

PROGRAMS ON MATH LOGIC

1 . Strong Numbers :

Strong Numbers are the numbers whose sum of factorial of digits is equal to the original number. Given a number, the task is to check if it is a Strong Number or not.

```
class Solution {  
    public int is_StrongNumber(int n)  
    {  
        int y=n;  
        int res=0;  
        while(n!=0)  
        {  
            int temp = n%10;  
            res+=fact(temp);  
            n=n/10;  
        }  
        if(res==y) return 1;  
        return 0;  
    }  
    int fact(int n)  
    {  
        int sum=1;  
        while(n!=0)  
        {  
            sum*=n;  
            n--;  
        }  
        return sum;  
    }  
}
```

The screenshot shows a web browser window for the GeeksforGeeks website, specifically the 'Practice' section. The URL is geeksforgeeks.org/problems/strong-numbers4336/1?page=2&category=Mathematical&status=solved&sortby=difficulty. The page displays a solved problem for Java.

Output Window:

- Compilation Results:** Test Cases Passed, 1200 / 1200
- Attempts:** Correct / Total: 2 / 4
- Accuracy:** 50%
- Time Taken:** 0.1

Solution Code (Java):

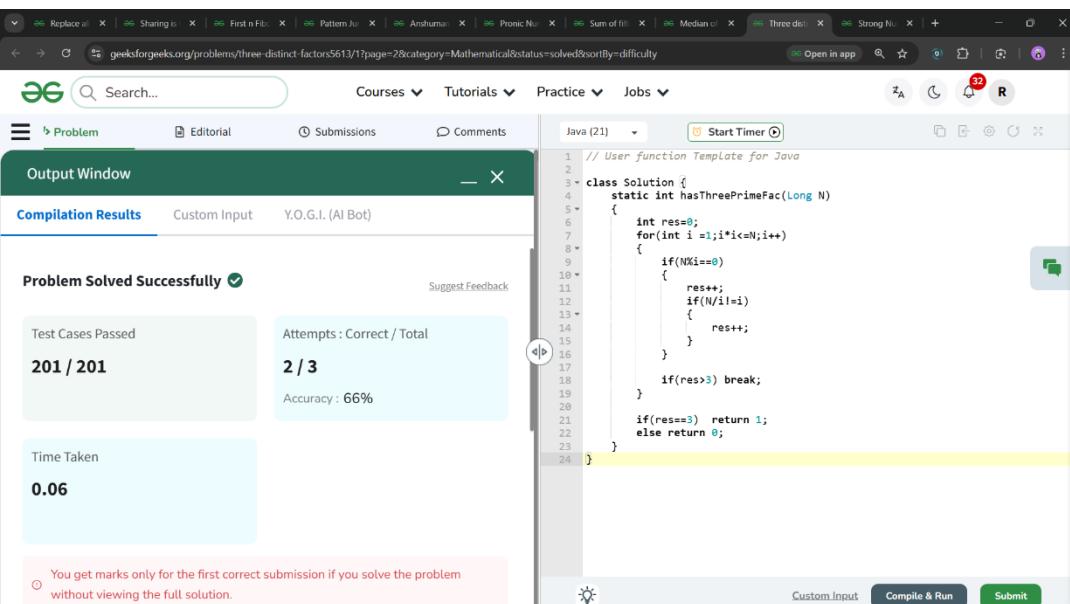
```
// User function Template for Java
class Solution {
    public int is_StrongNumber(int n)
    {
        // Code here
        int y=n;
        int res=0;
        while(n!=0)
        {
            int temp = n%10;
            res+=fact(temp);
            n=n/10;
        }
        if(res==y) return 1;
        return 0;
    }
    int fact(int n)
    {
        int sum=1;
        while(n!=0)
        {
            sum*=n;
            n--;
        }
        return sum;
    }
}
```

Feedback: You get marks only for the first correct submission if you solve the problem without viewing the full solution.

