Question 1. You are planning a car trip so you post on a carpooling website in order to share the cost of the trip.

If you have 0 passengers the carpool site does not charge anything and you alone pay the full cost of the trip. If you have 1 or more passengers the carpool site adds a $1 fee to the cost of the trip and evenly divides the total cost ($1 fee + gas) among the passengers and you. You want to write a program that calculates the cost you have to pay. The program should read the number of passengers (an integer) and the cost of gas for the trip (a decimal number). The program should then print the cost that you have to pay (a decimal number) with 2 digits after the decimal point.

Examples

Input

0 23.9

Output

23.90

Input

2 45.5

Output

15.50

Input

3 34.8

Output

8.95

Question 2. he hostel in which you plan to spend the night tonight offers very interesting rates, as long as you do not arrive too late. Housekeeping finishes preparing rooms by noon, and the sooner guests arrive after noon, the less they have to pay. You are trying to build a C program that calculates your price to pay based on your arrival time.

Your program will read an integer (between 0 and 12) indicating the number of hours past noon of your arrival. For example, 0 indicates a noon arrival, 1 a 1pm arrival, 12 a midnight arrival, etc. The base price is 10 dollars, and 5 dollars are added for every hour after noon. Thankfully the total is capped at 53 dollars, so you'll never have to pay more than that. Your program should print the price (an integer) you have to pay, given the input arrival time.

### Example 1

#### Input

7

#### Output

45

### Example 2

#### Input

10

#### Output

53

Question 3.

You arrive in front of a bridge that you must cross to reach a village before dark. Crossing the bridge is not free - the bridgekeeper asks you to roll two dice to determine the cost. You decide to write a program to verify that he is charging the right price.

Your program should read two integers, between 1 and 6, representing the values of each die. If the sum is greater than or equal to 10, then you must pay a special fee (36 coins). Otherwise, you pay twice the sum of the values of the two dice. Your program must then display the text "Special tax" or "Regular tax" followed by the amount you have to pay on the next line.

### Example

#### Input

5  
6

#### Output

Special tax  
36

#### Input

4  
3

#### Output

Regular tax  
14

Question 4. You decide to bet on the final match of the Tug of War National Championship.

Prior to the match the names and weights of the players are presented, alternating by team (team 1 player 1, team 2 player 1, team 1 player 2, and so on). There is the same number of players on each side. You record the player weights as they are presented and calculate a total weight for each time to inform your bet. You write a C program to assist with this.

Your program should first read an integer indicating the number of members per team. Then, the program should read the player weights (integers representing kilograms) alternating by team.

After calculating the total weight of each team, the program should display the text "Team X has an advantage" (replacing X with 1 or 2 depending on which team has a greater total weight).

You will then display the text "Total weight for team 1:" followed by the weight of team 1, then "Total weight for team 2:" followed by the weight of team 2 (see example below).

You are guaranteed that the two teams will not have the same total weight.

### Example

Each team is composed of four players. Those of the first weigh 110, 113, 112, and 117kg, while those of the second weigh 106, 102, 121, and 111kg. Team 1 weighs a total of 452kg whereas team 2 weighs a total of 440kg, giving team 1 an advantage.

#### Input

4  
110  
106  
113  
102  
112  
121  
117  
111

#### Output

Team 1 has an advantage  
Total weight for team 1: 452  
Total weight for team 2: 440

Question 5. The hostel in which you stop for the night changes its prices according to the age of the customer and the weight of their luggage. The rules are not very clear, so you decide to write a small program that will easily allow you and your travel companions to know the price of one night.

One room costs nothing if you are 60 (the age of the innkeeper), or 5 dollars if you are less than 10 years old. For everyone else, the cost is 30 dollars plus an additional 10 dollars if you bring more than 20 pounds of luggage. Your program should read the customer's age first, then the weight of their luggage, then output the price they have to pay.

### Example

#### Input:

22  
25

#### Output:

40

Questions 6. As you cross a forest you can't help but admire the nature around you including the many species of trees. Despite your interest, you are a very unskilled botanist and have a lot of trouble identifying different trees. A friend gives you some guidance and you decide to write a program that will give you the name of the tree based on its characteristics.

There are 4 types of trees:

the "Tinuviel" is **5 meters high or less** and its leaves are composed of **8 or more leaflets**

the "Calaelen" is **10 meters high or more** and its leaves are composed of **10 or more leaflets**

the "Falarion" is **8 meters high or less** and its leaves are composed of **5 or fewer leaflets**

the "Dorthonion" is **12 meters tall** **or more** and its leaves are composed of **7 or fewer leaflets**

Your program should read the height and the number of leaflets of a given tree (both integers), and should be able to determine and display the name of the corresponding tree.  If the height and number of leaflets does not match any of the tree type descriptions, your program should display "Uncertain".

