Code Wars Intra 2008

Programming

Instructions

- There are *four problems* in this paper. No, they are NOT questions. They are 'problems', because you'll have to sweat it out to solve them.
- The time limit for the event will be announced at the start of the event.
- The weightage of each question is *indicated separately* next to each question. The questions with a lower weightage are easier, and higher weightage are tougher. The problems are arranged in increasing order of difficulty (although you might think differently).
- There is a time bonus for finishing questions early, which will be awarded according to the discretion of the judges.
- There is *no negative marking* for making a *wrong* attempt. However, do check whether your program is working before calling the judges; otherwise, we may get the impression that you're a moron.
- When you think you've solve a problem correctly, raise BOTH of your hands and shout out 'Kevin!'. Anyone who does not follow this rule will get minus five points for being a disobedient brat.
- Best of luck!

Paper created (sort of) by Avani Gupta (programmer, CW batch of 2008). So If you think the paper was too tough (in which case, you shouldn't even think of becoming a Code Warrior) or had mistakes, lynch her.

Event judging by Naman Bagga (programmer, CW batch of 2008). Visit his blog at www.namanb.com for more about him.

Irritating stuff and further technical jiggery-pokery by Ankur Banerjee (president, CW batch of 2008). All flame mails after this event can be sent to him through contact details available on www.ankurb.info

Running Out Of Time?

5 ***points***

You are sitting in front of a mirror and looking at the image of a clock located behind you. You are paralysed, and can't turn around to face the clock. You want to know what time it is, by writing a program to 'translate' the time you see in the image to the actual time.

The clock is a traditional clock with a 12-hour board, without numbers written on it; a minute hand, and an hour hand. The hour hand is shorter than the minute hand, so that you can distinguish them. You are given the time shown in the image, in the format ***HH:MM***, where ***HH*** is the two-digit hour and ***MM*** is the two-digit minute. You may choose to enter the hours and the minutes into two separate integer variables declared as ***HH*** and ***MM***. The hour will be between 00 and 11, inclusive, where 00 represents 12 o'clock. Return a string in the same format denoting the actual time.

Examples

1. ***10:00*** returns ***02:00***
2. ***01:18*** returns ***10:42***

Factorial Factory

10 ***points***

Industrialist Vijay Mallya is highly disappointed with his IPL team's performance. After drinking heavily on McDowell's mineral water throughout the night, he decides (while going to the wash room) to set up a research team to find out the any field of business left (which he hasn't tried already yet) from which he can make money. The team spends a lot of time having a good time, and then finally decides to suggest setting up a research laboratory in mathematics. To start with, the laboratory decides to do a research project on factorials. They decide to outsource the coding work to you.

A factorial is denoted by ***x!*** (pronounced as 'ex factorial'), where ***x*** is any whole number. ***x!*** is defined as the *product all numbers starting from 1 to* ***x***. For example, 4! = 4.3.2.1; 5! = 5.4.3.2.1; and so on. Cook up a piece of code that determines the number of trailing zeros in the factorial an integer variable ***n***.

Examples

1. ***5!*** is 120, thus, it has ***1*** trailing zero.
2. ***8!*** is 40320, thus, it has ***1*** trailing zero.

Sticky Business

15 ***points***

The makers of the adhesive Fevicol are having a really bad time. Ever since that Vodafone ad came out in which a resourceful kid gets her dog to lick stamps (and then stick them on envelopes), the sales of Fevicol have fallen drastically. That's because every sane (and even some insane) people have now acquired cute dogs of their own, and are using them for any future adhesive needs.

You happen to be an ambitious executive (formerly working with the Dolmansaxlil Shoe Corporation) in Fevicol's parent company. Mysteriously, you also know C++ programming. You decide to hold a publicity stunt, by making extremely large rectangles using Fevicol and ice-cream sticks. How exactly this will boost sales is unclear even to you, but you're quite confident that *something* must have been written about this sort of gimmick in management books like *Count Your Chickens AFTER They Hatch (But Before They Run Away).*

You have ***n*** sticks (***n*** is any positive integer), one-inch each in size. You also have many bottles of Fevicol. Before beginning on your massive publicity stunt, you decide to write a program to *calculate the area of the biggest rectangle* you can form using the sticks you have. You can use all the sticks or some of them. For example, if you have 11 sticks, you can create a 2-inch x 3-inch rectangle using 10 sticks. This rectangle has an area of 6 square inches, which is the biggest area that can be achieved in this case. In case you didn't figure out how much the final area of that rectangle would be without us telling it, you *really* shouldn't be giving this paper.

Examples

1. ***5*** sticks can be used to make a rectangle with a maximum area of ***1*** square inches. (And before you ask a stupid question, a square is *also* a rectangle, dumbass.)

Cut It Out, Will You?

20 ***points***

Recently, a planet called 'Orkut' has been discovered in the outlying regions of our solar system. The alien inhabitants of this planet have a strange obsession with not following the rules of English grammar. Why this should be a problem with *us* – they're an alien species after all – will not be made clear at the moment to increase the universal level of mystery and irritation. Most aliens on the planet Orkut like to extra-emphasize their statements by using multiple exclamation points instead of one. For instance, *"This C++ problem is really great!!! I like exclamation points!!!!!!!!"*. At other times (when they're drinking tea), the aliens express surprise by mixing exclamation points and question marks. For instance, *"You really like THIS tea!?!?!?!!!?"*.

The Code Warriors would like to ensure that diplomatic relations of Earth with planet Orkut don't get soured by a misinterpreted statement of the aliens. Scientific studies have demonstrated that diplomats (and diplomatresses) understand statements better when extra punctuation marks are NOT used. To this effect, we ask you to create a program to get rid of the extra punctuation present in communications from the aliens. Wherever you see a group of multiple consecutive exclamation points, replace it with a single exclamation point. Wherever you see a group of multiple consecutive punctuation characters containing at least one question mark and zero or more exclamation points (and no other characters), replace that group with a single question mark. Display the final result after the changes have been made.

Examples

1. *"This book is really great!!!!!"* » *"This book is really great!"*
2. *"You really like THIS tea!?!?!?!!!?"* » *"You really like THIS tea?"*
3. *" !!?X! ?? This whole event is ridiculous!!! ??!a!?!"* » *" ?X! ? This is whole event is ridiculous! ?a?"*