Name 1: Date:
Name 2:

Assume:

- Relation R(a,b) contains 10,000 tuples, and has 10 tuples per block
- Relation S(a,c) contains 2,000 tuples and has 10 tuples per block
- Both relations are stored as simple heap files
- Neither relation has any indexes built on them

Part A:
Compute SELECT * FROM R NATURAL JOIN S;

Assume that the join is computed using a block oriented, simple nested loop. What is the minimum number of memory buffer blocks required to do this join in exactly one pass?

Part B:

How many memory blocks do we need to calculate $\Pi_b R \cap \Pi_c S$ in one pass?

Part C:
How many block reads do we need to compute the following query in one pass. Assume a naive evaluation plan (execute the intersection first, then the join)

```
SELECT a FROM
  R JOIN
    (SELECT b FROM R
     INTERSECT
     SELECT c FROM S);
```