1>

* Correctness Constraints:
* Only two hydrogen and one oxygen can work together at the same time.
* Nobody can finish until the whole team (2 hydrogen + 1 oxygen) is ready.
* Different teams cannot mix — if one team is working, others must wait.
* Conditions:

\*Case a:

* A hydrogen must wait if there are already 2 hydrogens waiting
* An oxygen must wait if there is already 1 oxygen waiting
* When there are exactly 2 hydrogens and 1 oxygen waiting, all three can go together

\*Case b:

* Same number rules as Case a.
* We also keep a line (queue) showing who came first.
* A hydrogen must wait if there are too many hydrogens or it’s not first in the line.
* An oxygen must wait if there are too many oxygens or it’s not first in the line.
* Shared State:

private int hCount;

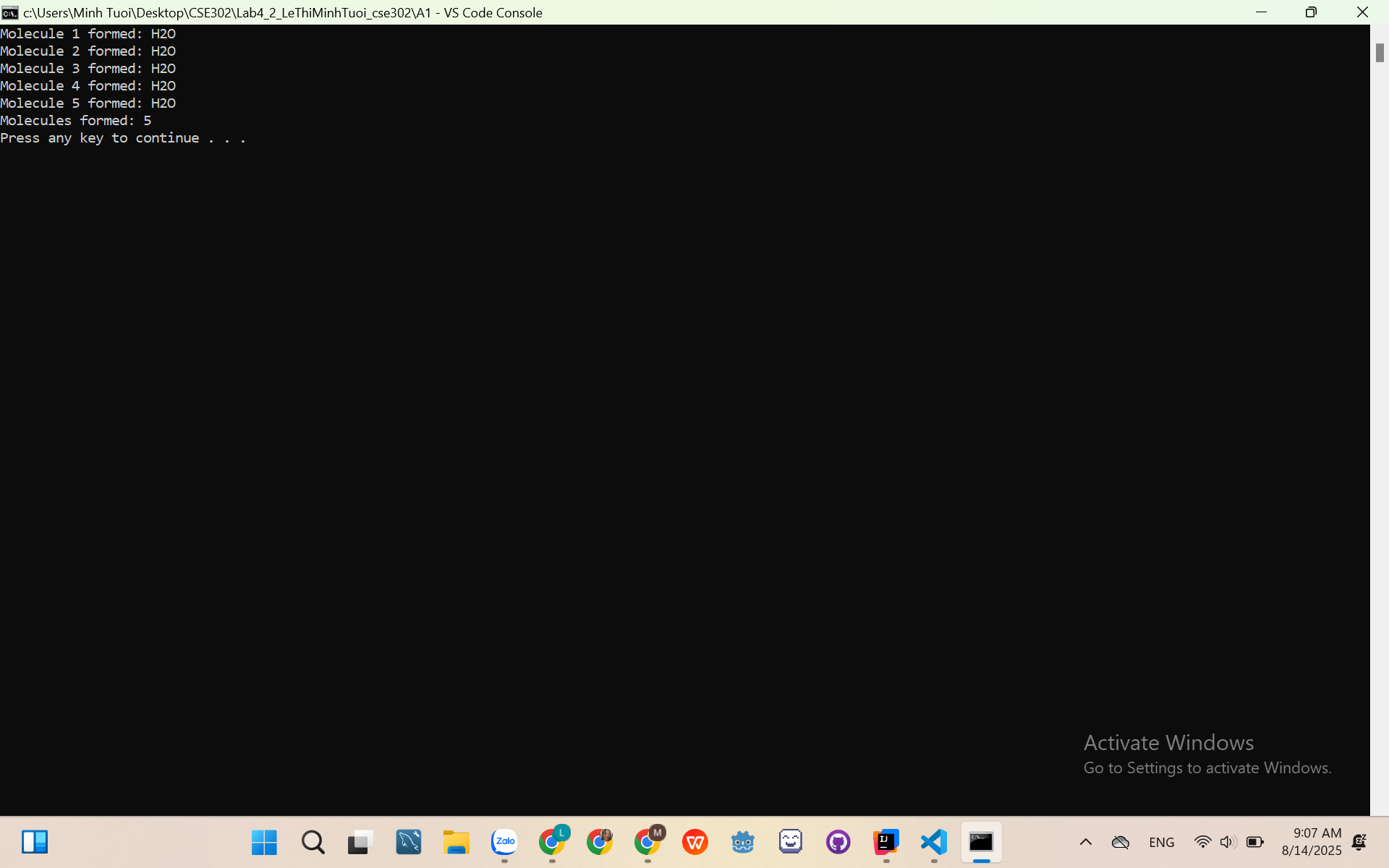
private int oCount;

