

## Practice Problems on B+Tree indexes

## Learning objective:

1. Gain a deeper understanding of how indexes and relations are related.
2. Gain a deeper understanding of the search algorithm for B+Tree.

## Questions:

Suppose the below diagram is a **dense** B+tree index created on the attribute id of the relation below.

R(id int, name varchar(10), primary key(id))

Suppose data entry format 2 (search key value, record id) is used.

A dense index means that there is one data entry per tuple/row.

Recall that a record id has information about which page in a file (storing the relation) and the slot number where the tuple is located in that page. See WK11-HowRelationAreStored.ppt.

Recall that a search key is a set of attributes we want to query. See CP-WK12-indexes.ppt. Search key attributes are considered for creation of additional indexes.

**Notation:** The notation i\* on a leaf page represents a data entry with the search key value of i followed by the record id to the tuple in the relation R.

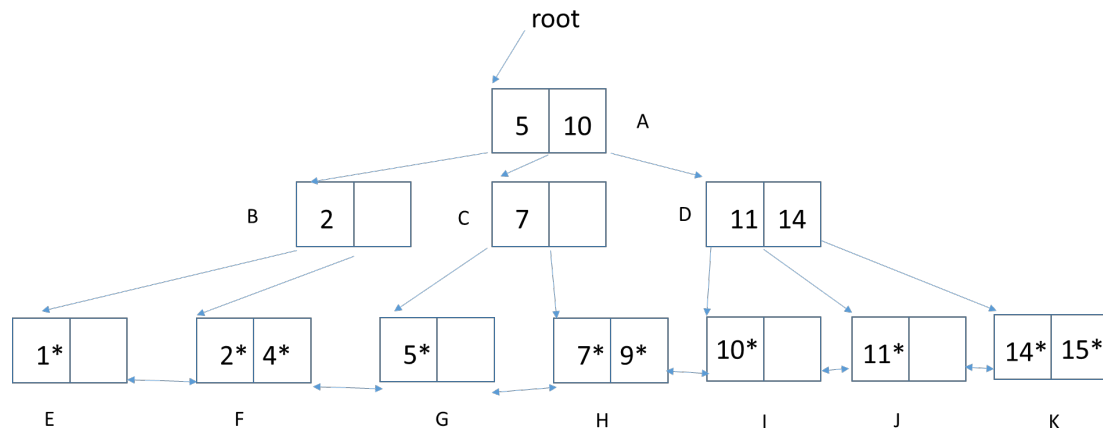


Figure 1. Dense B+Tree index on R.id

Answer the following questions. You can use the labels A, B, C, ..., K to represent the tree nodes in your answers for 1.c)-1.e).

- a) What is the order of this tree? 1 is from 2 (maximum number of entries per node)/2
- b) How many tuples are in the relation R? 10
- c) List all the nodes that must be examined to find R.id=6. Answer: A, C, G
- d) List all the nodes that must be examined to find R.id < 10. Answer: A, C, H, G, F, E
- e) List all the nodes that must be examined to find R.id R.id > 2. Answer: A, B, F, G, H, I, J, K