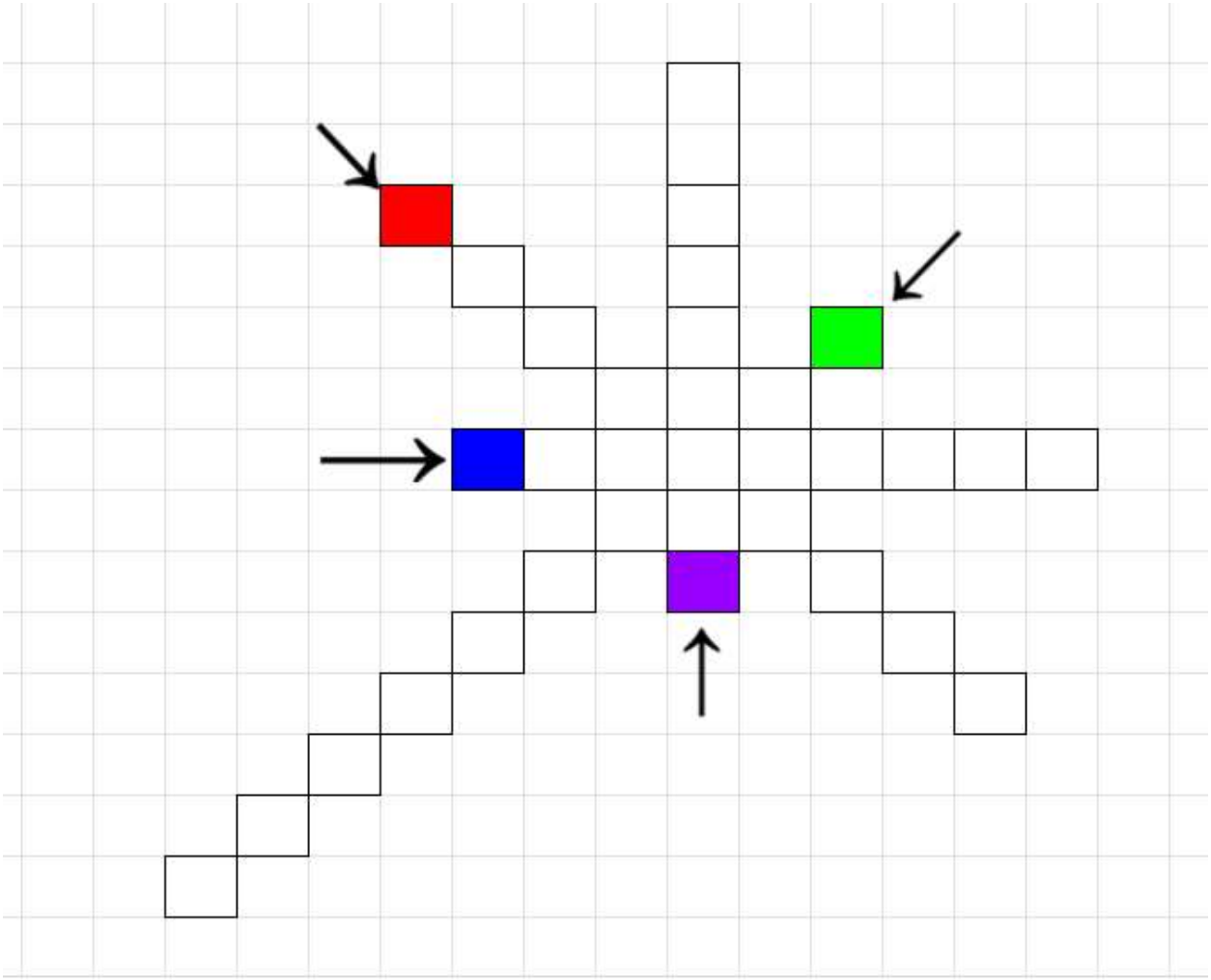

Figure 2: Four Player Race

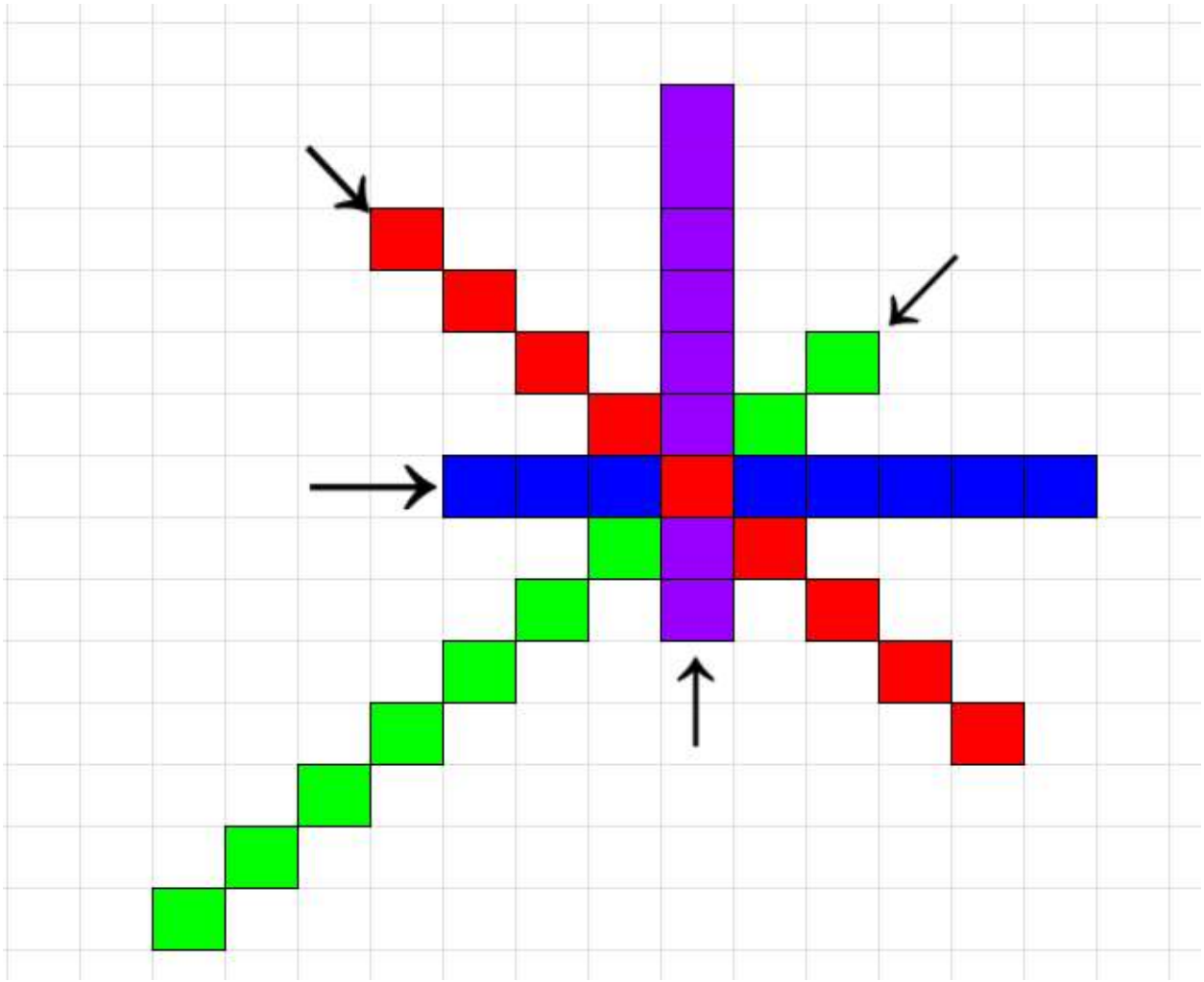

Figure 3: Possible Result:
The center square has been written to by all the students, but red wrote last so it appears red to everyone.