2 . Three distinct factors

Given a positive integer **N**. The task is to check whether a number has exactly three distinct factors or not.

```
class Solution {  
    static int hasThreePrimeFac(Long N)  
    {  
        int res=0;  
        for(int i =1;i*i<=N;i++)  
        {  
            if(N%i==0)  
            {  
                res++;  
                if(N/i!=i)  
                {  
                    res++;  
                }  
            }  
            if(res>3) break;  
        }  
  
        if(res==3) return 1;  
        else return 0;  
    }  
}
```



The screenshot shows a browser window for geeksforgeeks.org/problems/three-distinct-factors/1?page=2&category=Mathematical&status=solved&sortBy=difficulty. The code has been submitted and is displayed in the 'Output Window' under the 'Problem' tab. The submission was successful, with a message 'Problem Solved Successfully'. It shows 201/201 test cases passed, 2/3 attempts correct, and 66% accuracy. The time taken was 0.06 seconds. The code itself is identical to the one provided above. A note at the bottom states: 'You get marks only for the first correct submission if you solve the problem without viewing the full solution.'

3 .Median of an Array

Given an array arr[] of integers, calculate the median.

```
class Solution {  
    public double findMedian(int[] arr)  
    {  
        Arrays.sort(arr);  
        int n=arr.length;  
        if(n%2==0)  
        {  
            int m= (n/2)-1;  
            int res = (arr[m]+arr[m+1]);  
            if(res%2==0)  
            {  
                return (double) res/2;  
            }  
            else  
            {  
                return (double) (res/2)+0.5;  
            }  
        }  
        int mm=(n/2);  
        return (double) arr[mm];  
    }  
}
```

The screenshot shows a browser window for GeeksforGeeks with the URL [geeksforgeeks.org/problems/find-the-median0522/1?page=2&category=Mathematical&status=solved&sortBy=difficulty](https://www.geeksforgeeks.org/problems/find-the-median0522/1?page=2&category=Mathematical&status=solved&sortBy=difficulty). The code has been submitted and is displayed in the editor. The output window shows "Problem Solved Successfully" with 1115/1115 test cases passed, 2/8 attempts correct, and 25% accuracy. The time taken was 1.03 seconds. A note at the bottom says: "You get marks only for the first correct submission if you solve the problem without viewing the full solution."

```
1 class Solution {  
2     public double findMedian(int[] arr)  
3     {  
4         Arrays.sort(arr);  
5         int n=arr.length;  
6         if(n%2==0)  
7         {  
8             int m= (n/2)-1;  
9             int res = (arr[m]+arr[m+1]);  
10            if(res%2==0)  
11            {  
12                return (double) res/2;  
13            }  
14            else  
15            {  
16                return (double) (res/2)+0.5;  
17            }  
18        }  
19        int mm=(n/2);  
20        return (double) arr[mm];  
21    }  
22}  
23}  
24}
```

4 . Sum of fifth powers of the first n natural numbers

Given a number N. Find the sum of fifth powers of natural numbers till N i.e. $1^5+2^5+3^5+\dots+N^5$.

```
class Solution {  
    long sumOfFifthPowers(long N) {  
        long s=0;  
        for(long i=1;i<=N;i++)  
        {  
            s=s+(long)Math.pow(i,5);  
        }  
        return s;  
    }  
}
```

The screenshot shows a browser window for geeksforgeeks.org with the URL: geeksforgeeks.org/problems/sum-of-fifth-powers-of-the-first-n-natural-numbers3415/1?page=1&category=Mathematical&status=solved&sortBy=diff... The page displays a Java code editor with the provided solution. Below the editor, a green bar indicates "Problem Solved Successfully". It shows 1110 test cases passed out of 1110 total, with an accuracy of 100%. The time taken for the submission was 0.14 seconds.

```
// User function Template for Java  
class Solution {  
    long sumOfFifthPowers(long N) {  
        long s=0;  
        for(long i=1;i<=N;i++)  
        {  
            s=s+(long)Math.pow(i,5);  
        }  
        return s;  
    }  
}
```

Output Window

Compilation Results

Test Cases Passed: 1110 / 1110

Attempts : Correct / Total: 2 / 2

Accuracy : 100%

Time Taken: 0.14

You get marks only for the first correct submission if you solve the problem without viewing the full solution.

