



**PRACTICE** ([HTTPS://WWW.CODECHEF.COM/PROBLEMS/SCHOOL/?ITM\\_MEDIUM=NAVMENU&ITM\\_CAMPAIGN=PROBLEMS\\_HEAD](https://www.codechef.com/problems/school/?itm_medium=navmenu&itm_campaign=problems_head))

**COMPETE** ([HTTPS://WWW.CODECHEF.COM/CONTESTS/?ITM\\_MEDIUM=NAVMENU&ITM\\_CAMPAIGN=ALLCONTESTS\\_HEAD](https://www.codechef.com/contests/?itm_medium=navmenu&itm_campaign=allcontests_head))

**LEARN** ([HTTPS://WWW.CODECHEF.COM/LEARNING?ITM\\_MEDIUM=NAVMENU&ITM\\_CAMPAIGN=DISCUSS\\_HEAD](https://www.codechef.com/learning?itm_medium=navmenu&itm_campaign=discuss_head))

**DISCUSS** ([HTTPS://DISCUSS.CODECHEF.COM?ITM\\_MEDIUM=NAVMENU&ITM\\_CAMPAIGN=PROBLEMS\\_HEAD](https://discuss.codechef.com?itm_medium=navmenu&itm_campaign=problems_head))

**ASSOCIATE WITH US** ([HTTPS://WWW.CODECHEF.COM/CORPORATES](https://www.codechef.com/corporates))

**MORE** ([HTTPS://WWW.CODECHEF.COM/RATINGS/ALL](https://www.codechef.com/ratings/all))

[Home \(/\)](#) » [Compete \(/contests/\)](#) » [CodeChef Starters 25 Division 3 \(Rated\) \(/START25C\)](#) » Building Towers

# Building Towers

Problem Code: **TOWERTOP**

Submit (Practice) (/submit/TOWERTOP)



Chef is given a contract to build towers in Chefland which are made by stacking blocks one above the other. Initially, there is only 1 block in the inventory and no tower has been built. Chef follows the following 2 steps in each operation:

- Either build a new tower or update an existing tower that has been built in previous operations using **any** number of blocks currently present in the inventory. After this step, the size of the inventory reduces by the number of blocks used.
- Suppose the tower Chef updated or built has  $B$  blocks **after the step**, Chef gets to add  $B$  new blocks to the inventory as a reward.

Find the **maximum** number of towers of height  $X$  that Chef can build in  $M$  operations.

**Note:** Tower of height  $X$  means that the tower consists of  $X$  blocks placed one above the other.

## Input Format

- First line will contain  $T$ , number of test cases. Then the test cases follow.
- Each test case contains a single line of input, two space separated integers  $X, M$ .

## Output Format

For each test case, output a single integer, the maximum number of towers that Chef can build.

## Constraints

- $1 \leq T \leq 100$
- $1 \leq X \leq 10^9$
- $0 \leq M \leq 10^{17}$

## Sample Input 1

```
4
2 1
2 2
2 3
53 7
```

## Sample Output 1

```
0
1
2
1
```

## Explanation

My Submissions

(/START25C/status/TOWERTOP)

All Submissions

(/START25C/status/TC)

## Successful Submissions



## Video Solution

New!

Tried this problem but couldn't solve it? Check the detailed explanation by our expert educators.

TOWERTOP | BUILDING T...



## Discussions

See all discussions related to this problem on the discussion forum.

See Discussions

([https://discuss.codechef.com/search?](https://discuss.codechef.com/search?q=TOWERTOP)

q=TOWERTOP)

### Test Cases 1, 2 and 3:

- Operation 1:
  - Remove 1 block from the inventory and build a new tower of height 1 after which the inventory becomes empty.
  - Add 1 block to the inventory after which the inventory has only 1 block.
- Operation 2:
  - Remove 1 block from the inventory and update the tower of height 1 to  $1 + 1 = 2$  after which the inventory becomes empty.
  - Add 2 blocks to the inventory after which the inventory has only 2 blocks.
- Operation 3:
  - Remove 2 blocks from the inventory and build a new tower of height 2 after which the inventory becomes empty.
  - Add 2 blocks to the inventory after which the inventory has only 2 blocks.

So after operation 1, there is no tower of height 2 built, after operation 2, there is a single tower of height 2 built and after operation 3, 2 towers of height 2 are built.

### Test Case 4:

- Operation 1:
  - Remove 1 block from the inventory and build a new tower of height 1 after which the inventory becomes empty.
  - Add 1 block to the inventory after which the inventory has only 1 block.
- Operation 2:
  - Remove 1 block from the inventory and update the tower of height 1 to  $1 + 1 = 2$  after which the inventory becomes empty.
  - Add 2 blocks to the inventory after which the inventory has only 2 blocks.
- Operation 3:
  - Remove 2 blocks from the inventory and update the tower of height 2 to  $2 + 2 = 4$  after which the inventory becomes empty.
  - Add 4 blocks to the inventory after which the inventory has only 4 blocks.
- Operation 4:
  - Remove 4 blocks from the inventory and update the tower of height 4 to  $4 + 4 = 8$  after which the inventory becomes empty.
  - Add 8 blocks to the inventory after which the inventory has only 8 blocks.
- Operation 5:
  - Remove 8 blocks from the inventory and update the tower of height 8 to  $8 + 8 = 16$  after which the inventory becomes empty.
  - Add 16 blocks to the inventory after which the inventory has only 16 blocks.
- Operation 6:
  - Remove 16 blocks from the inventory and update the tower of height 16 to  $16 + 16 = 32$  after which the inventory becomes empty.
  - Add 32 blocks to the inventory after which the inventory has only 32 blocks.
- Operation 7:
  - Remove 21 blocks from the inventory and update the tower of height 32 to  $32 + 21 = 53$  after which the inventory has  $32 - 21 = 11$  blocks remaining.
  - Add 53 blocks to the inventory after which the inventory has  $53 + 11 = 64$  blocks in total.

