1. (4 points) Arrange the following orders of growth from least to greatest: $2^n, n^4, logn, n!, n$

**ANSWER:**

- $logn$
- $n$
- $n^4$
- $2^n$
- $n!$

2. (6 points) What is the worst-case runtime to insert into a DST?

What is the average-case runtime to insert into a DST?

**ANSWER:**

- $w$, a constant that is the bitlength of the key being inserted
- $lgn$
3. (7 points) Draw the result of inserting the following keys (as 4 bit integers) into a Radix search trie:

- 5 (0101)
- 10 (1010)
- 11 (1011)
- 3 (0011)
- 15 (1111)

**ANSWER:**
TBA
4. (8 points) Assume that you have been tasked with building a symbol table that will map Pitt usernames to full names (e.g., the key "nlf4" would map to the value "Nicholas Farnan"). Further assume that you will be using this symbol table to perform the following operations:

- Given a username, return the associated full name.
- Given a sequence of 3 characters (e.g., "abc"), determine whether those initials are currently being used as a username, and if so, what the next available number should be (e.g., "abc123" exists, so 124 is the next available number).

What symbol table implementation would you use? Why? State any assumptions that you make.

**ANSWER:**
Should be a trie because you are doing prefix lookups. Should be an R-way try, because most 3 char combinations will probably exists as initials.