

CMPS340 File Processing
HW #4 Fall 2016
Due: 1pm, Tuesday, October 18

Below is depicted a data file. **NAME** is a *key* field and **MAJOR** is the *ordering* field. (The values in the fields are strings; the usual alphabetic ordering is used in determining which is the lesser of two strings, **including for the field BIRTH_MONTH**.)

For *each of the three fields*, construct a flat (as opposed to tree-structured) index. For “references/pointers”, use (physical) bucket numbers in the indexes on **NAME** and **MAJOR**, but use (logical) **NAME** values in the index on **BIRTH_MONTH**.

(**Note:** The buckets are pictured from top to bottom in their logical order but numbered according to their physical order.)

In constructing an index, make it a *primary* index containing only one reference/pointer to each bucket—as in Figure 18.1 of 6th edition of Elmasri & Navathe¹— if possible. Otherwise, if it is possible, make it a *clustering* index (containing only one reference/pointer for each distinct value occurring in the indexing field) (as in Figure 18.2). Otherwise, make it a *secondary* index. Assume that, in a secondary index based upon a non-key field, there is enough space for **two** references/pointers in each record/entry of the index. (Hence, if there is a need to associate more than two references to the same value in the indexing field, multiple records/entries for that value should exist in the index.)

NAME	MAJOR	BIRTH_MONTH
Joan	Art	Feb
Carol	Art	Mar
Brian	Art	Dec
Marcie	Bio	Mar
Joe	Bio	Apr

Bucket #2

NAME	MAJOR	BIRTH_MONTH
James	Bio	Oct
Kate	Chem	Jun
Marie	Chem	May

Bucket #5

¹Chapter 18 in the 6th edition has been moved to Chapter 17 in the 7th edition.

NAME	MAJOR	BIRTH_MONTH
George	CIS	Nov
Chris	CIS	Sep
Rebecca	CS	Sep
Linda	CS	Jul
Kurt	Engl	Oct

Bucket #3

NAME	MAJOR	BIRTH_MONTH
Bill	Engl	May
Erin	Engl	Dec

Bucket #7

NAME	MAJOR	BIRTH_MONTH
Cathy	Engl	Nov
Burke	Hist	Aug
Tom	Hist	Apr
Tina	Math	Oct

Bucket #6

NAME	MAJOR	BIRTH_MONTH
Marge	Math	Jan
Mike	Math	Nov
Janet	Phys	Jul

Bucket #1

NAME	MAJOR	BIRTH_MONTH
Jean	Phys	Feb
Joyce	Psyc	Aug
Ernie	Psyc	Mar
Bert	T/RS	Apr
Julie	T/RS	Jul

Bucket #4