(2)(a)

Implementation 1

$T(n) = T(n-1) + T(n-2) + c$

$\approx T(n-1) + T(n-1) + c$

$\approx 2T(n-1) + c$

$\approx 2[2T(n-2) + c] + c$

$\approx 2^2 T(n-2) + 2c + c$

$\approx 2^2 T(n-2) + 3c$

$\approx 2^2[2T(n-3)] + 3c$

$\approx 2^3 T(n-3) + 4c + 3c$

$\approx 2^3 T(n-3) + 7c$

$\vdots$

$\approx 2^k T(n-k) + c$

$\approx 2^n (1) + c$

$\approx 2^n + c$

$T(n-k) = 0$

$n = k$

$T(n-k) = 1$

Complexity = $O(2^n)$

~~Tha~~

$T(n) = O(2^n)$

Implementation 2

$T(n) = O(1) + O(1) + O(1) + O(1) + O(1) + O(n)$

$= O(5) + O(n)$

$= O(5+n)$

Complexity : $T(n) = O(n)$

∴ Time complexity for implementation 2 is better than implementation 1.