5 . Pronic Number

A pronic number is a number which is the product of two consecutive integers. Find all Pronic Numbers less than or equal to the given integer **N**.

The first few Pronic numbers are: 0, 2, 6, 12, 20, 30, 42, 56, 72, 90, 110, 132 and so on.

```
class Solution {  
    static ArrayList<Integer> pronicNumbers(int N) {  
        ArrayList<Integer> al = new ArrayList<>();  
        for(int i=0;i*(i+1)<=N;i++)  
        {  
            al.add(i*(i+1));  
        }  
        return al;  
    }  
}
```

The screenshot shows a browser window for geeksforgeeks.org with the URL <https://www.geeksforgeeks.org/problems/pronic-number0729/1?page=1&category=Mathematical&status=solved&sortBy=difficulty>. The page displays a Java code editor with the provided solution. Below the editor, the 'Output Window' shows 'Problem Solved Successfully' with 200/200 test cases passed and 3/3 attempts correct. The 'Time Taken' is 0.27 seconds. A note at the bottom states: 'You get marks only for the first correct submission if you solve the problem without viewing the full solution.'

```
// User function Template for Java  
class Solution {  
    static ArrayList<Integer> pronicNumbers(int N) {  
        // code here  
        ArrayList<Integer> al = new ArrayList<>();  
        for(int i=0;i*(i+1)<=N;i++)  
        {  
            al.add(i*(i+1));  
        }  
        return al;  
    }  
}
```

6 . Anshuman's Favourite Number

You are given an integer input N and you have to find whether it is the sum or the difference of the integer 5. (5+5, 5+5+5, 5-5,5-5+5+5.....)

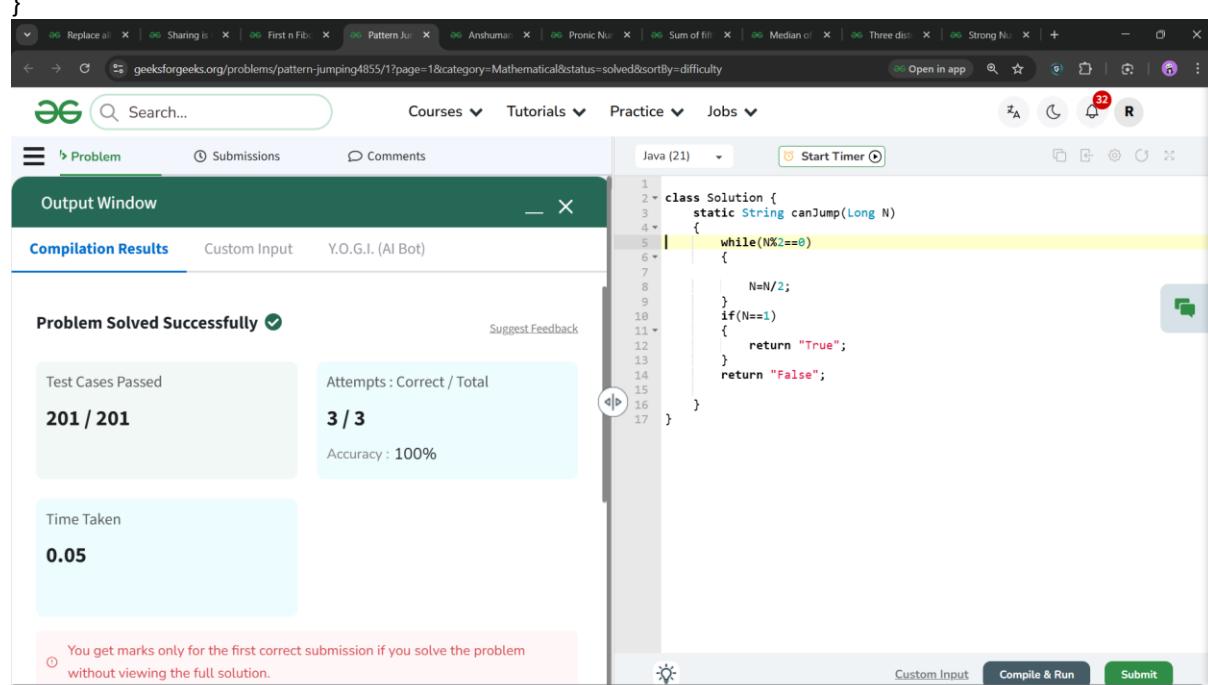
```
class Solution
{
    static String isValid(Long N)
    {
        if(N%5==0) return "YES";
        else return "NO";
    }
}
```

