CS 350 File Systems Project IV

In the final part of the project, you are going to augment the search function from the last project with a function that searches the database using a **B-Tree** index file to search over the primary key (year) of the database. Of course, to implement such a search it is necessary to first build the B-Tree.

The project will require you to design and implement a tree construction system which will consist of structuring the database index file as a B-tree. The function *Build_Index* from Part III of the project should be replaced with one that uses the following functions :

- **build_root(record1, record2)**

  This module will accept two index records, create a root block and two data blocks (leaves) each consisting of 1 record. Remember that every record in an index file consists of the key value and the block (record) number of the flat file where the record with that key value can be found. You should add a private variable **root** to the class. The value of **root** is the block number where the root of the B-tree is stored.

- **add_index_record(node,record)**

  This module will accept an index record and add it to node in the B-Tree. Initially, the call to add_index_record(root,record) will be used.

- **index_search(value)**

  This module augments the **Search** function written in Project III. The linear search function **IndexSearch** will be replaced by a fast search of the index file to retrieve the record which matches the query. The function **search** will call **index_search** which will return the block (record) number of the record which matches the query.

Extra Credit

- **del_index_record(key)**

  This module will accept a key and delete the index record with that key from the B-Tree.

IMPLEMENTATION GUIDELINE : The index file should have no more than 4 index records per block in order to generate some height on the B-Tree. You will need to modify Build_Table from Project III to call build_root and add_index_record when building the index file. Likewise, you will need to modify Search by replacing calls to IndexSearch with index_search.