### Example 1

#### Input

12  
12

#### Output

Calaelen

### Example 2

#### Input

4  
9

#### Output

Tinuviel

### Example 3

#### Input

4  
6

#### Output

Uncertain

Question 7. Your grandparents gave you a fantastic cooking recipe but you can never remember how much of each ingredient you have to use! There are 10 ingredients in the recipe and the quantities needed for each of them are given as input (in grams). Your program must read 10 integers (the quantities needed for each of the ingredients, in order) and store them in an array. It should then read an integer which represents an ingredient's ID number (between 0 and 9), and output the corresponding quantity.

### Example

#### Input:

500 180 650 25 666 42 421 1 370 211  
3

#### Output:

25

Question 8. You are responsible for a rail convoy of goods consisting of several boxcars. You start the train and after a few minutes you realize that some boxcars are overloaded and weigh too heavily on the rails while others are dangerously light. So you decide to stop the train and spread the weight more evenly so that all the boxcars have exactly the same weight (without changing the total weight). For that you write a program which helps you in the distribution of the weight.

Your program should first read the number of cars to be weighed (integer) followed by the weights of the cars (doubles). Then your program should calculate and display how much weight to add or subtract from each car such that every car has the same weight. The total weight of all of the cars should not change. These additions and subtractions of weights should be displayed with one decimal place.

You may assume that there are no more than 50 boxcars.

### Example 1

In this example, there are 5 boxcars with different weights summing to 110.0. The ouput shows that we are modifying all the boxcars so that they each carry a weight of 22.0 (which makes a total of 110.0 for the entire train). So we remove 18.0 for the first boxcar, we add 10.0 for the second, we add 2.0 for the third, etc.

#### Input

5  
40.0  
12.0  
20.0  
5.0  
33.0

#### Output

-18.0  
10.0  
2.0  
17.0  
-11.0

Question 9. ou plan to make a delicious meal and want to take the money you need to buy the ingredients. Fortunately you know in advance the price per pound of each ingredient as well as the exact amount you need. The program should read in the number of ingredients (up to a maximum of 10 ingredients), then for each ingredient the price per pound. Finally your program should read the weight necessary for the recipe (for each ingredient in the same order). Your program should calculate the total cost of these purchases, then display it with 6 decimal places.

### Example

There are 4 ingredients and they all have a different price per pound: 9.90, 5.50, 12.0, and 15.0. You must take 0.25 lbs of the first, 1.5 lbs of the second, 0.3 lbs of the third and 1 lb of the fourth. It will cost exactly $29.325000.

#### Input:

4  
9.90 5.50 12.0 15.0  
0.250 1.5 0.300 1.0

#### Output:

29.325000

Question 10. You want to determine the number of cities in a given region that have a population strictly greater than 10,000. To do this, you write a program that first reads the number of cities in a region as an integer, and then the populations for each city one by one (also integers).

### Example

#### Input

6  
1000  
5000  
15000  
4780  
0  
23590

#### Output

2

Question 11. Create a program that displays on the screen a square of n x n stars, with the integer n given as an input.

### Examples

#### Input:

5

#### Output:

\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*

#### 

#### Input:

3

#### Output:

\*\*\*  
\*\*\*  
\*\*\*

Question 12. Much of the work of a university administration (in addition to managing teachers, researchers, students, courses, etc.) is to ensure the proper functioning of the university and in particular that the accounting job is well done. Once a year, an annual report of expenditures must be made.

All expenses for the year have been recorded and classified in a multitude of files and the sum of all these expenses must now be calculated. But no one knows exactly how many different expenses have been made in the past year!

Your program will have to read a sequence of positive integers and display their sum. We do not know how many integers there will be, but the sequence always ends with the value -1 (which is not an expense, just an end marker).

### Example 1

#### Input

1000  
2000  
500  
-1

#### Output

3500

### Example 2

#### Input

-1

#### Output

0

### Example 3

#### Input

150  
250  
350  
4500  
240  
120  
-1

#### Output

5610

Question 13. In order to be able to better fight various epidemics in a region, the department of medicine of a major university has launched a large study. Researchers are interested in how fast an epidemic spreads, and therefore the speed at which health measures must be put in place. Your program should first read an integer representing the total population of the area. Knowing that a person was infected on day 1 and that each infected person contaminates two new people every day, you must calculate the day at which the entire population of the area will be infected.

