Programming Assignment 2:

Use Python, C, or C++ for the following assignments. If you want to, you can also use numpy or pandas. You can assume that you are working on a 64 bit architecture. You will be also graded on efficiency.

3 pts (1) Develop an efficient implementation of a function with a single parameter, a 64bit number that calculates the number of ones in the binary representation of this function. Your implementation can benefit from tables, but the table can have at most 2^8 entries.

3 pts (2) Create a function that takes a 64b number and returns the same number with bits inverted, so that the least significant bit is now the most significant bit *et cet*. Hint: Tables can be useful.

4 pts (3) You are given a nine by nine integer array representing a partially filled in Sudoku puzzle. The puzzle is partially filled, missing numbers are given as zeroes. Write a function that determines whether the partial solution is valid, i.e. no numbers appears more than once in a row, a column, or a house (a 3×3 sub-grid, located in one of the corners, in the middle, or the remaining four locations not covered by the previous ones).

	5				8		4	
	4		3				7	
	3	1	7	2		8	9	
3						7	8	
		5				1		
	6	2						3
	2	6		4	7	9	3	
	8				6		2	
	9		8				1	