Company Specific JAVA questions

1) Best Programmer

Baldwin High School's Best Programmer Contest is organized today and the contest hones the students coding skills by making them solve different challenges. Based on the speed and accuracy with which the students finish the challenges, the Event coordinators will rank the participants and reward them. The entry level challenge was just one problem which the students has to program for. The problem reads like:
A positive integer, n, is said to be perfect if the sum of its proper divisors equals the number itself. (Proper divisors include 1 but not the number itself.) If this sum is less than n, the number is deficient, and if the sum is greater than n, the number is abundant. The Event coordinators wanted to prepare the answer key for all the problems given in the contest so as to evaluate the submissions of the participants.
Hence create a class named NumberType with the following method.

Method Name	Description
int findType(int)	This method return 1 if the given integer is a deficient number, return 0 if it is a perfect number and return -1 if it is a abundant number.

Create a driver class called Main. In the Main method, obtain input from the user in the console and display the number along with its classification by calling the findType method present in the NumberType class.

Input Format
The input consists of an integer that corresponds to the given number.

Output Format
Output should display if the given number is a perfect, abundant or deficient number. Refer sample output

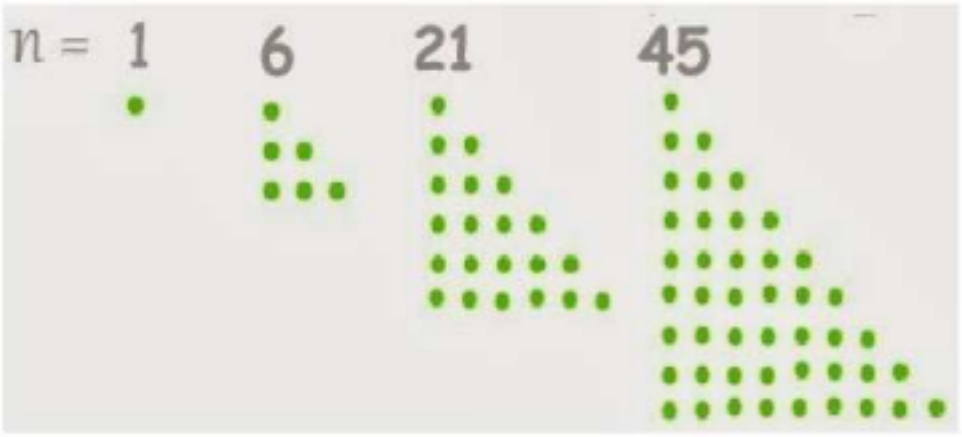
Sample Input
4
Sample Output
4 is a deficient number

2. Right Triangle of Dots

The much awaited event at the entertainment industry every year is the "Screen Awards". This year the event is going to be organized on December 25 to honour the Artists for their
professional excellence in Cinema. The Organizers of the event, J&R Events, decided to design the logo of the Screen Awards as a digitalized image and display it on the LED panel boards for the show promotions all across the venue. The Event team wanted to border the logo with right triangles which will describe it better.
For this purpose, the Event development team are in the task to find if N dots can make a right triangle or not (all N dots must be used). Given N dots, we can make it look like a Right Triangle (45-45-90 triangle) exactly with N dots. Rearrange the given N dots, like this:

Method Name	Description
int find(int)	This method should return 1 if you can make a right triangle using N dots, else return 0.

Your task is to help the team. Hence create a class named Dots with the following method.



Create a driver class called Main. In the Main method, obtain input from the user in the console and display "Yes" if you can make a right triangle using N dots, otherwise "No" by calling the find method present in the Dots class.
Input Format

Input consists of a single integer n.
Output Format
Output "Yes" (without quotes) if you can make a right triangle using N dots, otherwise "No"(without quotes).

Sample Input : 1
Sample Output : Yes

Sample Input : 6
Sample Output : Yes
3. Winter Challenge
Swapna is a regular reader of Youth Digest magazine. The magazine has a whole host of fun and interesting facts from around for the youth especially that encourage interactivity and enhances their imagination. "Winter Challenge" is an event announced in the December month edition of the magazine. Readers of the magazine who are between 10 to 15 years can participate in the special challenge. Those readers who participate and give the correct answer for the challenge will avail exciting gift coupons. According to the event, the challenge published was:
Given 0 < x < m, where x and m are integers, the modular inverse of x is the unique integer n, 0 < n < m, such that the remainder upon dividing x × n by m is 1.
For example,
if x = 4 and m = 17, we get n = 13
4 x 13 = 52 = 17 x 3 + 1, so the remainder when 52 is divided by 17 is 1, and thus 13 is the inverse of 4 modulo 17.
Swapna wants your help to find the correct answer for the problem based on the inputs given in the magazine.
Hence create a class named ModInverse with the following method.

