Coding Assignment-9

Q1. **There are N street lights numbered from 1 to N each street lamp i has two numbers start[i] and end[i] meaning they can light all the streets numbered from start to end. You just need to find how many areas are getting lighted.**

Test Case-1:
Input: { {5,8} , {10,12} }
Output: 5

Test Case-2:
Input: { {5,10} , {8,12} }
Output: 7

Q2. **There are N interns numbered from 1 to N. Each intern is assigned a unique ID for each day. Rules being 1<=N<=24. The i^{th} intern has an ID of (5000*i) on day1 and for rest of days; day[j]=day[j-1]+5000+(j-1). Input to the problem id ID of the intern. Output is number of intern on particular day.**

Test Case-1:
Input: 15000
Output: Third Intern [Day 1]

Test Case-2:
Input: 25003
Output: Third Intern [Day 3]

Q3. **There are N bus stops numbered from 1 to N. B[i] denotes the number of buses going from the ith bus stop. Each bus will only stop in the bus stop which is the multiple of the bus stop the bus is initially in, which means if a bus starts from 2nd bus stop, it will only stop in 2,4,6,8,10,12……. bus stops. If 3 then, 3 6 9 12 15 18….. Each bus if it goes from the i^{th} bus stop, will also go from the next i^{th} multiple bus stop. You need to tell the number of unique buses from each bus stop.**

Test Case-1:
Input: 1 2 3
Output: 1 1 2

Test Case-2:
Input: 2 3 4 6
Output: 2 1 2 3

Q4. **There are N bowls numbered from 1 to N and each bowl can contain maximum 9 marbles. A user has to add a marble to the last bowl i.e. Nth Bowl. If Nth bowl is full i.e. it already has 9 marbles, you need to check in (N-1)th. If (N-1)th bowl has space to accommodate one more marble, then you need to add marble in it and remove all the marbles from Nth bowl. You need to identify the bowl will be modified when you add a marble. If all bowls are full, print output as 0.**

Input : First line contains number of bowls.
Second line will denotes number of marbles in each bowl from 1 to N.

Output : index of last modified bowl.

Test Case-1:

Input: 2

2 3

Here first line denotes that there are 2 bowls. Second line denotes that there are 2 marbles in first bowl and 3 marbles in second bowl.

Output: 2

First we will check in the last bowl. It has less than 9 marbles, so we can add marble to last bowl and now status of the bowls will 2 4. As we have added marble to the second bowl, output will be 2.

Test Case-2:

Input: 2

2 9

Since if we add 1 to the last bowl, it becomes 2 10, not allowed, so the one marble gets carry forwarded to the next bowl making it 3 0, so 1st bowl is the last modified.

Test Case-3:

Input: 2

9 9

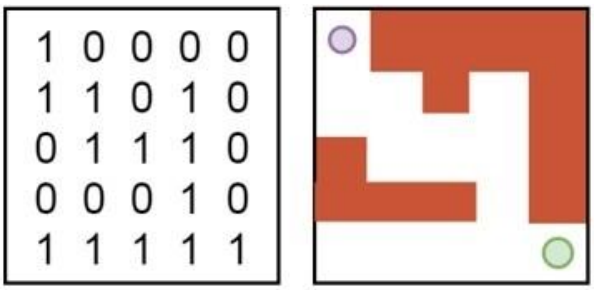
Since if we add 1 to the last bowl, it becomes 9 10, carry forward it becomes 10 0, again a problem, so 0 0 making nothing getting modified at the end.

Q5. There is a given maze of size N x N. The source and the destination location is top-left cell and bottom right cell respectively. Some cells are valid to move and some cells are blocked. If one rat starts moving from start vertex to destination vertex, we have to find that is there any way to complete the path, if it is possible then mark the correct path for the rat.

The maze is given using a binary matrix, where it is marked with 1, it is a valid path, otherwise 0 for a blocked cell.

NOTE: The rat can only move in two directions, either to the right or to the down.

Input: This algorithm will take the maze as a matrix.
In the matrix, the value 1 indicates the free space and 0 indicates the wall or blocked area.



In this diagram, the top-left circle indicates the starting point and the bottom-right circle indicates the ending point.

Output:
It will display a matrix. From that matrix, we can find the path of the rat to reach the destination point.