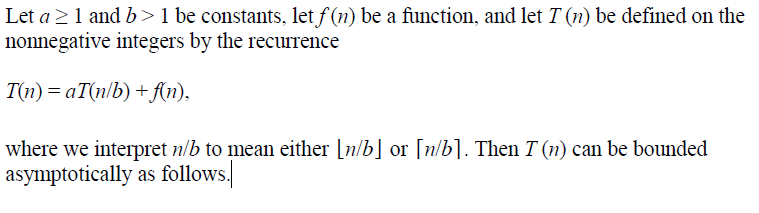
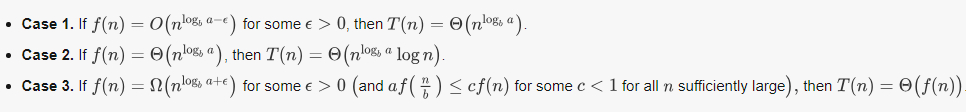
Master Theorem





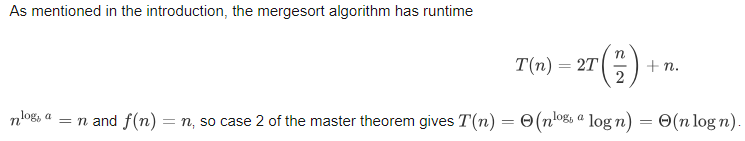
In each of the three cases, we are comparing the function *f* (*n*) with the function  . Intuitively, the solution to the recurrence is determined by the larger of the two functions.

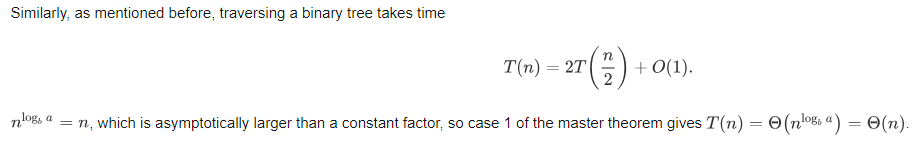
If, as in case 1, the function is the larger, then the solution is

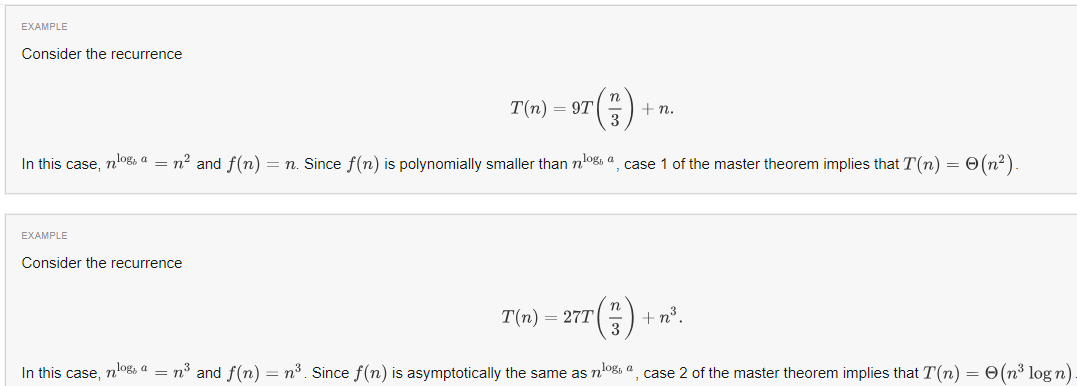
If, as in case 3, the function *f* (*n*) is the larger, then the solution is *T* (*n*) = Θ(*f* (*n*)).

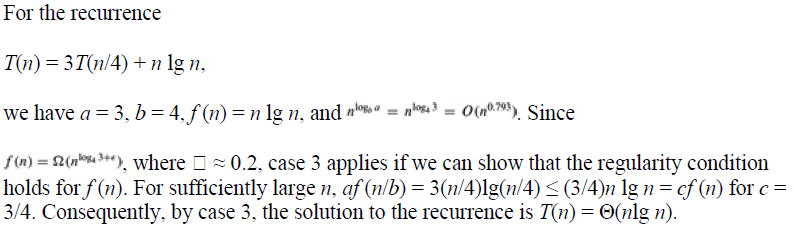
If, as in case 2, the two functions are the same size, we multiply by a logarithmic factor, and the

solution is









F(n)=nlgn 🡺 f(n/4)=n/4lgn/4

where c=3/4

T(n) = Ꝋ (f(n)) = Ꝋ(nlgn)

The recurrence for Binary Search procedures is therefore

*T (n)* = *T (n/*2*)* + Ꝋ (1) whose solution is *T (n)* = Ꝋ(lgn)

**Solve the following recurrences**

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

***T* (*n*) = *T* (2*n*/3) + 1,**

***T* (*n*) = 4*T*(*n*/2) + *n***

***T* (*n*) = 4*T*(*n*/2) + *n*2**

***T* (*n*) = 4*T*(*n*/2) +n3**