Method Name	Description
int findValue(int,int)	This method returns the modular inverse n or return -1 if there is no such integer n.

Create a driver class called Main. In the Main method, obtain input from the user in the console and display the modular inverse n, or -1 if there is no such integer n by calling the findValue method present in the ModInverse class.
Input Format

The input consists of x and m separated by a space.
Output Format
Output should display the appropriate value or print -1 otherwise.

Sample Input 4 17
Sample Output 13

4. Best Mobile Plan

St. Patrick Convent organizes a project exhibition "Innovative Minds" every year with an objective to provide the platform and unleash the potential of the students by showcasing their innovative projects.
Albert is a science expert and is a topper at his high school. He became interested about the project exhibition and enrolled his name for the same.
Albert's Dad has a cell phone but often seemed to worry about the price plans for his phone that best fits for his usage pattern and monthly expenses.
There are two options, each plan has different costs for daytime minutes, evening minutes and weekend minutes.

Plan	Costs		
	daytime	evening	weekend
A	100 free minutes then 25 paise per minute	15 paise per minute	20 paise per minute
B	250 free minutes then 45 paise per minute	35 paise per minute	25 paise per minute

Having this as a spark for his project, Albert decided to design a handy application that will input the number of each type of minutes and output the cheapest plan for this usage pattern, using the format shown below. In the case that the two plans are the same price, output both plans. He needs your help to evaluate his project and suggest corrections. Hence create a class named Best Mobile Plan with the following method.

Method Name	Description
void printPlanDetails(int,int,int)	This method should display the cheapest plan for this usage pattern.

Create a driver class called Main. In the Main method, obtain input from the user in the console and call the printPlanDetails method present in BestMobilePlan class. Input Format
Input consists of the usage during daytime,evening and night time separated by a space. Output Format
Output should print the cheapest plan for this usage pattern. In the case that the two plans are the same price, output both plans.
Sample Input 251 10 60
Sample Output
Plan A costs 51.25
Plan B costs 18.95
Plan B is cheapest

Sample Input 162 61 66
Sample Output
Plan A costs 37.85
Plan B costs 37.85
Plan A and B are the same price

5. Addition Challenge
Charlie set off with great zeal to the "Kracker Jack Fun Fair 2017". There were numerous activities in the fair, though Charlie being a Math expert, liked to participate in the Addition Challenge.
The Challenge given to him was to find S, where S=20 +21+22+.....+2N. He would succeed in his challenge if he manages to tell the answer for the problem before others. He requests your help to solve the problem in a flash.
Help Charlie to find S and win over the challenge.
Hence create a class named AdditionChallenge with the following method.

Method Name	Description
long findSum(int)	This method should return S.

Create a driver class called Main. In the Main method, obtain input from the user in the console and display S by calling the findSum method present in the AdditionChallenge class.
Input Format

Input consists of the value of n.
Output Format
Output prints the sum.
Sample Input 1
Sample Output 3

6 Expression Evaluation

In the Mini project 7th module is to evaluate the expression y = x + x^2+.....+x^n. Rita allotted this function to Malini. Collect and display the values returned by the called function. Test your program and report the results obtained.

Help Malini to write a program to evaluate the expression?

Get the value of x and n from the user as input

Use the following function:

int calculate(int x,int n)

where the first argument corresponds to the value of x and second corresponds to n respectively.

Input Format
Input consists of x and n separated by a space.
Output Format
Output prints the sum.
Sample Input 2 3
Sample Output 14

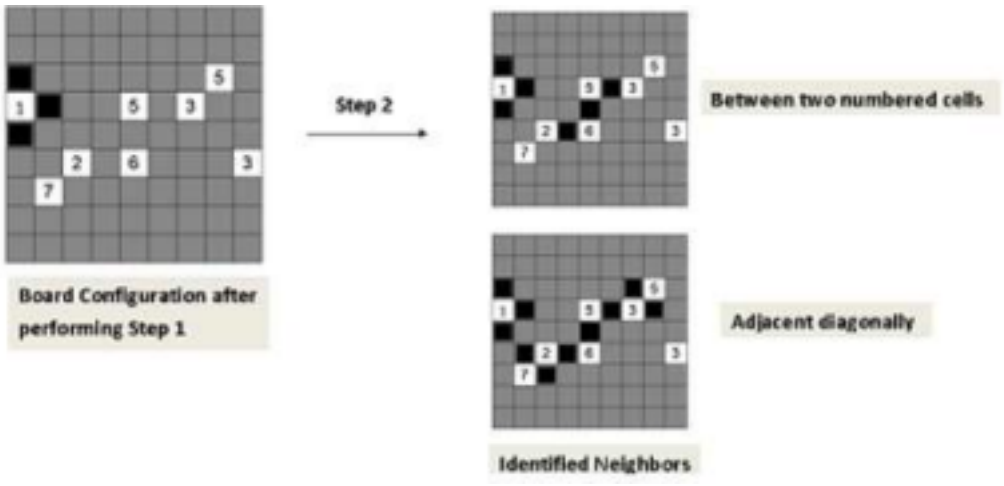
7. Identify Neighbor Numbers

Nurikabe logical game (sometimes called Islands in the Stream) is a binary determination puzzle. The puzzle is played on a typically rectangular grid of cells, some of which contain numbers. You must decide for each cell if it is white or black (by clicking on them) according to the following rules:

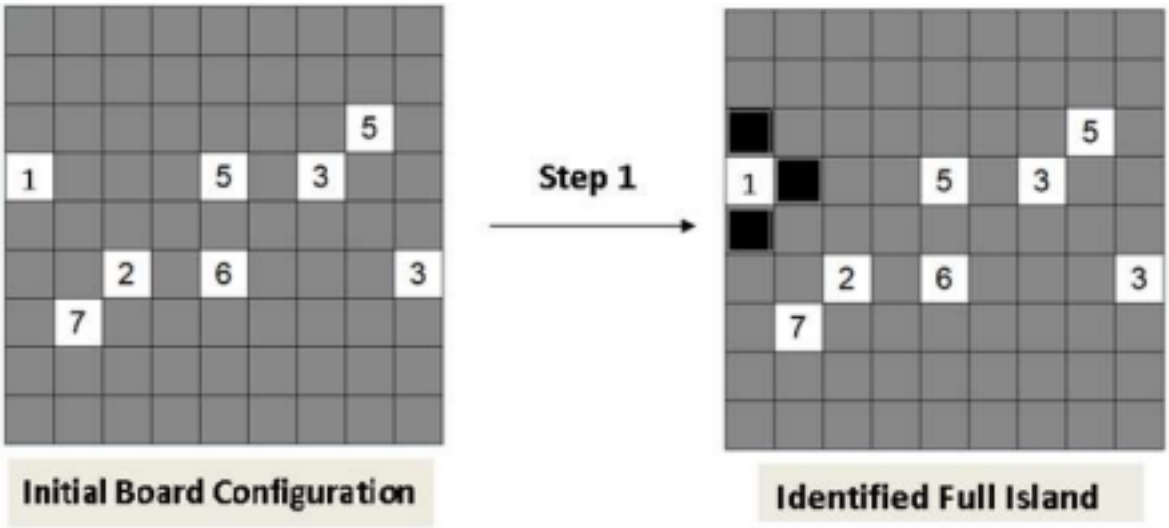
· All of the black cells must be connected.
· Each numbered cell must be part of a white island of connected white cells. · Each island must have the same number of white cells as the number it contains (including the numbered cell).
· Two islands may not be connected.
· There cannot be any 2x2 blocks of black cells.

Unnumbered cells start out grey and cycle through white and black when clicked. Initially numbered cells are white in color.

Problem Statement:
The step 1 of solving the puzzle is identifying "Full islands".
Below figure is the one after identifying full islands.



The step 2 of solving the puzzle is to identify the neighbors.
Since two numbers in a nurikabe puzzle cannot be part of the same island, any cell that has two numbered neighbors must be black. The two cases are when a cell is between two numbered cells, or (as in the image) when two numbered cells in the nurikabe are adjacent diagonally.



Given the board configuration after performing step 1. Write a program to find the board configuration after the step 2.
Input Format
First line of the input is an integer N that gives the number of rows and columns of the grid.
Next N lines will have a board configuration with N*N cells after performing step1. Assume that the maximum number in a cell can be 10. Grey colored cells are represented by the integer 20 in the matrix representation of the input configuration. Output Format
Output should display the board configuration with N*N cells after applying step 2. Grey colored cells are represented by the integer 20, numbered cells are

represented by the same number given in the input and black cells are represented by 0. Refer sample input and output for formatting specifications.

Sample Input :

9
20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20
0 20 20 20 20 20 20 5 20
1 0 20 20 5 20 3 20 20
0 20 20 20 20 20 20 20 20
20 20 2 20 6 20 20 20 3
20 7 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20
Sample Output

20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20
0 20 20 20 20 20 0 5 20
1 0 20 20 5 0 3 0 20
0 20 20 20 0 20 20 20 20
20 0 2 0 6 20 20 20 3
20 7 0 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20
20 20 20 20 20 20 20 20 20

8. Number of White Cells

Nurikabe logical game (sometimes called Islands in the Stream) is a binary determination puzzle. The puzzle is played on a typically rectangular grid of cells, some of which contain numbers. You must decide for each cell if it is white or black (by clicking on them) according to the following rules:

· All of the black cells must be connected.

