Interview questions extended from ECE2800J

I have recently participated in several internship interviews. Surprisingly, many of the questions related to programming stem from ECE2800J. Although almost all of the concepts are taught, what we learned couldn't directly answer the interview questions. Therefore, I decided to make an extention from the course material. I made a very subjective organization here, and will invite my friends to update together. I'm not confident with my answers, so you can search online (or ask AI) for better-organized ones. Hope that this document can help you in your future interviews.

I don't think these contents will be tested in exams, though.

Keep track of the updated version: Interview questions extended from ECE2800J

Linux

1. What does `-r` mean when we type `rm -r <dir>`?
2. How to use a linux command to find a file in a folder (Eg. a folder with thousands of files)?

Git

1. What's the relationship (&difference) between remote branches and local branches?
2. What is the difference between using `git merge` and `git rebase`?

C++

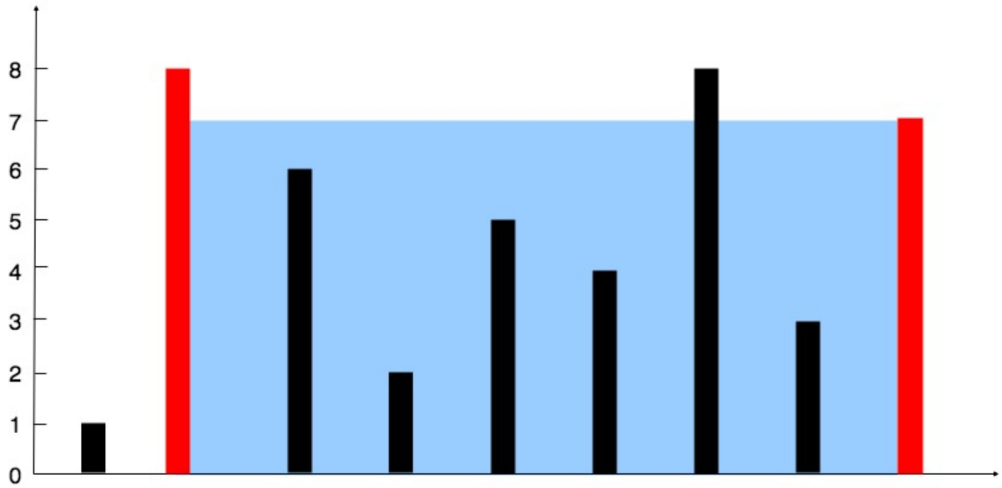
Class

1. What does the `static` keyword mean when used in a class definition?
2. If a class is defined as empty, which default member functions are automatically generated by the compiler?

3. When a class is derived from another, and an object of the derived class is created, whose default constructor will be called first (the base class's or the derived class's)?

Programming Exercises

1. Find the substring `substr` in a string `str`, return the index of the first character in `str`, return -1 if cannot find.
   a. What if `substr` appears several times? How to return the index of the first appearance? What about the last appearance?
   b. What if we accept different orders of `substr` ? Eg. `str="abc"`, then `substr="ab"` & `substr="ba"` are both acceptable.
2. You are given an integer array `height` of length `n`. There are `n` vertical lines drawn such that the two endpoints of the `i(th)` line are `(i, 0)` and `(i, height[i])`. Find two lines that together with the x-axis form a container, such that the container contains the most water. Return the maximum amount of water a container can store.

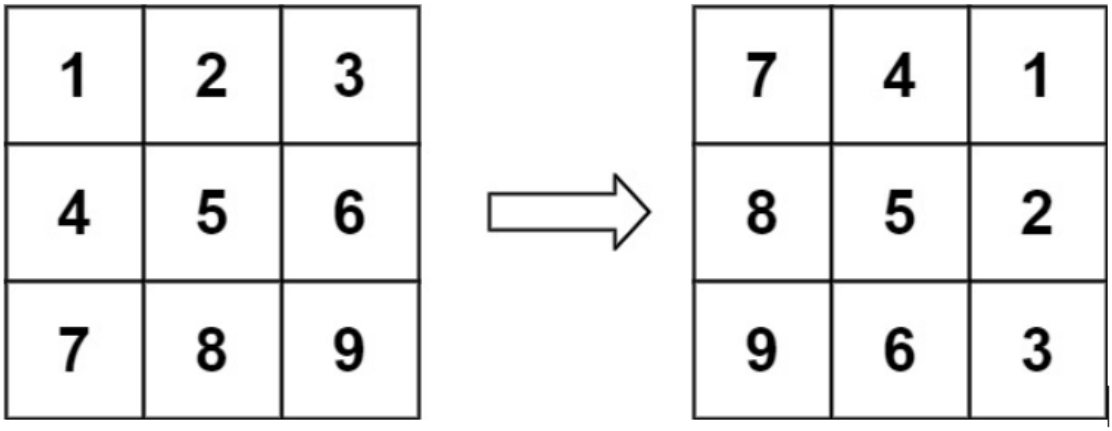


> **Input:** height = [1,8,6,2,5,4,8,3,7]
> **Output:** 49
> **Explanation:** The above vertical lines are represented by array [1,8,6,2,5,4,8,3,7]. In this case, the max area of water (blue section) the container can contain is 49.

3. You are given an `n x n` 2D `matrix` representing an image, rotate the image by **90** degrees (clockwise).

You have to rotate the image **in-place**, which means you have to modify the input 2D matrix directly. **DO NOT** allocate another 2D matrix and do the rotation.

Example 1:




```
Input: matrix = [[1,2,3],[4,5,6],[7,8,9]]
Output: [[7,4,1],[8,5,2],[9,6,3]]
```