**By Master theorem: given T(n) = T(n/3) + n**

We know that T(n) = a \* T (n/b) + f(n) by comparing a = 9 b = 3 f(n) = n

Nlogba  = nlog39  = n2

Then f(n) = n = 0 = n(logba - e)  = 0(n2-e)

If f(n) = 0(nlogba - e) then T(n) = Ө \* (nlogba)

T(n) = Ө (n \* log39) = Ө \* n2

T(N) = Ө \* n2

**By using direct unwinding method given recurrence equation**

T(n) = 9T \* (n/3) + n --------> **1**

Let n = n/3 = T(n/3) = 9T((n/3)/3) + n/3

T(n/3) = 9T(n/9) + n/3

T(n) = 9(9T(n/9) + (n/3)) + n

= 81T(n/9) + 3n + n

T(n) = 81 \* T (n/9) + 4n --------------> **2**

Substitute n = n/9 into 1

T(n/9) = 9T ((n/9/3) + n/9

T(n/9) = 9T (n/27) + n/9

2 -> T(n) = 81 ( 9T(n/27) + (n/9) ) + 4n

= 729 T(n/27) + 9n + 4n

T(n) = 729 T(n/27) + 13n ----------------> **3**

**From 1,2, and 3**

T(n) = 9k \* T(n/3k) + 3Kn + 3K-1n + ….

32K \* T(n/3k) + n(3K + 3K-1 + ……..)

Let n / 3K = 1 = 3K = n = K = log3n

**T(n) = 32 log3n + n∑ \* 3log3n**