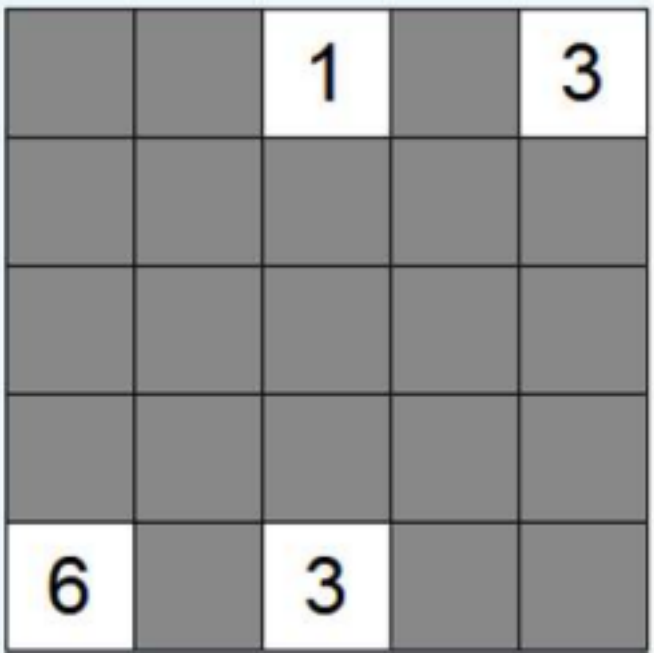
· Each numbered cell must be part of a white island of connected white cells. · Each island must have the same number of white cells as the number it contains (including the numbered cell).

· Two islands may not be connected.

· There cannot be any 2x2 blocks of black cells.

Unnumbered cells start out grey and cycle through white and black when clicked. Initially numbered cells are white in color.

Problem Statement:
Write a program to find the number of white cells in the final configuration of the board, given a valid initial



Input Format
First line of the input is an integer N that gives the number of rows and columns of the grid.
Next N lines will have a valid initial board configuration with N*N cells. Assume that the maximum number in a cell can be 10. Grey colored cells are represented by the integer 20 in the matrix representation of the input configuration.
Output Format
Output should display an integer that the number of white cells in the final configuration of the board.
Sample Input
5
20 20 1 20 3
20 20 20 20 20
20 20 20 20 20
20 20 20 20 20
6 20 3 20 20
Sample Output 13

9. Alternating Code
It is IPL Season and the first league match of Dhilip's favorite team, "Chennai Super Kings". The CSK team is playing at the IPL after 2 years and like all Dhoni

lovers, Dhilip is also eagerly awaiting to see Dhoni back in action.
After waiting in long queues, Dhilip succeeded in getting the tickets for the big match. On the ticket, there is a letter-code that can be represented as a string of upper-case Latin letters.
Dhilip believes that the CSK Team will win the match in case exactly two different letters in the code alternate. Otherwise, he believes that the team might lose. Please see note section for formal definition of alternating code.
You are given a ticket code. Please determine, whether CSK Team will win the match or not based on Dhilip'sconviction. Print "YES" or "NO" (without quotes) corresponding to the situation.
Note:
Two letters x, y where x != y are said to be alternating in a code, if code is of form "xyxyxy...".

Input Format
First and only line of the input contains a string S denoting the letter code on the ticket. Output Format
Output a single line containing "Yes" (without quotes) based on the conditions given and "No" otherwise.
Refer sample input and output for formatting specifications.

Sample Input ABABAB
Sample Output Yes

Sample Input ABC
Sample Output No

10. Casper at the Carnival
The Circoloco Children Carnival is the City's largest and successful event dedicated to children and families. Casper is a smart little boy who loves eating cookies and drinking fresh juices. He visits the carnival with his parents and is going to spend N minutes at the event ground. Each minute he either eats a cookie or drinks fresh juice. Cookies are very sweet and thus Casper's parents have instructed him to drink fresh juice in the next minute, after eating a cookie.
You are given whether he ate a cookie or drank fresh juice in each of the N minutes. Your task is to check if Casper followed his parents' instructions.
That is, you need to verify whether after each eaten cookie he drinks fresh juice in the next minute. Input Format
The first line of the input contains an integer N denoting the number of minutes.
The second line of the input contains N space-separated strings S1, S2, ...,SN.

The string Si is either "cookie" (if Casper eats a cookie in the i-th minute) or "juice" (otherwise). Output Format
Output a single line containing the answer — "Yes"(without quotes) if Casper followed his parents' instructions, and "No"(without quotes) otherwise, both without the quotes. Refer sample input and output for formatting specifications.
Sample Input 5 cookie cookie juice juice juice

Sample Output No
Sample Input 7
cookie juice juice cookie juice cookie juice
Sample Output Yes