

Tutorial 02: May 17

1. **Θ -Notation:**

Prove from first principles that $\log(n!) \in \Theta(n \log(n))$.

2. **Dynamic Arrays**

Prove that inserting n elements into a dynamic array takes $O(n)$ operations.

3. **Algorithm Analysis:**

Find a Θ -bound on the number of operations taken by the following algorithm

```
for  $i \leftarrow 0$  to  $n$  do  
   $j \leftarrow 1$   
  while  $j \leq 2^i$  do  
     $j \leftarrow j + 1$   
  end while  
end for
```