5.4 $T(n) = 2T(n/2) + \log n$

$a = 2$ $f(n) = \log n$

$b = 2$ $g(n) = n^{1-\varepsilon}$ $\varepsilon > 0$

$\log_b a = 1$

       $f(n) \le g(n)$

       $\log n \le n^{0.9}$, and $t(n)$ is $\Theta(n)$

(b) $T(n) = 8T(n/2) + n^2$

$a = 8$ $f(n) = n^2$

$b = 2$ $g(n) = n^{3-\varepsilon}$ $\Big\}$ $T(n)$ is $\Theta(n^3)$

$\log_b a = 3$

(c) $T(n) = 16T(n/2) + (n \log n)^4$

$a = 16$ $f(n) = (n \log n)^4$

$b = 2$ $g(n) = n^4 \log n^4$ $k = 4$ $\Big\}$ (A)

$\log_b a = 4$

       $T(n)$ is $\Theta(n^4 \log^5 n)$

1

d) $T(n) = 7T(n/3) + n$

$a = 7$
$\qquad$ $\left. \begin{array}{l} f(n) = n \\ g(n) = n^{1.78} \end{array} \right\}$ is O

$b = 3$

$\log_b a = 1.78$

$$T(n) = n^{\log_3 7}$$

e) $t(n) = 9T\left(\dfrac{n}{3}\right) + (n^3 \log n)$

$a = 9$
$\qquad$ $\left. \begin{array}{l} f(n) = n^3 \log n^{n^3} \\ g(n) = n^{2+e} \end{array} \right\} >$ Is Ω

$b = 3$

$\log_b a = 2$

$$T(n) = n^3 \log n$$

Algorith is Same Elements (A, B)

    A := Merge Sort (A, C)

    B := Merge Sort (B, C)

    for i := 0 to n-1 do

        a := A remove fist ()

        b := B. remove first ()

        if a != b then

            retun false

    return true

runnin- in n logn