Matrix Representation of Relation

To determine the matrix representation of the relation R given by the set of ordered pairs R = {(1, b2), (1, b3), (3, b2), (4, b1), (4, b3)}, we follow these steps:

1. Identify the elements in sets A and B:
   - Set A = {1, 2, 3, 4} represents the row labels (elements on the left).
   - Set B = {b1, b2, b3} represents the column labels (elements on the top).

2. Matrix dimensions:
   - The matrix will have dimensions of 4x3 (4 rows for set A and 3 columns for set B).

3. Matrix Entries:
   - For each pair (a, b) in the relation R, place a 1 in the position corresponding to row a and column b.
   - If the pair is not in the relation, place a 0 in that position.

Now, let's write the matrix with A = {1, 2, 3, 4} as rows and B = {b1, b2, b3} as columns:

Matrix Representation:

	b1	b2	b3
1	0	1	1
2	0	0	0
3	0	1	0

| 4 | 1 | 0 | 1 |

Explanation:

- Row 1 (corresponding to 1 in set A): The pairs (1, b2) and (1, b3) exist in the relation, so the entries for b2 and b3 are 1, and the entry for b1 is 0 (since there's no pair (1, b1)).
- Row 2 (corresponding to 2 in set A): There are no pairs involving 2 in the relation, so all the entries are 0.
- Row 3 (corresponding to 3 in set A): The pair (3, b2) exists, so the entry for b2 is 1, and the entries for b1 and b3 are 0.
- Row 4 (corresponding to 4 in set A): The pairs (4, b1) and (4, b3) exist, so the entries for b1 and b3 are 1, and the entry for b2 is 0.