Computing the frequency count for each line of the function:

import java.util.Scanner; -----------------------------------------------------------------(0)

public class nonrecursive{ ---------------------------------------------------------------(0)

public static void main(String[] args){ --------------------------------------(0)

Scanner input = new Scanner(System.in); -------------------------------- (1)

long a = 1, --------------------------------------------------------------------------(1)

b = 1, -----------------------------------------------------------------------------(1)

temp; ----------------------------------------------------------------------------(0)

System.out.print("Enter nth number: "); ------------------------------------(1)

int n = input.nextInt(); -----------------------------------------------------------(1)

int ctr = 1; ---------------------------------------------------------------------------(1)

long time1 = System.nanoTime(); ---------------------------------------------(1)

for(int i=1; i<n; i++){ --------------------------------------------------------------(1 + n + n - 1) = (2n)

temp = a + b; -------------------------------------------------------------(n-1)

a = b; -----------------------------------------------------------------------(n-1)

b = temp; ------------------------------------------------------------------(n-1)

ctr += 7; --------------------------------------------------------------------(n-1)

}

ctr++; ----------------------------------------------------------------------------------(1)

System.out.println("\n" + n + " Fibonnaci number is: \n" + a); ----------(1)

long time2 = System.nanoTime(); ----------------------------------------------(1)

long elapsed = time2 - time1; ---------------------------------------------------(1)

System.out.println("\nTotal operation count: " + ctr); --------------------(1)

System.out.println("Elapsed time: " + elapsed + " nanoseconds"); ----(1)

input.close(); ------------------------------------------------------------------------(1)

}

}

Total frequency count of the function: 6n+16

The Big-Oh of the function is O(n)

To prove that the total frequency count is indeed the Big-Oh we have concluded:

**G(n) <= c f(n)**

**6n + 10 <= cn**

We then assign the value of 7 to c and we get.

**6n + 10 <= 7n**

**10 <= 7n - 6n**

**10 <= n**

We then test the equation for different values of n:

* **If n = 10**

**6(16) + 10 <= 7(16)**

**106 <= 112 (True)**

* **If n = 17**

**6(17) + 10 <= 7(17)**

**112 <= 119 (True)**

So the frequency count and Big-Oh is true iff c = 7 and n > = 10.