3.3 **Eliminating data dependencies in the grid method.**

eliminating data dependencies means finding ways to make your parallel computations more efficient by reducing situations where one part of your computation relies on the results of another part, slowing down overall progress.

Imagine a grid where each cell represents a task, and these tasks need to share some information:

Grid of Tasks:

| Task 1 | Task 2 | Task 3 |

|--------|--------|--------|

| Task 4 | Task 5 | Task 6 |

|--------|--------|--------|

| Task 7 | Task 8 | Task 9 |

Eliminating data dependencies means minimizing situations where one task must wait for data from another task to proceed. For example:

* **Task 5** can't start until **Task 2** and **Task 4** finish because it depends on their results.
* **Task 9** can't start until **Task 5** and **Task 6** finish because it depends on their results.

To eliminate these data dependencies:

1. **Parallelize:** If possible, make tasks independent, so they can execute simultaneously. For example, if **Task 2** and **Task 4** don't depend on each other, they can be done in parallel.
2. **Reorganize:** Rearrange the order of tasks so that the dependent ones come after the tasks they depend on, if possible.

By reducing data dependencies, you can make your MIMD computations more efficient, enabling multiple tasks to be processed simultaneously and accelerating the overall computation.

3.3.5 Coloring a graph by edges**.**

Let's try to color the graph. Let's color its edges in such a way that no two edges of the same color stick out from one vertex. The number of colors will be no less than the maximum degree of the graph vertex, that is, the maximum number of edges incident to one vertex.