The screenshot shows a browser window for GeeksforGeeks with the URL [geeksforgeeks.org/problems/anshumans-favourite-number2029/1?page=1&category=Mathematical&status=solved&sortBy=difficulty](https://www.geeksforgeeks.org/problems/anshumans-favourite-number2029/1?page=1&category=Mathematical&status=solved&sortBy=difficulty). The page displays a Java code editor with the provided solution. Below the editor, the 'Compilation Results' section shows 'Problem Solved Successfully' with a green checkmark. It also shows 'Test Cases Passed' as 200 / 200, 'Attempts : Correct / Total' as 3 / 3, and 'Accuracy : 100%'. At the bottom, a note says 'You get marks only for the first correct submission if you solve the problem without viewing the full solution.' There are buttons for 'Custom Input', 'Compile & Run', and 'Submit'.

7. Pattern Jumping

A frog starts at the point 0. In his first turn, he can make a jump of 1 unit. Now for all consequent turns, if the frog is currently at a distance x (from the start), his jump will take him x units forward. Given a leaf at a distance N , you have to find if the frog can reach that leaf or not.

```
class Solution {  
    static String canJump(Long N)  
    {  
        while(N%2==0)  
        {  
  
            N=N/2;  
        }  
        if(N==1)  
        {  
            return "True";  
        }  
        return "False";  
    }  
}
```



The screenshot shows a browser window on the GeeksforGeeks website. The URL is geeksforgeeks.org/problems/pattern-jumping4855/1?page=1&category=Mathematical&status=solved&sortBy=difficulty. The page displays a Java code editor with the provided solution. Below the code editor, the 'Output Window' shows 'Compilation Results' for 'Custom Input' and 'Y.O.G.I. (AI Bot)', both indicating success. A message 'Problem Solved Successfully' is displayed. Test case statistics show '201 / 201' test cases passed, '3 / 3' attempts correct, and 'Accuracy : 100%'. The 'Time Taken' is listed as '0.05'. At the bottom, a note says 'You get marks only for the first correct submission if you solve the problem without viewing the full solution.' Buttons for 'Custom Input', 'Compile & Run', and 'Submit' are visible at the bottom right.

```
1 class Solution {  
2     static String canJump(Long N)  
3     {  
4         while(N%2==0)  
5         {  
6             N=N/2;  
7         }  
8         if(N==1)  
9         {  
10            return "True";  
11        }  
12        return "False";  
13    }  
14 }
```

8 . First n Fibonacci

Given a number **n**, return an array containing the first **n** Fibonacci numbers.