### Examples

For a total population of 3 inhabitants, on day 1 a single person is infected. The next day, that person contaminates 2 new people so there are 3 infected people in total. This is the entire population, so it takes 2 days to contaminate the entire population.

#### Input:

3

#### Output:

2

For a total population of 10 inhabitants, on day 1 a single person is infected. This is followed by 2 new people on the second day for a total of 3 infected people. On the third day,  6 new people are infected for a total of 9 infected people. On the fourth day the last of the 10 people is infected (though the epedemic had the potential to infect 18 people on the fourth day) so your program should output '4'.

#### Input:

10

#### Output:

4

Question 14. We would like you to develop a program capable of making a child play automatically the game of "more or less" -- the child must try to guess a secret number. The program should respond to each guess with "it is more" or "it is less" until the child finds the right number.

Your program must first read an integer indicating the number that the child will have to find during the game. Next the program should repeatedly read the player's guesses and display the text "it is more" if the child has submitted a smaller number or "it is less" if they have submitted a larger number. Once the correct number is reached, the program should print "Number of tries needed:" followed by a new line and the integer number of tries that it took the guesser.

### Example 1

#### Input

5  
1 2 3 4 5

#### Output

it is more  
it is more  
it is more  
it is more  
Number of tries needed:  
5

### Example 2

#### Input

10  
5 15 8 12 11 10

#### Output

it is more  
it is less  
it is more  
it is less  
it is less  
Number of tries needed:  
6

Question 15.

University chemists have developed a new process for the manufacturing of a drug that heals wounds extremely quickly. The manufacturing process is very lengthy and requires monitoring the chemicals at all times, sometimes for hours! Entrusting this task to a student is not possible; students tend to fall asleep or not pay close attention after a while. Therefore you need to program an automatic device to monitor the manufacturing of the drug. The device measures the temperature every 15 seconds and provides these measurement to your program.

Your program should first read two integers representing the minimum and maximum safe temperatures. Next, your program should continuously read temperatures (integers) that are being provided by the device. Once the chemical reaction is complete the device will send a value of -999, indicating to you that temperature readins are done. For each recorded temperature that is in the correct range (it could also be equal to the min or max values), your program should display the text "Nothing to report". But as soon as a temperature reaches an unsafe level your program must display the text "Alert!" and stop reading temperatures (although the device may continue sending temperature values).

### Examples

#### Input:

10 20  
15 10 20 0 15 -999

#### Output:

Nothing to report  
Nothing to report  
Nothing to report  
Alert!

#### Input:

0 100  
15 50 75 -999

#### Output:

Nothing to report  
Nothing to report  
Nothing to report

Question 16. Write a C-program that prints out a word as many times as specified. The number of repetitions and the word should be given as input to the program. You may assume that the word has no more than 100 characters (be sure to also reserve space for the null terminator, \0, though!).

### Examples

#### Input:

2 Hello

#### Output:

Hello  
Hello

#### Input:

4 thing

#### Output:

thing  
thing  
thing  
thing

Question 17.

Your local public library keeps a record of all of its patrons, consisting of index cards that hold a person's last name followed by their first name (so that the cards can easily be sorted alphabetically by last name). Unfortunately a computer error led to incorrectly printed forms last month, resulting in a number of cards that list the patron's first name followed by their last name rather than the other way around. Your job is to read these pairs of first and last names and display them in the correct order (last name followed by first name). You may assume that each first and last name has at most 100 characters and does not contain any spaces.

Your program should first read the total number of names (an integer) in order to know how many index cards need to be processed altogether. Next,  for each index card, your program should read a patron's first name and last name and then display these names correctly, that is on one line, the last name followed by one space, followed by the first name.  Your program should print the reversed name immediately after reading the patron's names (ie, it should not wait until it has read all of the index cards to begin printing).

Note that, for ease of viewing, the example below shows all of the inputs in one block and all of the outputs in another block, despite the fact that programmatically these will be interspersed.

### Example

#### Input:

4  
Alan Turing  
Ada Lovelace  
Donald Knuth  
Claude Shannon

#### Output:

Turing Alan  
Lovelace Ada  
Knuth Donald  
Shannon Claude

Question 18.

At the annual meeting of MOOC fans, participants register on the first day of the event in order to receive their name tags, brochures and banquet vouchers. Unfortunately this often results in long lines. In an attempt to speed things up, there are now two people working the registration desk: one person who has the registration materials for those fans whose names contain an odd number of letters, the other for those whose names have an even number of letters. Your job is to write a C-program that will tell a fan which line to stand in.

To simplify the program, you may assume that student names are less than 50 characters long and contain no spaces. Your program should output an integer value (1 or 2) depending on whether the fan should join line 1 (name has even number of letters) or line 2 (name has odd number of letters).

