**DBT Assignment 1**

1. When is it preferable to use a dense index rather than a sparse index? Explain

2. What is the difference between a primary index and a secondary index?

3. Construct a B +-tree for the following set of key values: (2, 3, 5, 7, 11, 17, 19, 23, 29, 31) Assume that the tree is initially empty and values are added in ascending order. Assume n=3

a. Find records with a search-key value of 11.

b. Find records with a search-key value between 7 and 17, inclusive

c. Insert 9.

d. Insert 10.

e. Insert 8.

f. Delete 23.

g. Delete 19.

4. Suppose that we are using extendable hashing on a file that contains records with the following search-key values: 2, 3, 5, 7, 11, 17, 19, 23, 29, 31 Show the extendable hash structure for this file if the hash function is h(x) = x mod 8 and buckets can hold three records.

5. Consider a dynamic hash structure where buckets can hold up to three records. Initially the structure is empty. Then we insert the following records, in the order below, where we indicate the hashed key in parenthesis (in binary):

a [010000]

b [011010]

c [111100]

d [001110]

e [010111]

f [011010]

g [101001]

h [010111]

i [000110]

j [101001]

Show the extensible hash structure after these records have been inserted.