private int moleculeCount;

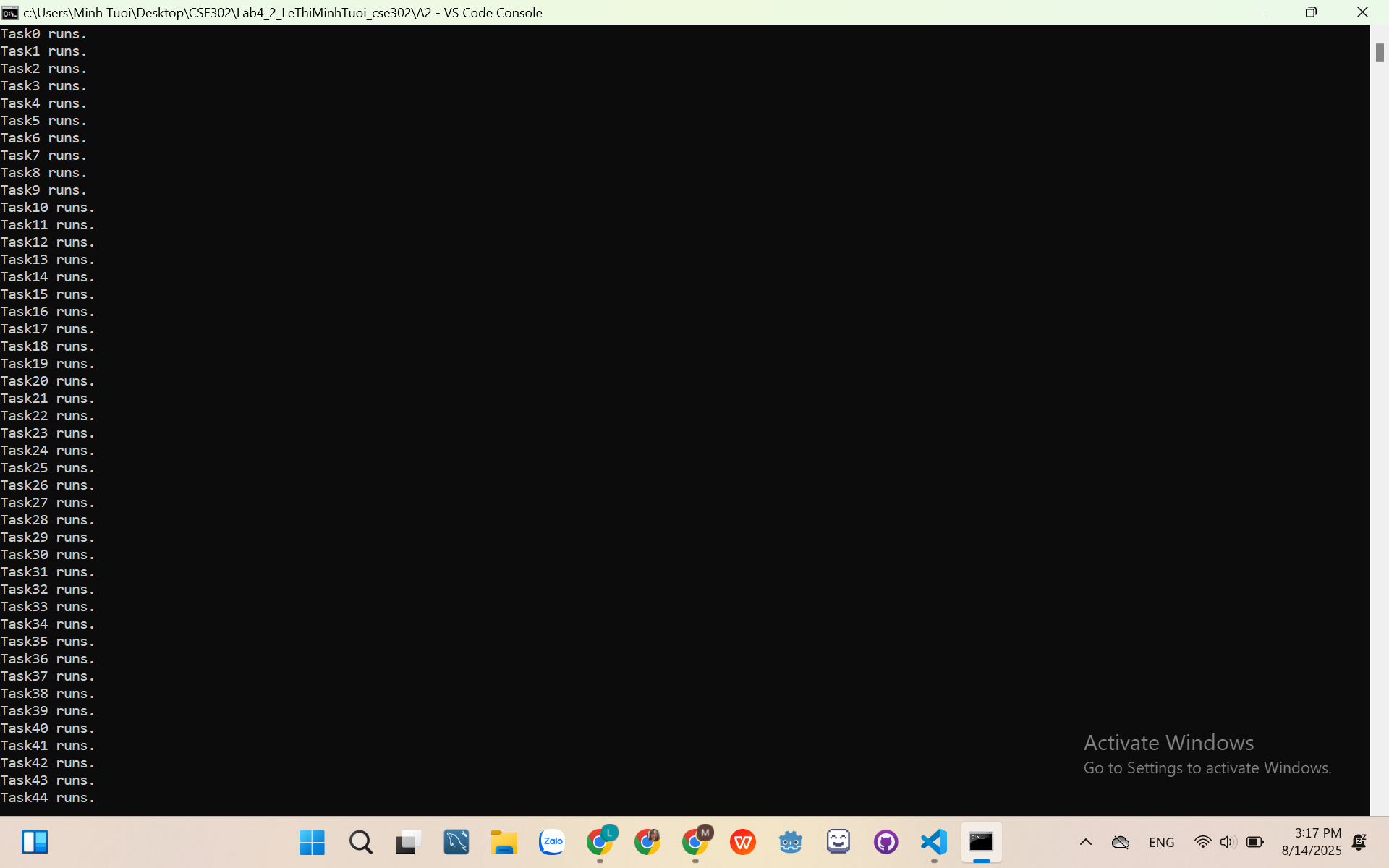
private Lock lock;

