

# Structures and Array

Raihan Kabir  
Computer Science and Engineering  
University of Chittagong

June 15, 2023

## 1 Case Study

Wano Pharmaceuticals are specialized in producing Paracetamols. Recently they wanted to grow their business by increasing their supply and production. There are almost a million ( $\leq 10^6$ ) pharmacy shops throughout Bangladesh where they supply their product each week. They have decided to examine the whole business by looking at each state and the sub-states of Bangladesh. So they came up with some queries to analyze the business. Following are the queries,

1. In which state do they have the most sales per month?
2. In which sub-state do they have the most sales per month?
3. In which sub-state of each state do they have the most sales per month?
4. From which state and sub-states do they get products returned the most?
5. How much product they are supplying now to each state per week?
6. If each product is produced at  $4.5BDT$  and sold at  $11BDT$ , what is our net revenue each month?
7. In which state and sub-state do they supply the most products in a week?

Now, they want you to come up with an efficient solution that can produce answers to the queries. You have to choose a data structure to store all the gathered data and then apply different algorithms to answer each query.