

More practice problems on arrays. Write C++ programs to carry out the specified tasks.

(1) Create a 2-dimensional array with 10 rows and 10 columns. Fill the array with random 3 digit integers. Print out the column with the largest sum. (If two or more columns share the largest sum, print out one of them only.)

(2) Write a C++ program that asks the user to enter the populations of the 3 largest cities in each state. Find the average of all the populations that have been entered and print the names of all states that have three cities larger than this average.

(3) Asks the user to input the entries of a 10 x 10 array. Sort each column into increasing order. Print out the array with sorted columns.

(4) Ask the user to enter a 5 digit integer. Convert the integer to a bar graph stored in a 2-dimensional array of characters. Print the bar graph.

For example if the user enters 19683, the displayed graph should be

```
x
x x
x x
xxx
xxx
xxx
xxxx
xxxx
xxxxx
-----
19683
```

After printing the bar graph, the program should adjust the entries of the graph so as to represent each of the next 10 integers and it should also print them.

(5) Selection sort could be programmed recursively as follows:

```
void selectionSort(int a[], int startAt, int stopAt) {
    if (startAt >= stopAt) return;
    swapMin(a, startAt, stopAt);
    selectionSort(a, startAt + 1, stopAt);
}
```

Write the function swapMin that is called here. Write a main program to call and test the selectionSort function.

(6) Write an implementation of insertion sort that makes no use of recursion.

(7) Write a function called median that returns the median entry in a 2-dimensional array of integers.