Implementation of DBMS
Exercise Sheet 11
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1) Suppose that keys are hashed to four-bit sequences and that blocks can hold three records. If we start with a hash table with two empty blocks (corresponding to 0 and 1), show how the hash table evolves if we insert records with the following hash values:
0000, 0001, ..., 1111, and the method of hashing is linear hashing with a capacity threshold of 100%.

2) Consider the following set of strings: {bittersweet, bituminous, blacksmith, blacksnake, bulldozer, bulk, sunday, sunshade} and construct for these strings
a) a patricia tree
b) a prefix tree

3) We assume in this task that a projection (like in SQL) does not remove duplicates. Give an example to show that projection cannot be pushed below set (no duplicates!) union. E.g., give relations R and S such that $\pi_A(R \cup S) \neq \pi_A(R) \cup \pi_A(S)$