DS and OOP

lab2

Question 1 (30%)

Given two positive integers which are less than 2^31-1, please find the

Greatest Common Divisor.

Format

input format:

# of testing data

[positive integer1] [positive integer2]

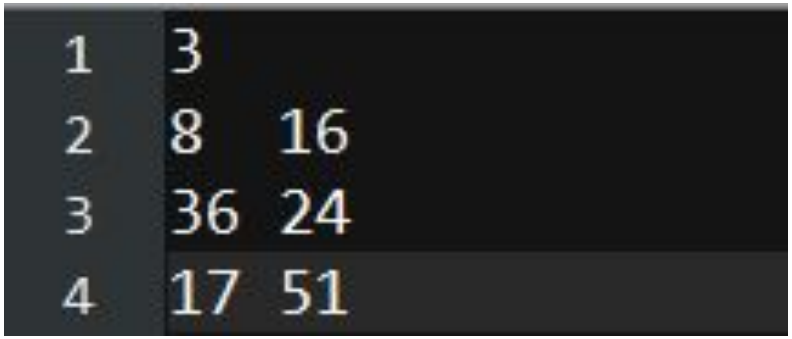
(2 positive integers are seperated by space.)

output format:

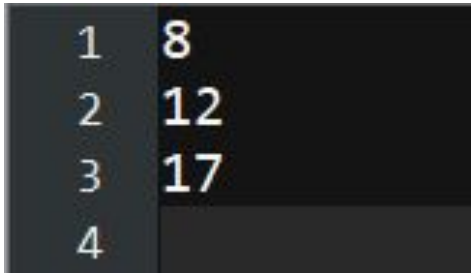
[Greatest Common Divisor]

Example

input:



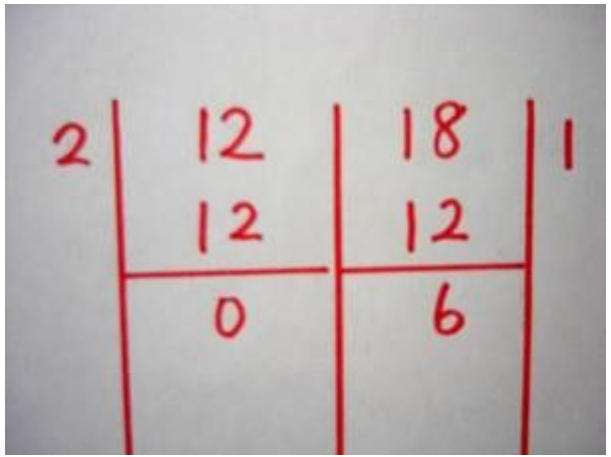
output:



Requirements

1. Read input from `stdin` and output to `stdout`
2. Use your workstation to run your code
3. Your program must terminate correctly.

Hint:



Question 2 (30%)

Every decimal number has a binary representation. If a bit of a number is “1” and its next bit is also “1” then we can say that the number has a 1 adjacent bit.

For examples:

Number	Binary Representation	# of 1 adjacent bit	# of trailing zeros
12	1100	1	2
15	1111	3	0
54	110110	2	1

Find out how many times this scenario occurs and # of trailing zeros for N.

Format

input format:

[value of N] // where 0 < N <= 2^32 -1

[value of N]

...

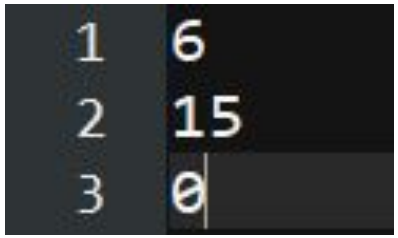
0 // means no more input and your program should terminate.

output format:

[Times of 1 adjacent occurs for N] [# of Trailing zeros for N]

Example

Input:

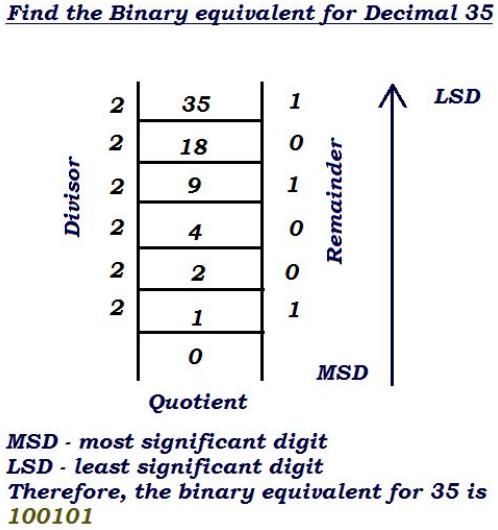


output:

Requirements

1. Read input from `stdin` and output to `stdout`
2. Use your workstation to run your code
3. Your program must terminate correctly.

