CMPE 211 - Data Structures and Algorithms

Quiz 5 - Hash Table Implementation of Sparse Vectors

You are given the code for a linear probing hash table in HashST.java. Use this code to represent a sparse vector, where keys of HashST correspond to index of a sparse vector.

1. The code for SparseVector is also given to you, but its constructor, size, put, get methods are missing. Also fill the missing parts of the dot-product method.

2. In the main method, create a sparse matrix as an array of SparseVector's. This sparse vector will have the same values as this matrix,

$$A = \begin{bmatrix} 8 & 4 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

3. Write an array of type double

$$x = \begin{bmatrix} 0.1 & 0.1 & 0.1 & 0.1 & 0.1 & 0.25 & 0.25 \end{bmatrix}$$

4. Calculate and show the result of

$$b = Ax$$