Note: The first two numbers of the series are 0 and 1.

```
class Solution
{
    public static int[] fibonacciNumbers(int n)
    {
        int[] arr = new int[n];
        if(n > 0) arr[0] = 0;
        if(n > 1) arr[1] = 1;
        for(int i = 2; i < n; i++)
        {
            arr[i]=arr[i-1] + arr[i-2];
        }
        return arr;
    }
}
```

The screenshot shows a browser window on the GeeksforGeeks website. The URL is [geeksforgeeks.org/problems/print-first-n-fibonacci-numbers1002/1?page=1&category=Mathematical&status=solved&sortBy=difficulty](https://www.geeksforgeeks.org/problems/print-first-n-fibonacci-numbers1002/1?page=1&category=Mathematical&status=solved&sortBy=difficulty). The page displays a Java code editor with the provided solution. The code is highlighted in green. To the right of the code, there is a status bar showing 'Java (21)' and a 'Start Timer' button. Below the code editor, the 'Output Window' shows 'Problem Solved Successfully' with a green checkmark. It also displays 'Attempts : Correct / Total' as '4 / 6'. At the bottom of the window, there is a note: 'You get marks only for the first correct submission if you solve the problem without viewing the full solution.' The browser's address bar and various tabs are visible at the top.

9 . Sharing is Caring

Geek is very fond of chocolates. But he can't reach the kitchen shelf which has 'N' chocolates. His family has K members and he can call any number of family members to help him out. After acquiring the chocolates, the family members that Geek called will first divide the chocolates amongst themselves equally. They do this in such a way that they all get maximum number of chocolates. The remaining chocolates are given to Geek.

Find the maximum number of chocolates that Geek can get.

```
class Solution {  
    static int maxChocolate(int N, int k) {  
        int res=0;  
        for(int i=k;i>0;i--)  
        {  
            int r = N%i;  
            if(r>res)  
            {  
                res=r;  
            }  
        }  
        return res;  
    }  
}
```

The screenshot shows a browser window for geeksforgeeks.org/problems/sharing3134/1?page=4&category=Mathematical&status=solved&&sortBy=submissions. The page displays a Java code editor with the provided solution and an output window showing success. The output window includes statistics like 84/84 test cases passed and 3/4 attempts correct, with an accuracy of 75%.

```
// User function Template for Java  
class Solution {  
    static int maxChocolate(int N, int k) {  
        int res=0;  
        for(int i=k;i>0;i--)  
        {  
            int r = N%i;  
            if(r>res)  
            {  
                res=r;  
            }  
        }  
        return res;  
    }  
}
```

Output Window:
Compilation Results: Custom Input Y.O.G.I. (AI Bot)
Problem Solved Successfully ✓
Test Cases Passed: 84 / 84
Attempts : Correct / Total: 3 / 4
Accuracy : 75%

Time Taken: 0.09

You get marks only for the first correct submission if you solve the problem without viewing the full solution.

10 . Replace all 0's with 5

You are given an integer **n**. You need to convert all zeroes of **n** to 5.

```
class Solution {  
    int convertfive(int num)  
    {  
        int n=num;  
        int x=5;  
        if(n==0)  
            return 5;  
        while(n>0)  
        {  
            if(n%10==0)  
            {  
                num=num+x;  
            }  
            n=n/10;  
            x=x*10;  
        }  
        return num;  
    }  
}
```

The screenshot shows a browser window for GeeksforGeeks with the URL [geeksforgeeks.org/problems/replace-all-0s-with-51?page=1&category=Mathematical&status=solved&sortBy=difficulty](https://www.geeksforgeeks.org/problems/replace-all-0s-with-51?page=1&category=Mathematical&status=solved&sortBy=difficulty). The page displays a Java code editor with the provided solution. Below the editor, the 'Compilation Results' section shows 'Problem Solved Successfully' with a green checkmark. It also shows 'Test Cases Passed' as 1115 / 1115, 'Attempts : Correct / Total' as 7 / 12, and 'Accuracy : 58%'. At the bottom, a note says 'You get marks only for the first correct submission if you solve the problem without viewing the full solution.'

```
class Solution {  
    int convertfive(int num)  
    {  
        int n=num;  
        int x=5;  
        if(n==0)  
            return 5;  
        while(n>0)  
        {  
            if(n%10==0)  
            {  
                num=num+x;  
            }  
            n=n/10;  
            x=x*10;  
        }  
        return num;  
    }  
}
```