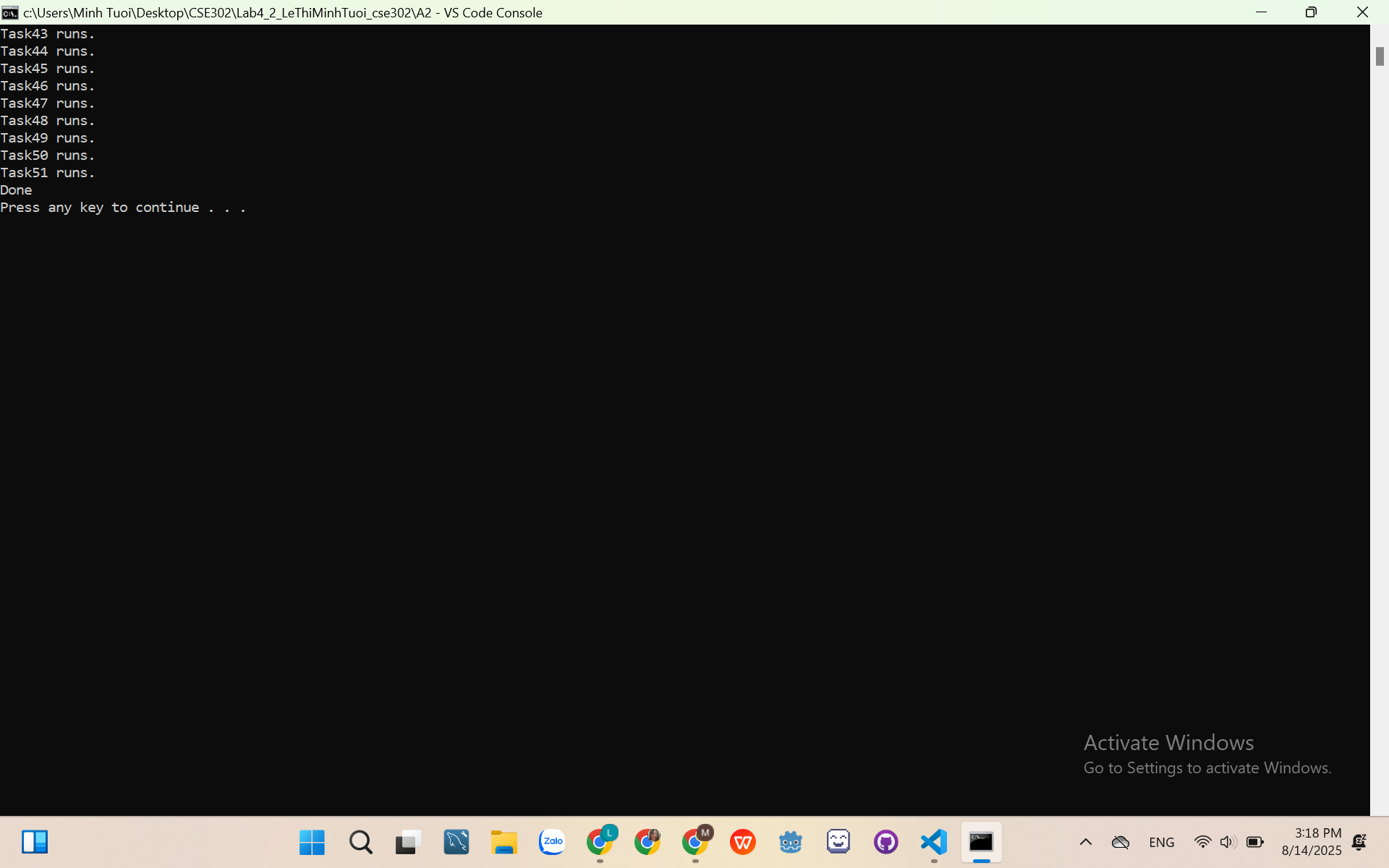
private Queue<Condition> hqueue;

private Queue<Condition> oqueue;

