Induction:

$T(n) = n\log n + n \Rightarrow O(n\log n)$

Base: let $n = 1$

$T(1) = (1)\log(1) + (1)$

$= 0 + 1$

$= 1$ True

let $n = 2$

$T(2) = 2T\left(\frac{2}{2}\right) + 2$

$T(2) = 2(1) + 2$

$= 2 + 2$

$= 4$

Induction hypothesis:

n is true for any k

prove for $n = k+1$

$T(k+1) = 2T\left(\frac{(k+1)}{2}\right) k+1 = (k+1)\log(k+1) + (k+1)$