### Examples

#### Input:

Sharrock

#### Output:

1

#### Input:

Bonfert

#### Output:

2

Question 19.

Your job is to find the length of the longest word in a text with no punctuation or special characters of any kind - only contains words. To do so, please write a C-program that takes as a input first the number of words in a text, followed by all of the words in the text. The output of your program should be the length of the longest word in the text.

To simplify your program, you can assume that the longest word will not exceed 100 characters.

### Examples

#### Input:

14  
This is a simple example text  
we have to find the largest word length

#### Output:

7

#### Input:

7  
All cats are grey in the dark

#### Output:

4

Question 20.

You are conducting a linguistic study and are interested in finding words that contain the letter 't' or 'T' in the first half of the word (including the middle letter if there is one). Specifically, if the first half of the word does contain a 't' or a 'T', your program should output a 1. If the first half does not contain the letter 't' or 'T', but the second half does, then your program should output a 2. Otherwise, if there is no 't' or 'T' in the word at all, your program's output should be -1. You may assume that the word entered does not have more than 50 letters.

### Examples

#### Input:

apple

#### Output:

-1

#### Input:

raincoat

#### Output:

2

#### Input:

enter

#### Output:

1

#### Input:

Taylor

#### Output:

1

Question 21.

You are still conducting linguistic research! This time, you'd like to write a program to find out how many letters occur multiple times in a given word. Your program should read a word from the input and then sort the letters of the word alphabetically (by their ASCII codes). Next, your program should iterate through the letters of the word and compare each letter with the one following it. If these equal each other, you increase a counter by 1, making sure to then skip ahead far enough so that letters that occur more than twice are not counted again. You may assume that the word you read from the input has no more than 50 letters, and that the word is all lowercase.

### Examples

#### Input:

apple

#### Output:

1

#### Input:

keeper

#### Output:

1

#### Input:

erroneousnesses

#### Output:

5

#### Input:

taylor

#### Output:

0

Question 22.

You are writing a function named "special" that takes three input parameters (integers) and returns the product of the first number with the sum of the second and third number. What is an appropriate prototype for this function?

int special;

int special(int);

int special(int, int, int);

special(int, int, int);

Question 23.

Where does the semicolon go, following the function prototype or following the function definition?

1. following the function prototype
2. following the function definition
3. in both places
4. in neither places

Question 24.

Write a C-program that converts metric measurements to imperial system values. Measurements are provided to your program in meters, grams or degrees Celsius and must be converted to feet, pounds and degrees Fahrenheit, respectively.

Here are the conversion rules to use:

1 meter = 3.2808 feet;

1 gram = 0.002205 pounds;

temperature in degrees Fahrenheit = 32 + 1.8 × temperature in degrees Celsius.

On the first input line you are given the number of conversions to be made. Each of the following lines contains a value to be converted as well as its unit: m, g or c (for meters, grams or degrees Celsius). There will be a space between the number and the unit. You should print your output value for each input line immediately after calculating it (ie, you do not have to wait until you have read all inputs).

Display the converted values with 6 decimal places, followed by a space and their unit: ft, lbs or f (for feet, pounds or degrees Fahrenheit). Each conversion result should be printed on its own line, and you should store and display all decimal values as doubles.

You may use functions to complete this exercise, but that is not required. However, you will need to use a comparison operation with characters, for example:

char letter = 'a';  
  
if(letter == 'a') {...}

### Example

The following entry indicates that there are four values to be converted. The first is 10 meters, which, when converted, gives approximately 32.808 feet. The second is 1245.243 grams, or about 2.745761 pounds, the third is 37.2 degrees Celsius, or 98.96 degrees Farenheit, and the fourth is 23 grams, or 0.050715 pounds.

#### Input

4  
10 m  
1245.243 g  
37.2 c  
23 g

#### Output

32.808000 ft  
2.745761 lbs  
98.960000 f  
0.050715 lbs

Question 25.

The goal of this problem is to find the smallest integer in a list of numbers.

To help you with this task, please write a function called min() that finds and returns the smallest amongst two integers (be sure to also write a prototype for this function). The function thus takes two integers as input and returns the smallest of the two. This function will use an if statement with a condition that contains either "less than" or "greater than".

Next, please use min() in your main function to work your way through an entire list of numbers in order to find its minimum. The first number you read gives the number of elements in the list of integers under consideration. You will then read the integer values, using min() to keep only the smallest integer read at each step. In the end, please print out the smallest integer in the list.

### Example

#### Input

10  
4 3 6 2 6 8 9 8 5 4

#### Output

2