CS111 Homework 5

Name your program **hw5.cpp**. Program must be able to compile or you will get at most 0.5 out 3 points for the assignment.

Write **one single** complete C++ program to do all two sections below:

**Part A: Recursion** (from professor Yang) (1.5 points)

Write a recursive function called **countFive**. It counts how many 5's appears in a given number passed in as a parameter.

**Sample Run:**
515054  
counting digit 5: 3

177771  
counting digit 5: 0

5  
counting digit 5: 1

Write a recursive function called **printStarDigit** which prints out all the digit in the given number passed in as a parameter. Also, it prints out a * at the beginning and end of this number and in between each digit.

**Ex:**
Number: 23455212  
*2*3*4*5*5*2*1*2*

Number: 7  
*7*

Number: 18  
*1*8*
Part B: (from professor Michael Fried) (1.5 points)
Modify the program by writing the following functions. Do not modify the main function.

1. Write a `sum` function:
   - This function should take 2 parameters: a 1D int array and the number of elements.
   - It should return the sum of all the elements.

2. Write an `arraysEqual` function:
   - This function should take 3 parameters: two 1D int arrays and the number of elements.
   - It should return true if the 2 arrays have the same elements in the same order. Otherwise it should return false.

Sample run:
```
Part B: 
The elements of array a add up to 15
Arrays a and b are equal
Arrays c and d are not equal

// Returns the sum of all the elements.
int sum(int a[], int size) {
   // Fill in.
}

// Returns true if the 2 arrays have the same elements in the same order.
bool arraysEqual(int a[], int b[], int size) {
   // Fill in.
}
```
Use the following main function to test for both part A and part B:

```cpp
int main(){
    cout << "Part A:\n";
    int input1 = 505155, input2 = 5, input3 = 717171;

    //should output: 4
    cout << "counting digit 5: " << countFive(input1) << endl;
    printStarDigit(input1); //should output: *5*0*5*1*5*5*
    cout << endl;

    //should output: 1
    cout << "counting digit 5: " << countFive(input2) << endl;
    printStarDigit(input2); //should output: *5*
    cout << endl;

    //should output: 0
    cout << "counting digit 5: " << countFive(input3) << endl;
    printStarDigit(input3); //should output: *7*1*7*1*7*1*
    cout << endl;

    cout << "Part B:\n";
    int a[4] = {3, 5, 5, 2};
    int b[4] = {3, 5, 5, 2};
    int c[5] = {3, 3, 3, 3, 3};
    int d[5] = {3, 3, 3, 3, 4};
    cout << "The elements of array a add up to " << sum(a, 4) << endl;
    if (arraysEqual(a, b, 4))
        cout << "Arrays a and b are equal" << endl;
    else
        cout << "Arrays a and b are not equal" << endl;
    if (arraysEqual(c, d, 5))
        cout << "Arrays c and d are equal" << endl;
    else
        cout << "Arrays c and d are not equal" << endl;

    return 0;
}
```