PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++ and JAVA:
Lesson-5: Tables

Table

- A two-dimensional array (matrix) and is an important data set that is allocated a memory block.

- There is always a base pointer for a table.

- Base pointer points to its first element at the first column first row.

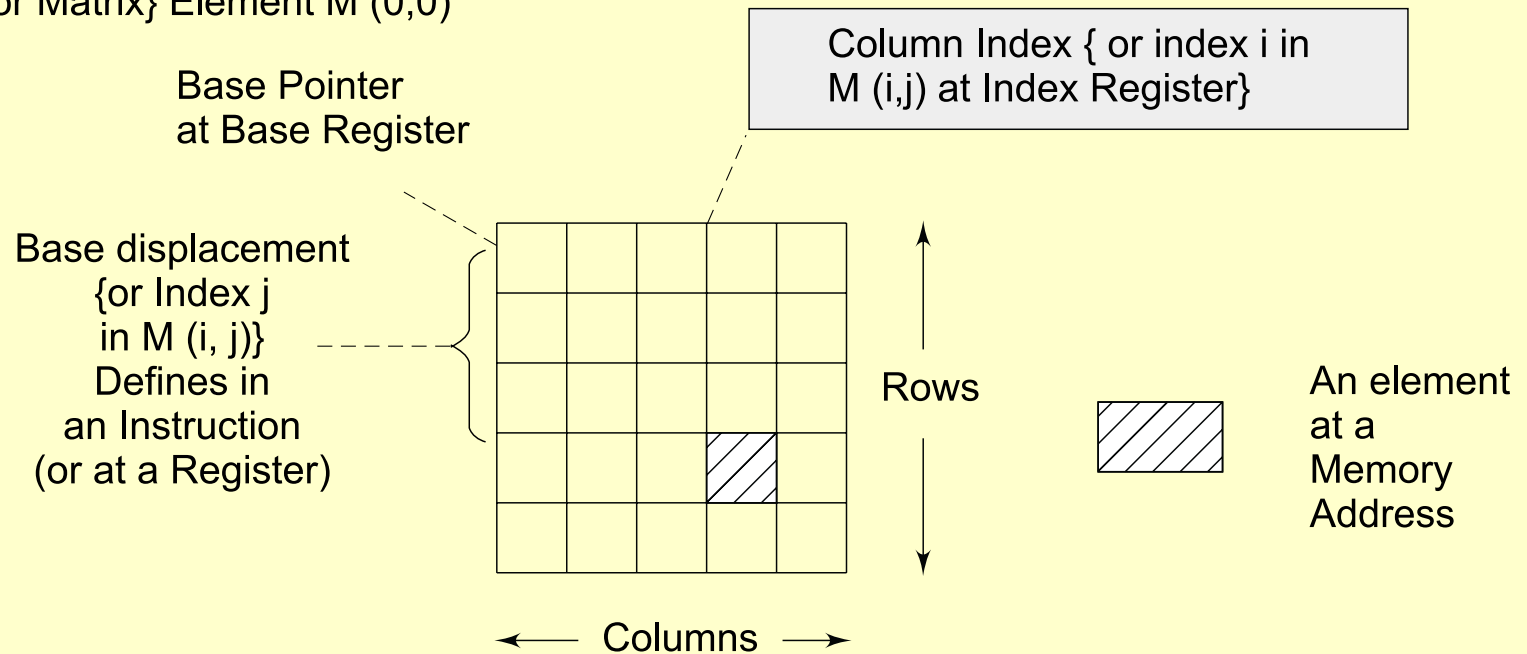- There are two indices, one for a column and other for a row.

Three pointers in table

- Three pointers, table base, column index and destination index pointers can retrieve any element of the table

Table

A Memory Block Extends from Base Pointer onwards

Table { or Matrix} Element M (0,0)

Base Pointer
at Base Register

Column Index { or index i in
M (i,j) at Index Register}

Base displacement
{or Index j
in M (i, j)}
Defines in
an Instruction
(or at a Register)

Rows

An element
at a
Memory
Address

Columns

Look up Table

- An important data set

- A lookup *table* can be said a two-dimensional array (matrix) with first column can be said to hold the pointers, one pointer in each row and second column the values pointed by first column in each row.

- First and second columns are at different non-adjacent addresses.

- Each row has pointer in first column and from pointed memory block the addressed data is traced

Column of the pointers in lookup table

- Column index pointers can retrieve any row element in the table

Hash Table

- A data set that is a collection of pairs of a key and a corresponding value.

- A hash table has a key or name in one column. The corresponding value or object is at the second column.

- The keys may be at non-consecutive memory addresses.

- When look-up tables store like a hash. If the first column of a table is used as a key (pointer to the value) and the second column as a value, we call that table as look-up table.
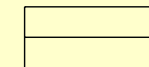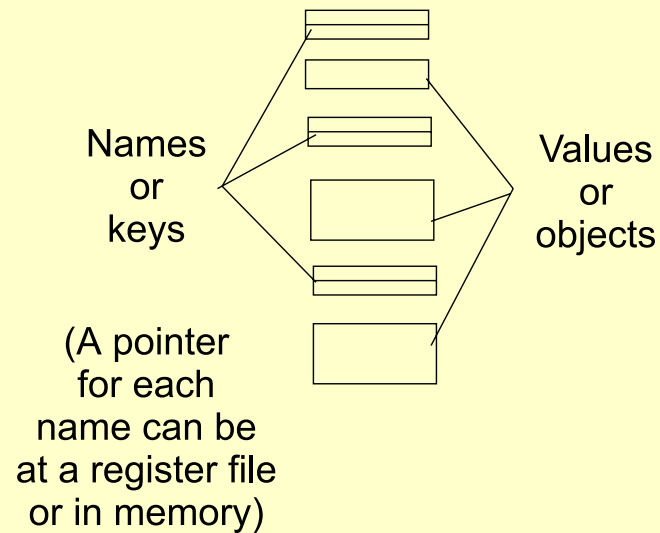
Hash Table

- A has *table* is a two-dimensional array (matrix) with first column can be said to hold key and second column the values

- An important data set.

- Each row has key and from look at the key, the addressed data in second column is traced

- Just as an index identifies an array element, a hash-key identifies a hash element
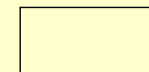
Column of keys in hash table

- By matching a key in a column of keys the values are retrieved from second column of the table

Hash Table

Name	Marks

Names
or
keys

(A pointer
for each
name can be
at a register file
or in memory)

Values
or
objects

A pointer for
Bytes for an
Address that
points to Value
or object

Memory
for a
value or Object
in list.

Summary

We learnt

- A table is a data set allocated with a memory block. Three pointers, table base, column index and destination index pointers can retrieve any element of the table

- A hash table is a data set allocated with a memory block for key and value pairs. Just as an index number identifies an array element, a hash-key identifies a hash element. Hash table has a column of keys

- A look up table has a column of pointers

End of Lesson 5 of Chapter 5