Digital Tracetables

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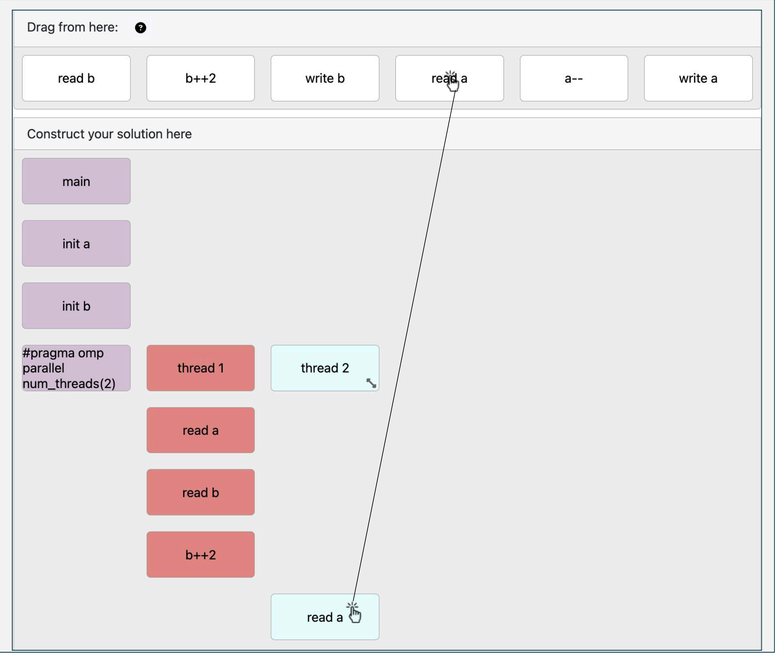
CS 194: Star Assessments for Mastery Learning

Abstract

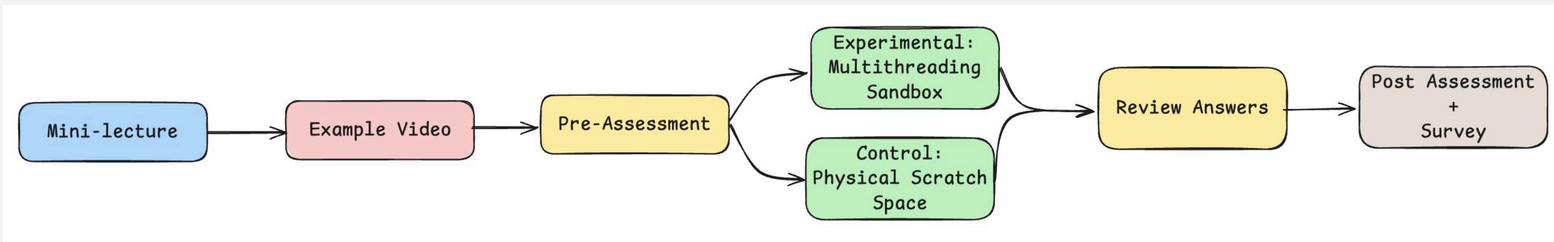
```
int a = 3;
int b = 0;

#pragma omp parallel
{
    while (a > 0)
    {
        b = b + 2;
        a = a - 1;
    }
}
```

- Motivation: students have had difficulty understanding multi-threaded code.

