**Problem 6**

a) T(1) = 1

T(n) = T(n-1) + T(n-2) + 1 for n > 1

T(n) ≤ 2T(n-1)

T(n) < 22 T(n-2)

T(n) < 23 T(n-3)

T(n) < 2x T(n-x) = 2x T(0)

Hence, n-x = 0

n = x

so, T(n) = 2n T(0) = 2n

Therefore, T(n) ϵ O(2n)

b)

int memo[10000] = {0} ;

int fib(int n)

{

if (n == 0 or n==1)

return 1;

if (memo[n] != 0)

return memo[n] ;

else

memo[n] = fib(n-1) + fib(n-2) ;

return memo[n] ;

}