HW 2: due Thursday, February 25 at 9pm

Problem 1

a) Prove that the following language on binary strings is regular:
D = { All binary strings that either start with two 0's or end with three 1's (but not both) }
b) Prove that the following language over the English 26 letter alphabet is regular:
$R = \{w \mid w$ contains an even number of occurrences of the substring "go" and the last go is part of the substring "gone" $\}$

Problem 2

Do these two regular expressions represent the same language?

$aa(a \cup b)^* \cup (bb)^* a$ and $(ab \cup ba \cup a)^*$

Problem 3

Prove that the following language is not regular: $\{a^m b^n c^p d^q : m + n = p + q\}$

Problem 4

Is the language of Problem 3 context free?

Problem 5

For any string $w = w_1 \ldots w_n$, the *reverse of w,* written w_R, is the string in reverse order, $w_n \ldots w_2 w_1$. For any language A, let $A^R = \{w_R \mid w \in A\}$. Show if A is regular, so is A^R.