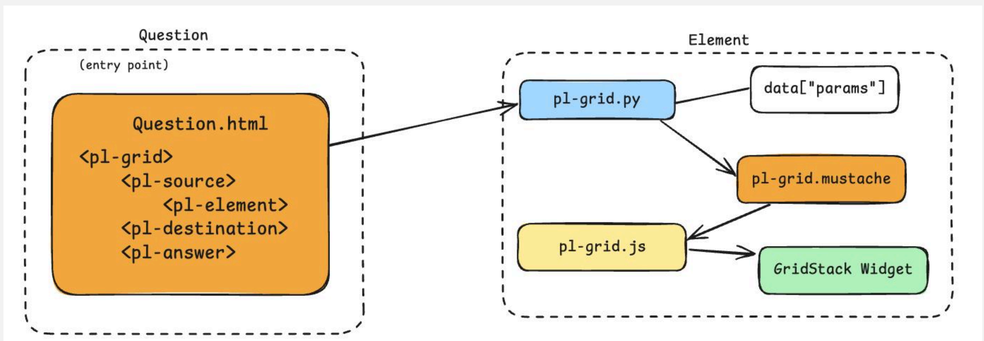


User Study



RQ1: What are the learning gains between students that use Digital Trace Tables compared to students who complete the discussion worksheet.
RQ2: What are students' perceptions about the usability of the Multithreading Sandbox?

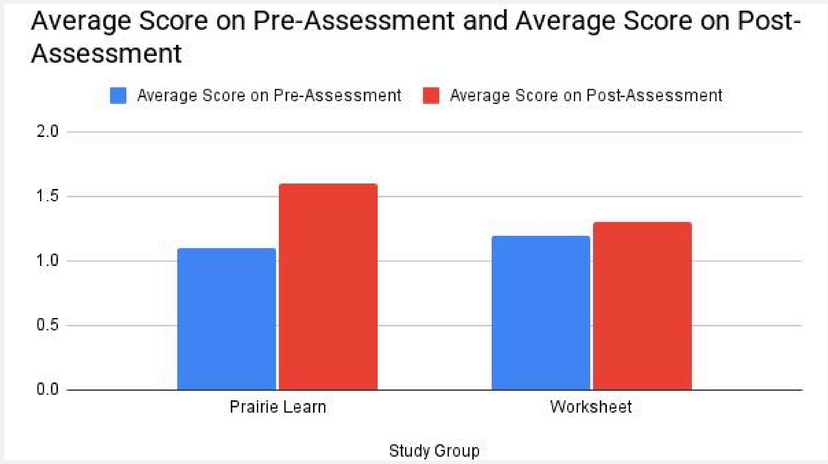
PL Grid Element

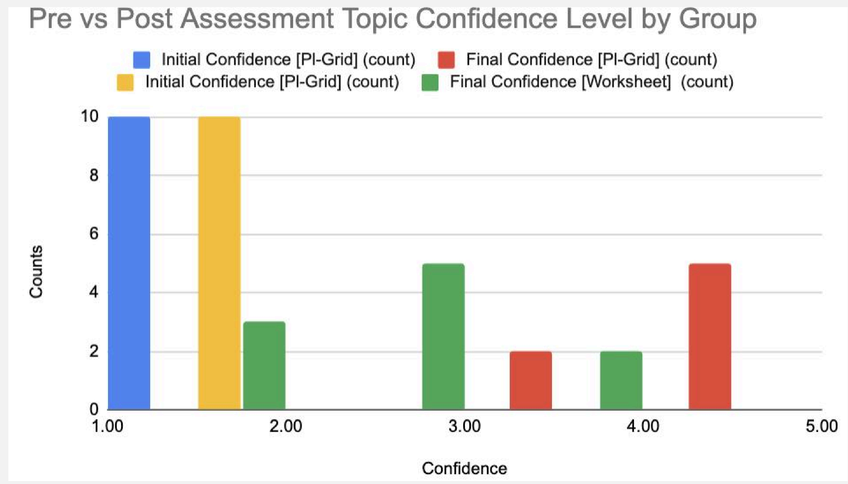


Customizable Features

1. Number of columns (maximum of 12)
2. Number of rows
3. Blocks used to make the solution grid
4. Partial pre-population of the solution grid
5. Coloring of blocks

Study Results





User Feedback & Next Steps

User Feedback

1. Enable copy & pasting of grid blocks because dragging can get a bit tedious
2. Add more instructions on how to use the grid element because it wasn't immediately clear.
3. Grid made learning parallelism more intuitive & fun

Next Steps

1. The PL-Grid can be repurposed for classes that require a grid of variable states or execution order. Potential classes the tool can expand to are: CS10, CS61B, and CS61C