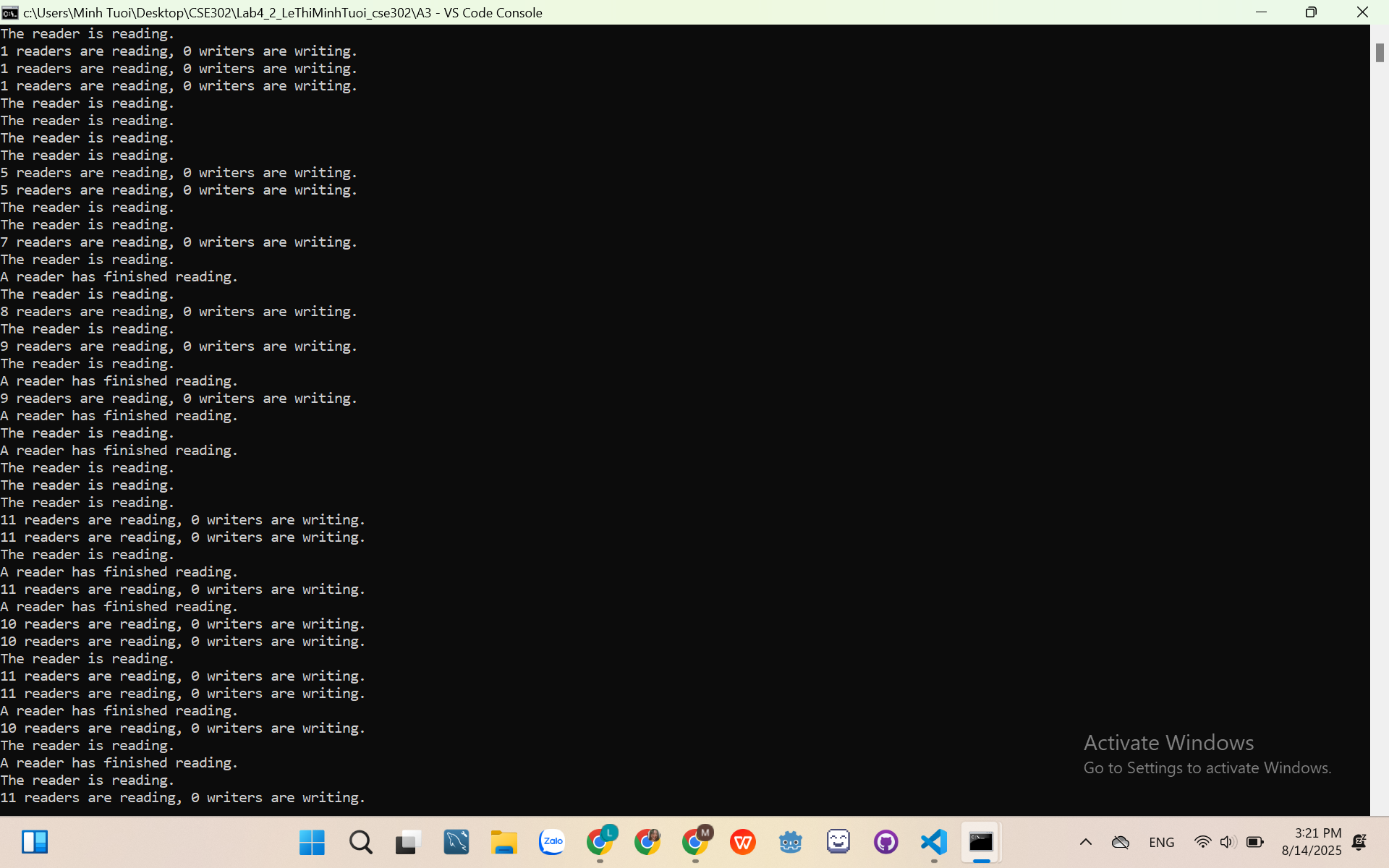


