TIME COMPLEXITY EXERCISES

EXERCISE 1

- (e.g., n^3, n^2, $n * \log(n)$, n, $\log(n)$) order them based on their asymptotic growth.

EXERCISE 2

- s generate 10 functions and order them based on asymptotic growth

EXERCISE 3

- Find a simple, tight asymptotic bound for:

$$log\left(\left(log\left(n^{\sqrt{n}}\right)\right)^2\right)$$

EXERCISE 4

- Show that

$$(log\ n)^{log\ n} = \Omega(n)$$

EXERCISE 5

- *Analyze the time complexity of a nested loop structure, such as*:

```
for i in range(n):
    for j in range(i):
        # Constant time operations
```

EXERCISE 6

- Show that

$$n^{\log n} \in \Omega(n^2)$$

EXERCISE 7

- Show that

$$n! \in O(n^n)$$

EXERCISE 8

- Show that is it true or nat

$$\log(n) * \log(n) \in O(\log(n))$$

EXERCISE 9

- Find the asymptotic upper bound ($Big\ O$ notation) for $h(n)$

$$h(n) = n\ log\ n + n + 1$$

EXERCISE 10

- *Show that* $n! \in O((2n)!)$, *but that* $log(n!) \in \Omega(n\ log\ n)$