

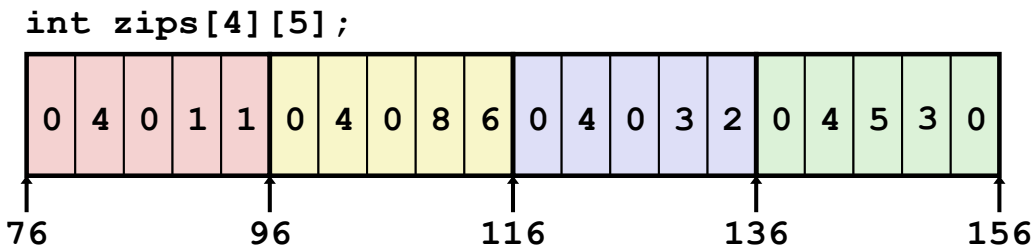
## CSCI 2330 – Multidimensional Array Exercises

Consider a generic 2-dimensional nested array **A** declared as follows:

**T A[R][C];**

where **T** is the type of the array, **A** is the base pointer of the array, **R** is the number of rows, and **C** is the number of columns. Assume row-major ordering.

1. Give a formula for the number of bytes needed to store **A**.
2. Without using array notation, give a formula for the address of row vector **i**, i.e., **A[i]**. Verify by computing **zips[2]** (address 116) for the array shown.



3. Without using array notation, give a formula for the address of a single array element **A[i][j]**. Verify by computing **zips[1][3]** (address 108).
4. Recall that an alternative approach for storing a 2D array is a multi-level array, in which each row is allocated independently. What is an advantage of a multi-level array over a nested array? **Hint:** think of the structure that you built in Lab 2 and why it wouldn't have worked well using a nested array.
5. What is an advantage of a nested array over a multi-level array? **Hint:** think about efficiency and memory accesses.