Online test

20 MCQ questions, 2 coding questions

1) Given a positive integer, find maximum integer possible by doing at-most K swap operations on its digits.
2) Given a string and pattern, find if the string follows the same pattern. Input string is a combination of “red”, “green” and “blue” only.
   Ex: String: “redbluered”, Pattern: “aba”. Output: True

Round 1

Discussion about my freelancing projects, 2 coding questions:

1) Given an array of n elements which contains elements from 1 to n, with any of these numbers appearing any number of times. Find these repeating numbers in O(n) and using only constant memory space.
2) Given a cost matrix cost[][] and a position (m, n) in cost[][], write a function that returns cost of minimum cost path to reach (m, n) from (0, 0). Each cell of the matrix represents a cost to traverse through that cell. Total cost of a path to reach (m, n) is sum of all the costs on that path (including both source and destination). You can only traverse down and right cells from a given cell, i.e., from a given cell (i, j), cells (i+1, j) and (i, j+1) can be traversed.

   This is a standard question, then he modified a few parameters (we can traverse in all possible directions, what if –ve cost was allowed etc.)

Round 2

1) Again discussed about my projects.
2) Most challenging of all? Why it was challenging? Be prepared to answer such questions!
3) Why Amazon?
4) Given a string, find the longest substring which is palindrome.
5) About Hash table, collision resolution etc.

Round 3

Discussion about my projects yet again followed by 1 question. This could be the Bar Raiser round of Amazon hiring process. The question is fairly complex so I’ll try to explain it the best way I can.

Consider an e-commerce company ABC. It only processes bulk orders i.e. you cannot order 1 unit of a product type. The quantity ordered should be > 1. This company has many vendors and warehouses to store pre-packed goods. Each warehouse has a Manager to keep a record of all goods stored in that particular warehouse. Here’s how the configuration a warehouse goods might look like:

iPhone: [2, 9, 3, 6, 7], Laptop: [22, 5, 2], ...

Interpretation: The warehouse has a pre-packed box containing 2 iPhones, another pre-packed box of 9 iPhones, another of 3, 6, 7 and so on for other product types as well.

One more thing. Managers are not going to unpack and edit any of the pre-packed boxes. A box containing “x” iPhones won’t be edited after packing and storing in a warehouse.

Now, he asked two questions:

1) What type of Data Structure would you suggest for storing this type of configuration?
2) An order request, R (Product + Quantity), comes in. How will the manager know if he can serve the request successfully?

   Example:
   Assuming only 1 warehouse of the company with configuration:
   iPhone: [2, 6, 4]

   Request 1: (iPhone, 12)
   Output: True (We can send him a box of 2, 6 and 4 iPhones each.)

   Request 2: (iPhone, 11)
   Output: False (We can't do it. Remember, we are not allowed to unpack and modify any pre-packed boxes.)

   Request 3: (iPhone, 16)
   Output: False

After solving these questions, he modified a few parameters. Now assume you've infinite pre-packed boxes of each 2, 6 and 4 iPhones. Now, how will this affect Question 2?

iPhone: [2 (infinite == very large), 6 (infinite), 4 (infinite)]

Since we have infinite supply of 2, 6 and 4 pre-packed boxes, we can now serve requests looking for 16 iPhones (which was not possible before) – 6 + 6 + 4 = 16

I handled this case. However, the approach I suggested had a flaw. Consider this situation.

iPhone: [2 (3 boxes), 6 (9 boxes), 4 (5 boxes)]

Request: (iPhone, 6), Output: True

We would want to send a single pre-packed box of 6 iPhones instead of 3 boxes of the 2 pre-packed iPhones. We don't want to exhaust our boxes when we have a better way to serve the request. I provided a solution to handle this case.

In the end he asked me to code the approach, handling all above cases. So this was the final question of this round.

Round 4

1) What happens when you enter a URL in your browser?
2) About DNS, DHCP server and Routers.
3) Given a matrix of dimension m*n where each cell in the matrix can have values 0, 1 or 2 which has the following meaning:

   0: Empty cell
   1: Cells have fresh apples
   2: Cells have rotten apples

So we have to determine what is the minimum time required so that all the apples become rotten. A rotten apple at index [i,j] can rot other fresh apples at indexes (i-1, j), (i-1, j + 1), (i, j+1), (i+1, j+1), (i+1, j), (i+1, j-1), (i, j-1) and (i-1, j-1) (basically, every possible direction). If it is impossible to rot every apple then simply return -1.

4) Given an N x M matrix, where every row and column is sorted in non-decreasing order. Print all elements of matrix in sorted order.