

## Sample Recursion Problems

1. Write a function with the following prototype that returns the sum of the digits of an integer.

```
int sumOfDigits(int x);
```

If x is 234, the function should return 2 + 3 + 4, that is, 9.

If x is 12, the function should return 1 + 2, which is 3.

If x is 39, the function should return 12.

If x is negative, ignore the minus sign. For example, -12 and 12 both return 3.

Use recursion.

Hints:

- The base case is a number between 0 and 9.
  - If x is negative, just multiply it by -1 as soon as you enter the function.
  - For the recursive call, consider how computing the values  $x/10$  and  $x\%10$  might be useful.
2. Write a recursive function (use no while loops or for loops) that prints all the elements of an array of integers, one per line. The parameters to the function should be `int a[]`, and `int size`. where the size starts out as the size of `a[]`.

Hint :

- The return type is void

3. Same problem as the last one, but print out the elements in reverse order.

Hint :

- All you have to do is "flip" two lines of code. Which two lines?

4. Find the sum of the integers from 1 through n. Use recursion.
5. Find the product of the integers from 1 through n (this is called the factorial function). If n is zero, return 1. Use recursion.
6. Count the number of zeroes in an array of integers. Use recursion.
7. Find the minimum element in an array of integers. Use recursion.
8. Find the maximum element in an array of integers. Use recursion.