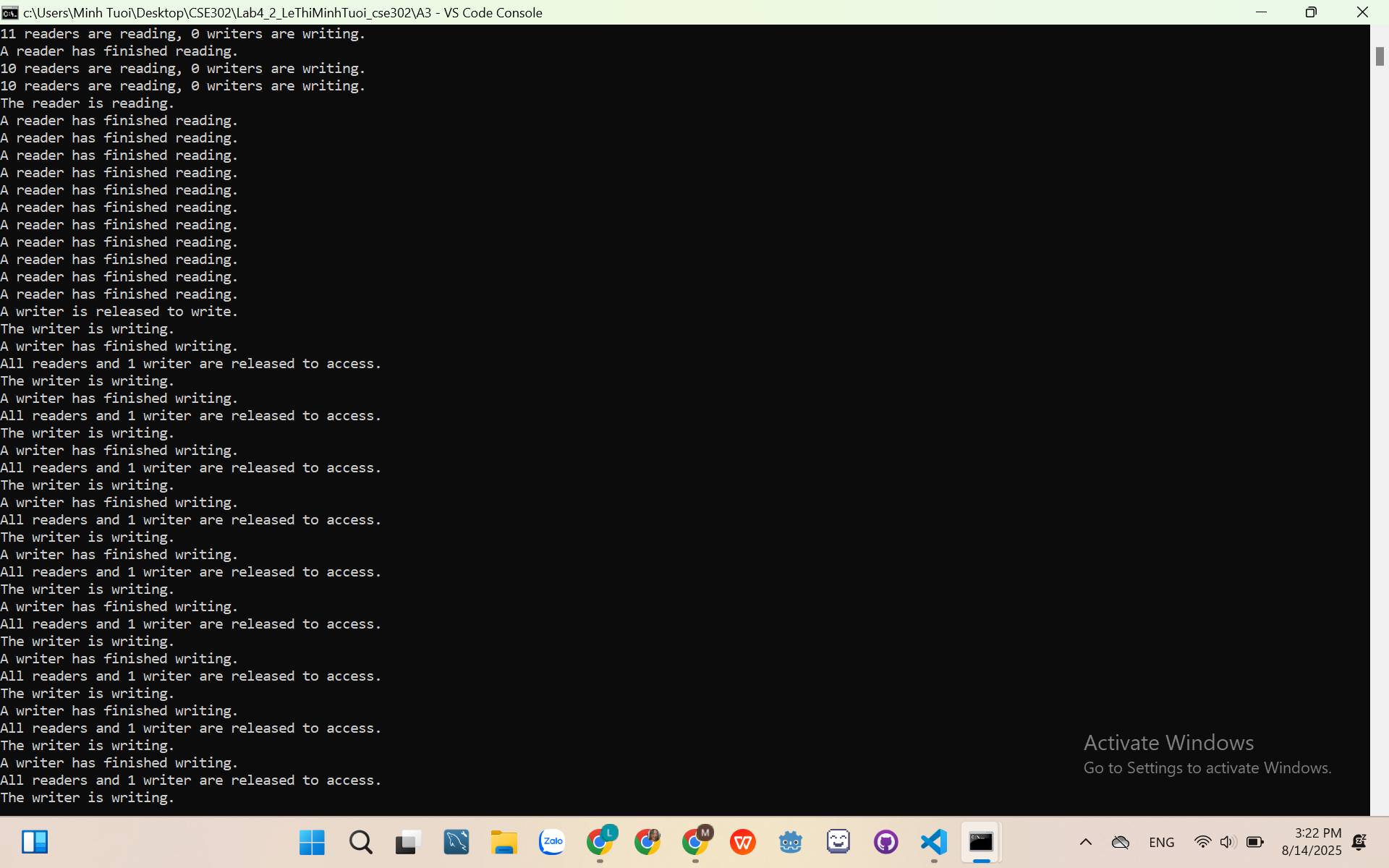
2>

