GeeksforGeeks Practice (/) BETA

GeeksforGeeks (http://geeksforgeeks.org/)

Special Keyboard

SolvedBy : 492 (solvedby.php?pid=511) Accuracy : 18.68

| dp | (tag-page.php?tag=dp&isCmp=0) |
| recursion | (tag-page.php?tag=recursion&isCmp=0) |

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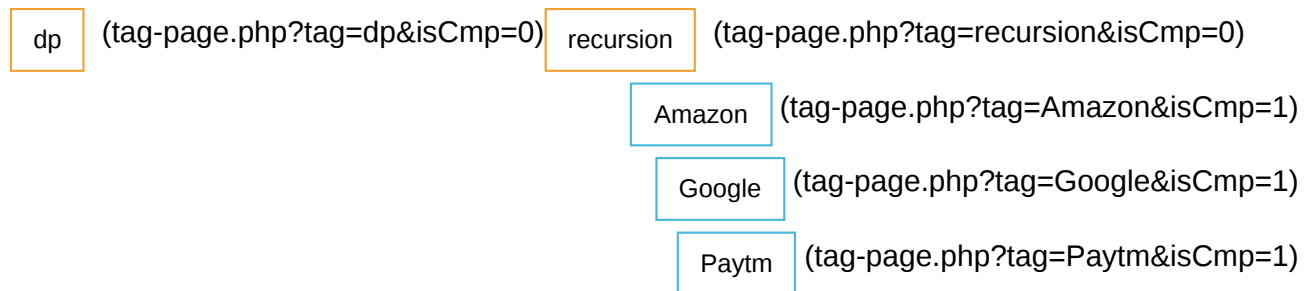
Imagine you have a special keyboard with the following keys:

Key 1: Prints 'A' on screen

Key 2: (Ctrl-A): Select screen

Key 3: (Ctrl-C): Copy selection to buffer

Key 4: (Ctrl-V): Print buffer on screen appending it
            after what has already been printed.

If you can only press the keyboard for N times (with the above four keys), write a program to produce maximum numbers of A's. That is to say, the input parameter is N (No. of keys that you can press), the output is M (No. of As that you can produce).

Input:

The first line of input contains an integer T denoting the number of test cases.
The first line of each test case is N,N is the number of key.

Output:

Print maximum number of A's. Print -1, if N is greater than 75.

Constraints:

1 ≤ T ≤ 50
1 ≤ N ≤ 75

Example:

Input:
2
3
7

Output:
3
9

Explanation:

Input: N = 3
Output: 3
We can at most get 3 A's on screen by pressing
following key sequence.
A, A, A

Input: N = 7
Output: 9
We can at most get 9 A's on screen by pressing
following key sequence.
A, A, A, Ctrl A, Ctrl C, Ctrl V, Ctrl V

For More Examples Use Expected Output

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(http://www.geeksforgeeks.org/how-to-begin-with-competitive-programming/)and How to Pick
a Category? (http://www.practice.geeksforgeeks.org/pickACategory.php)

C(gcc 4.8.4)	C++(gcc 4.8.4)	Java(1.8)	Python(2.7)

Theme Light ▼   Set Default Code (edit-profile.php)

```
1  #include <stdio.h>
2
3  int main() {
4      //code
5      return 0;
6  }
```

Result:

Submit	Test	Expected Output	Save Code

Editorial (editorial.php?pid=511)

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Need help with your code? Please use code.geeksforgeeks.org (http://code.geeksforgeeks.org)**,
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24 Comments   **GeeksforGeeks Practice**   ● **Shubhanshu Soni** ⌄

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⬤   **Sheng Wang** • 8 months ago
     the answer for n=79 should be 4294967296.why is it 2013265920?
     1 ⌃ | ⌄ • Reply • Share ›

        ⬤   **Practice Help** ➜ Sheng Wang • 8 months ago
             Can you please explain how did you get the answer as 4294967296 for
             n=79.
             ⌃ | ⌄ • Reply • Share ›

               ⬤   **Sheng Wang** ➜ Practice Help • 8 months ago
                    I just can't understand that if the answer for n=76 is 1811939328
                    which means the answer for n=79 should at least be 2 times larger
                    by pressing 3 keys (2,3,4) after 76th operation,but for n=79 it is only
                    2013265920.So I modified the type to 'long long int' and got that
                    number.There must be some overflow in the calculation i think.
                    2 ⌃ | ⌄ • Reply • Share ›

               ⬤   **vivek** ➜ Practice Help • 7 months ago
                    I agree with **@Sheng Wang** .
                    Also , 1 more observation to note here is that => the maximum value
                    for a given value of n , always come from n-4th or n-5th . So, we
                    could devise an O(n) solution instead of O(n^2) (this is for all n > 6).
                    ⌃ | ⌄ • Reply • Share ›

                       ⬤   **shally** ➜ vivek • 4 months ago
                            can you please explain how could we sure that maximum
                            value always come from n-4 or n-5? If this is true then we

have to consider only these values instead of checking all the
way from n-3 to 1 !!

∧ | ∨ • Reply • Share ›

bangu • a month ago

i got the error for n=62 while submitting(no output value) but it runs perfectly and
gives correct answer for n=62 when i run it.

∧ | ∨ • Reply • Share ›

GeeksforGeeks Mod ➔ bangu • a month ago

Debug your code for multiple test cases like below

3
23
62
11

And make sure that you reset your variable after every test case.

