Data *Structures*
Trie Homework 3

Mostafa S. Ibrahim
Teaching, Training and Coaching since more than a decade!

Artificial Intelligence & Computer Vision Researcher
PhD from Simon Fraser University - Canada
Bachelor / Msc from Cairo University - Egypt
Ex-(Software Engineer / ICPC World Finalist)

Problem #1: Find all substrings

- void list_substrs(const string& str, vector<string> &queries)
- An external function that takes a (long) string and several queries. Print all query words that are substring in str
- Find 2 trie based solutions
  - Normal thinking: A trie based on str
  - Reverse thinking: A trie based on queries
  - Compare time complexity
- Input: "hey**ab**cd**t**w**xy**w" and queries: "xy", "ab", "t", "yz"
  - Only print: "xy", "ab", "t"

Problem #2: Prefix and Suffix Search

- int f(string prefix, string suffix)
- Given dictionary, and above query find the word index that starts with this prefix and ends with this suffix. If there are several matches, return the last index. -1 for no match.
- Assume dict: ["aae", "apple", "bannana"]
- Query ["a", "e"] : it matches both "aae", "apple" ⇒ return 1 [largest idx]
- Query ["a", "x"] : ⇒ -1
- Query ["a", "ae"] ⇒ 0
- Tip: there are several trie-based solutions

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."