Exercise . 5.-3 (Secision Tree)

log n! =
$$\theta$$
 (nlog n)

Upper bound:

 $n! \leq n^n$
 $\Rightarrow log (n!) \leq log (n^n) = n log (n)$

Lower bound:

 $(n!)^2 > n^n$
 $\Rightarrow log ((n!)^2) = a log (n!) > n log (n)$

There fore:

 $log (n!) = \theta (nlog (n))$