Hint:



Question 3 (40%)

You are given a map in form of a two-dimensional integer grid where 1 represents land and 0 represents water. Please determine the perimeter of the island.

Constrains of the Island:

1. There is exactly one island.
2. Grid cells are connected horizontally/vertically (not diagonally).
3. The grid is completely surrounded by water
4. The island doesn't have "lakes" (No “0” is surrounded by “1”).
5. One cell is a square with side length 1. The grid is rectangular, width and height don't exceed 100.

Format

input format:

# of testing data

[height of first map] [weight of first map]

[first row of map]

...

output format:

[The perimeter of first island]

[The perimeter of second island]

Example

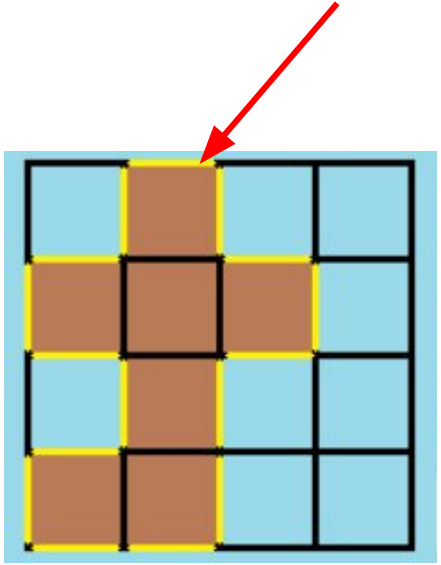
Input:

```
1
4 4
0 1 0 0
1 1 1 0
0 1 0 0
1 1 0 0

```

output:

```
16

```

which indicate:



Requirements

1. Read input from `stdin` and output to `stdout`
2. Use your workstation to run your code
3. Your program must terminate correctly.
4. Output format must be exactly the same as mentioned.

Reference

Putty:
https://help.cs.nctu.edu.tw/help/index.php/HOWTO_-_%E4%BD%BF%E7%94%A8PuTTY%E7%99%BB%E5%85%A5%E7%B3%BB%E4%B8%8A%E5%B7%A5%E4%BD%9C%E7%AB%99

Filezilla:
https://help.cs.nctu.edu.tw/help/index.php/HOWTO_-_%E9%80%A3%E4%B8%8A%E7%B3%BB%E4%B8%8A%E5%B7%A5%E4%BD%9C%E7%AB%99%E7%9A%84_FTP

Command line:
http://crasseux.com/books/ctutorial/argc-and-argv.html

Putty

Please connect to:

linux1.cs.nctu.edu.tw

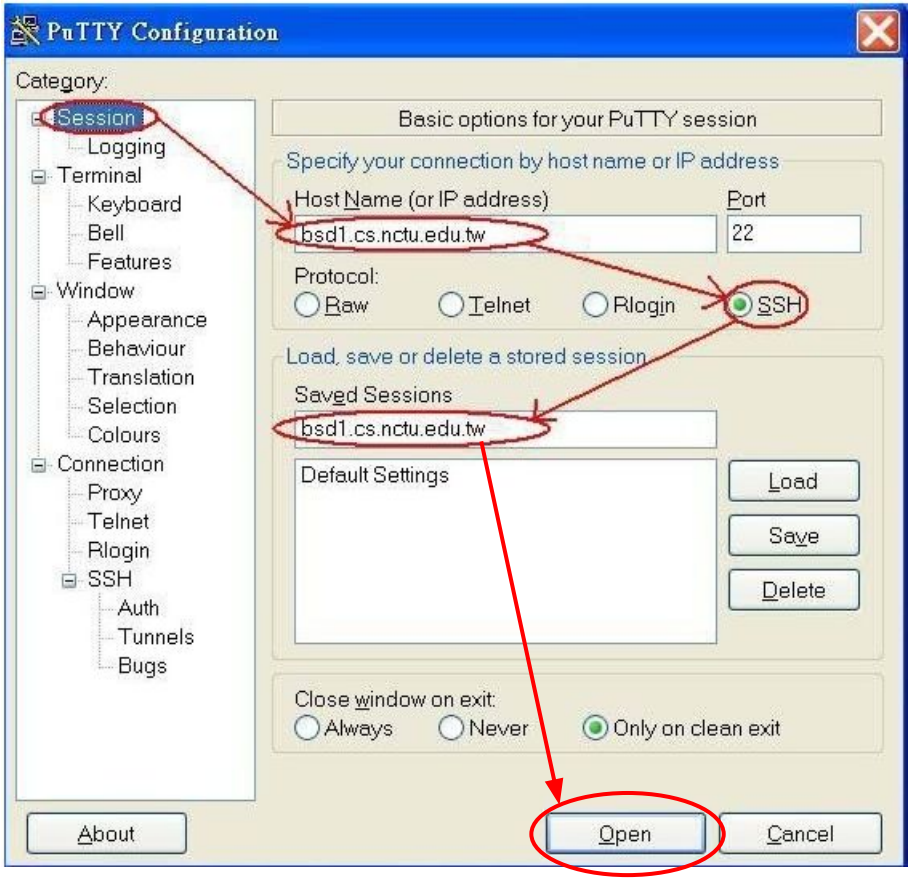
linux2.cs.nctu.edu.tw

linux3.cs.nctu.edu.tw

linux4.cs.nctu.edu.tw

linux5.cs.nctu.edu.tw

linux6.cs.nctu.edu.tw



Download:

https://goo.gl/bFz961

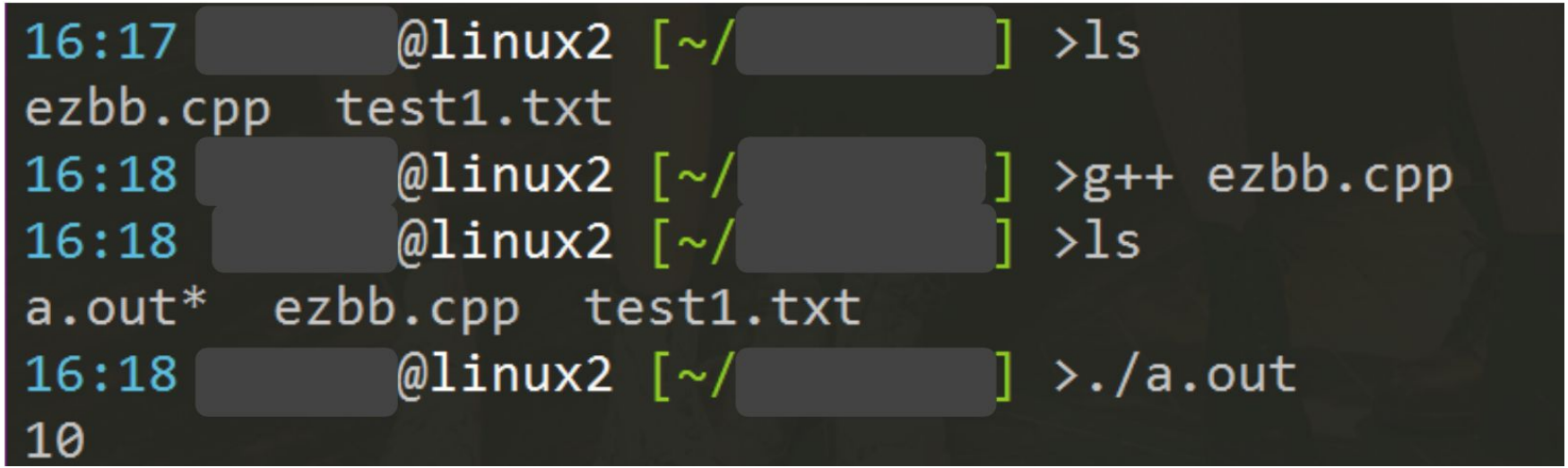
More Settings:

https://goo.gl/y5zc2d

Upload to Work Station

Linux command

command you may use: cd, ls, g++ [-o outputfilename], ./[outputfilename]



* Redirect file to standard input : [executable] < [file] (i.e., ./a.out < input.txt)