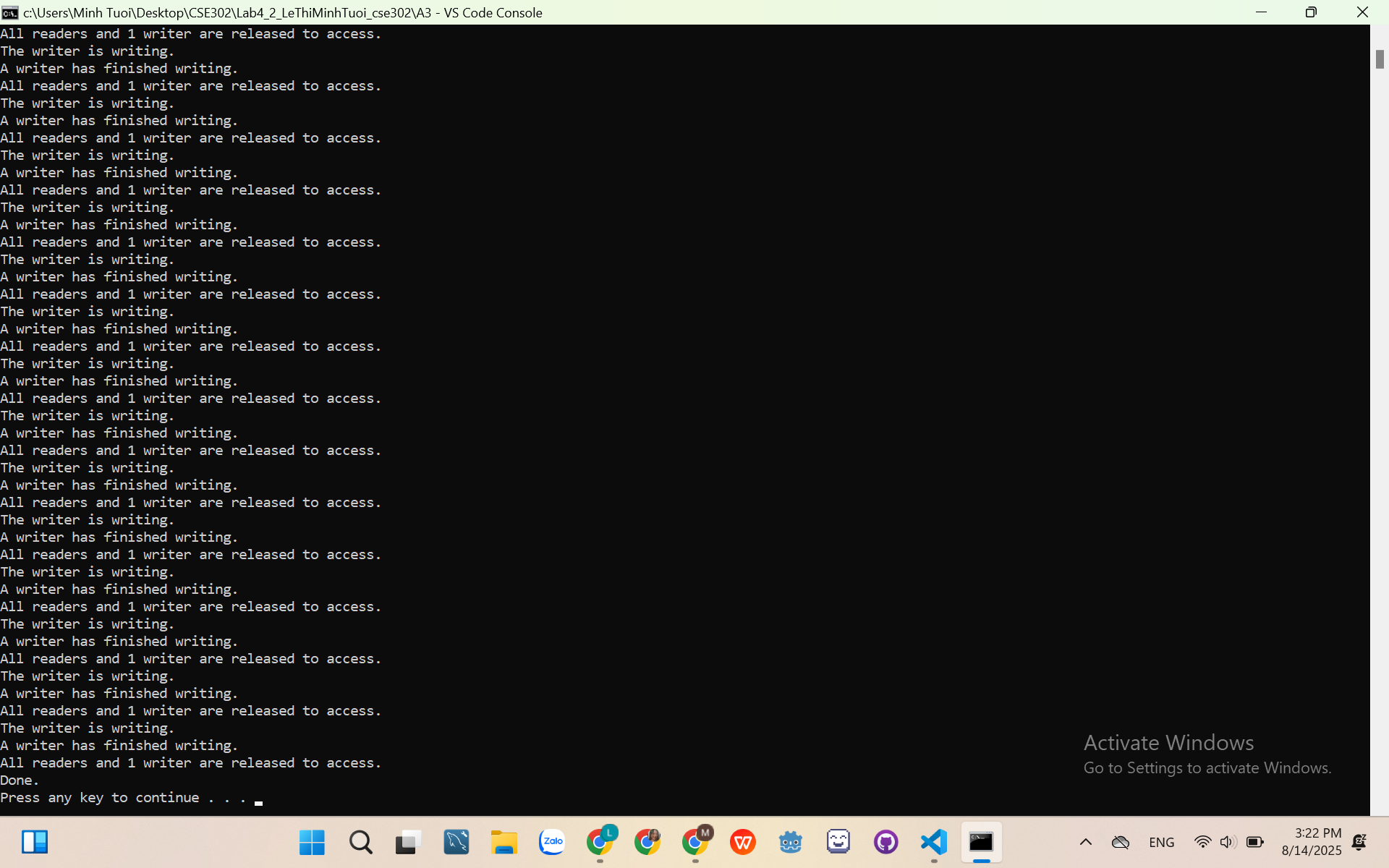




3>







4>