So after 7<sup>th</sup> operation we are able to achieve one tower of height 53.

Editorial: <https://discuss.codechef.com/problems/TOWERTOP>  
(<https://discuss.codechef.com/problems/TOWERTOP>)

Tags: Tags are hidden. [Show temporarily](#)

---

Update this setting in [edit profile](#)  
([/users/hariprakash\\_s/edit#additional\\_info](/users/hariprakash_s/edit#additional_info)).

Problem level: Simple

Date Added: 29-01-2022

Time Limit: 1 secs

Source Limit: 50000 Bytes

Languages: CPP17, PYTH 3.6, JAVA, C, CPP14, PYTH, PYP3, CS2, ADA, PYPY, TEXT, PAS fpc, NODEJS, RUBY, PHP, GO, HASK, TCL, kotlin, PERL, SCALA, LUA, BASH, JS, rust, LISP sbcl, PAS gpc, BF, CLOJ, R, D, CAML, swift, FORT, ASM, FS, WSPC, LISP clisp, SQL, SCM guile, PERL6, ERL, CLPS, PRLG, SQLQ, ICK, NICE, ICON, COB, SCM chicken, PIKE, SCM qobi, ST, NEM

---

[Submit \(Practice\) \(/submit/TOWERTOP\)](/submit/TOWERTOP)

## Comments ▶

---

[CodeChef is a competitive programming community](#)

[About CodeChef \(/aboutus/\)](/aboutus/) [Contact Us \(/contactus/\)](/contactus/)

The time now is: 07:51:27 PM  
Your IP: 49.204.112.198

CodeChef uses SPOJ © by [Sphere Research Labs \(https://www.sphere-research.com\)](https://www.sphere-research.com)  
In order to report copyright violations of any kind, send in an email to [copyright@codechef.com](mailto:copyright@codechef.com) (<mailto:copyright@codechef.com>).

### [CodeChef \(/\)](/) - A Platform for Aspiring Programmers

CodeChef was created as a platform to help programmers make it big in the world of **algorithms**, **computer programming**, and **programming contests**. At CodeChef we work hard to revive the geek in you by hosting a **programming contest** at the start of the month and two smaller programming challenges at the middle and end of the month. We also aim to have training sessions and discussions related to **algorithms**, **binary search**, technicalities like **array size** and the likes. Apart from providing a platform for **programming competitions**, CodeChef also has various algorithm tutorials and forum discussions to help those who are new to the world of **computer programming**.

### [Practice Section \(/problems/easy/\)](/problems/easy/) - A Place to hone your 'Computer Programming Skills'

Try your hand at one of our many practice problems and submit your solution in the language of your choice. Our **programming contest** judge accepts solutions in over 55+ programming languages. Preparing for coding contests were never this much fun! Receive points, and move up through the CodeChef ranks. Use our practice section to better prepare yourself for the multiple **programming challenges** that take place through-out the month on CodeChef.

### [Compete \(/contests/\)](/contests/) - Monthly Programming Contests, Cook-off and Lunchtime

Here is where you can show off your **computer programming skills**. Take part in our 10 days long monthly coding contest and the shorter format Cook-off and Lunchtime **coding contests**. Put yourself up for recognition and win great prizes. Our **programming contests** have prizes worth up to INR 20,000 (for Indian Community), \$700 (for Global Community) and lots more CodeChef goodies up for grabs.

Programming Tools	Practice Problems	Initiatives	Policy
<a href="#">Online IDE (/ide)</a>	<a href="/problems/easy/">Easy (/problems/easy/)</a>	<a href="/goforgold/">Go for Gold (/goforgold)</a>	<a href="/terms/">Terms of Service (/terms/)</a>
<a href="/contests#future-contests">Upcoming Coding Contests (/contests#future-contests)</a>	<a href="/problems/medium/">Medium (/problems/medium/)</a>	<a href="/school/">CodeChef for Schools (/school)</a>	<a href="/privacy-policy/">Privacy Policy (/privacy-policy/)</a>
<a href="/hostyourcontest">Contest Hosting (/hostyourcontest)</a>	<a href="/problems/hard/">Hard (/problems/hard/)</a>	<a href="/college-chapters/">College Chapters (/college-chapters)</a>	<a href="/refund-policy/">Refund Policy (/refund-policy/)</a>
<a href="/problemsetting">Problem Setting (/problemsetting)</a>	<a href="/problems/challenge/">Challenge (/problems/challenge/)</a>	<a href="https://business.codechef.com">CodeChef for Business (https://business.codechef.com)</a>	<a href="/codeofconduct/">Code of Conduct (/codeofconduct/)</a>
<a href="/wiki/tutorials">CodeChef Tutorials (/wiki/tutorials)</a>	<a href="/problems/extcontest">Peer (/problems/extcontest)</a>		<a href="/bug-bounty-pro">Bug Bounty Program (/bug-bounty-pro)</a>
<a href="/wiki">CodeChef Wiki (/wiki)</a>	<a href="/problems/school/">School (/problems/school/)</a>		
	<a href="/wiki/faq">FAQ's (/wiki/faq)</a>		