We use Master Theorem when we have a recursive function in the form: $T(n) = a.T(n/b) + f(n)$ and we want to express $T(n) = \Theta(?)$

1. We check that a, b are constants and $a >= 1$, $b > 1$, $f(n)$ is non-negative function.

If any of these conditions does not hold, theorem is not applicable

We test the three cases:

CASE #1: $f(n) = O(n^c)$ & $c < \log_b(a)$ => $T(n) = \Theta(n^{\log_b a})$

CASE #2: $f(n) = \Theta(n^c.\log^k(n))$ & $c = \log_b(a)$ & $(k>=0)$ => $T(n) = \Theta(n^{\log_b a} . \log^{k+1}(n))$

CASE #3: $f(n) = \Omega(n^c)$ & $c > \log_b(a)$ & $a.f(n/b) <= k.f(n)$ & $k<1$ => $T(n) = \Theta(f(n))$

If none of them holds then the BASIC form of Master theorem does not hold

For CASE #2 if all conditions hold except $(k>=0)$ then the extended theorem holds.