∧ | ∨ • Reply • Share ›

Shankar Kshetry • a month ago

Used : DP +Math

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kumar • a month ago

Please update the constraints. for some test cases N seems to be larger than 75.

Constraints:
1 ≤ T ≤ 50
1 ≤ N ≤ 75

∧ | ∨ • Reply • Share ›

GeeksforGeeks Mod ➔ kumar • a month ago

Kumar, we checked the test cases. There is no test case outside constraint.
We have added a check in expected output though.

∧ | ∨ • Reply • Share ›

kumar ➔ GeeksforGeeks • a month ago

of course there is . if i use array[76] it gives TLE. and when i increase
the arraySize i got AC.

∧ | ∨ • Reply • Share ›

shubham goyal • 2 months ago

what should be the answer for n=11?

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> **bangu** ➔ shubham goyal • a month ago
>
> 27
>
> ∧ | ∨ • Reply • Share ›

vidit mathur • 2 months ago

cant understand why i am getting expected time limit < 0.05 sec

∧ | ∨ • Reply • Share ›

Harkamwaljeet Singh Kataria • 2 months ago

Could someone explain the issue "Expected Time Limit < 0.15sec" while i try to submit my code?

∧ | ∨ • Reply • Share ›

> **Amit Khandelwal** ➔ Harkamwaljeet Singh Kataria • 2 months ago
>
> Hey, can you please share your code.
>
> ∧ | ∨ • Reply • Share ›
>
> > **Harkamwaljeet Singh Kataria** ➔ Amit Khandelwal • 2 months ago
> >
> > import java.util.*;
> > import java.lang.*;
> > import java.io.*;
> >
> > class GFG {
> > private static HashMap<integer, long=""> valuesMap = new HashMap<>();
> >
> > public static void main (String[] args) {
> > Scanner scanner = new Scanner(System.in);
> > int numberOfCases = scanner.nextInt();
> > for(int i=0;i<numberofcases;i++){ int=""
> > currentcase="scanner.nextInt();" for(int="" j="1;j<=currentCase;j++)
> > {" valuesmap.put(j,="" getvalue(j));="" }=""
> > system.out.println(valuesmap.get(currentcase));="" }=""
> > scanner.close();="" }="" private="" static="" long="" getvalue(int="" n)
> > {="" if(n="" <="6){" return="" n;="" }else{="" long="" max="0L;" int=""
> > counter="2;" for(int="" i="n-3;i">1;i--){
> > if(max <= valuesMap.get(i)*counter){
> > max = valuesMap.get(i)*counter;
> > }else{
> > break;
> > }

```
                counter++;
                }
                return max;
                }
                }
                }
```
∧ | ∨ • Reply • Share ›

AllergicToBitches • 3 months ago

How is his question falls under easy category, I fail to understand..
Original post itself has average difficulty : 4.3/5.0 based on 50 votes.

∧ | ∨ • Reply • Share ›

GeeksforGeeks Mod ➜ AllergicToBitches • a month ago

Thanks for the feedback. We have changed category of this question.

∧ | ∨ • Reply • Share ›

shally • 4 months ago

{"IGNORE"}

{sorry, this solution works only till n=12 so i was thinking wrong... an it seems to have no delete option so i am just tagging it as "IGNORE"}

I am getting a relation based on the expected output test cases ie.

A[n]=A[n-3]+A[n-4]+A[n-5];

I checked till n=10 it seems to be working fine... but giving wrong output for n=59... i know question cant be that simple but if anyone can explain why its not giving correct answer for n=59 would be really helpful.

∧ | ∨ • Reply • Share ›

Varun Bansal ➜ shally • 3 months ago

no a linear solution wouldn't work.That would mean we hit the key 'A' a couple of times,then we use CTRL+A,CTRL+C and then CTRL+V for the remaining terms.But we can also hit the key 'A' a few times,then CTRL+A,CTRL+C,CTRL+V and then again use CTRL+A,CTRL+C.Linear solution
doesnt take this into account.It will give correct answers only till 10.

∧ | ∨ • Reply • Share ›

Rahul kuamr • 5 months ago

int fun(int n,int bf,int edge)
{
if(n>=1&&n<=5)
{
return n;
}
else

else
{
//at distance 4 or 5 we will do two time and maximum use of buffer bf-> buffer
return max(2*(bf=fun(n-4,bf,4))+bf,2*(bf=fun(n-5,bf,5))+2*bf);
}
how i can make it best efficient program

∧ | ∨ • Reply • Share ›

BlahBlahBlah → Rahul kuamr • 3 months ago
1. Pass only the most required parameters in recursion.
2. Memoise your solution.

∧ | ∨ • Reply • Share ›

varun kunchakuri • 8 months ago
these are the outputs generated by using expected output and you can see at the
end that they are not increasing i think they should be increasing and the error is
because of over flow

1

2

3

4

5

6

9

12

Leaderboard (ranking.php)		
1	张昆玮 (user-profile.php?user=张昆玮)	1518
2	vishu5090 (user-profile.php?user=vishu5090)	1289
3	kulli_d_coder (user-profile.php?user=kulli_d_coder)	1161
4	sanjaykumar9 (user-profile.php?user=sanjaykumar9)	1136
5	Aditya Goyal (user-profile.php?user=Aditya Goyal)	1124
1261	shubhpy (user-profile.php?user=shubhpy)	101

More>> (ranking.php)

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Flipkart (tag-page.php?tag=Flipkart&isCmp=1)

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dp (tag-page.php?tag=dp&isCmp=0)

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