Perse Coding Team Challenge
2020

Round 1 Pairs

There are 10 questions with 40 minutes allowed.

Two students will share one computer

This is meant to be fun – do make sure you take the odd pause to enjoy it! If you are in a younger year group then remember you can always use what you learn this year for another year to come.

SUBMISSION ESSENTIALS:
- Ensure you change the language of your coding editor on hackerrank once you start Q1 (top right of coding area) to the language you wish to use.
- Ensure your inputs contain NO PROMPTS; the only screen output should be as requested in the question.

INSTRUCTIONS:
- You must work in pairs for Round 1 wherever possible (solo in exceptional cases)
- Your teacher will invigilate you for precisely 40 minutes and cannot discuss the problems.
- You may only use ONE computer for Round 1 and you may discuss problems/solutions quietly within your pair and so should be sitting next to each other, separated from other pairs wherever possible.
- All code submissions must be made within the time allowed. Any team that submits code after their time has been ended by the invigilator will be automatically disqualified from the competition once reviewed.
- You may write code directly into each hackerrank question page or you may write it in a development environment and copy/paste it across so long as these submissions are made within the time allowed.
- You may use the formal language reference online documentation for your language and you may also bring up to 10 A4 pages (20 sides) of notes/snippets into the competition. You should not have access to any other applications or resources (in particular no calculators are allowed either physical or digital).
- Questions may be attempted in any order; Questions 1-6 are worth three points with three test cases, Q7-10 questions are worth five points with five test cases.
- You should have some rough paper and a pen handy.

NOTES:
- Ensure you are logged in to hackerrank on your machines before the time starts.
- The invigilating teacher will record your names & the hackerrank username used (top right once logged in) and will submit a list of usernames used by your school as soon as possible after the event. Your hackerrank username used should be confidential and not include your name for data protection: you can change your hackerrank username easily and should do so before the competition starts under settings → account settings. Any offensive or inappropriate usernames will result in exclusion from the competition.

Question 1

EYES ON YOU

Most starfish have five eyes. Most spiders have eight eyes. Most scorpions have twelve eyes! Input the number of each in the room and output the number of eyes on you.

Input Format

Three non-negative whole numbers on separate lines to represent the number of starfish, spiders and scorpions respectively that are present.

Output Format

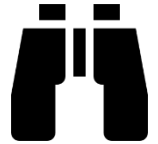A single number representing the number of eyes.

Constraints

- Each input *n* will be a whole number, $0 <= n <= 1000$

Example Input

```
3
1
2
```

Example Output

```
47
```

Question 2

FIND THE VOWELS

Mark wants to find and print out all of the vowels (aeiou) as they occur <u>in order</u> and including repeats within a 5-letter lower-case word entered by the user.

Input Format

A five-letter lower-case word

Output Format

The vowels as they occur in the input word, one each line.

Example Input

```
moose
```

Example Output

```
o
o
e
```

Question 3

SHOPPING LIST

As a good computer scientist, you always like your shopping list to be printed in exactly the same format with a line of dashes underneath of matching length.

Input the names of 4 food items on separate lines of input.

Output a formatted shopping list which is comma and space separated and exactly underlined in the format:

```
food1, food2, food3, food4
-------------------------
```

Input Format

4 words in lower case on separate lines

Output Format

2 lines of text in the form shown above

Example Input

```
peas
carrots
squash
bread
```

Example Output

```
peas, carrots, squash, bread
----------------------------
```
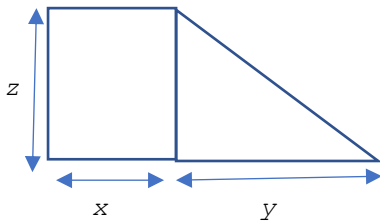
Question 4

GARDEN ENVY

Jen and Sid have adjacent gardens as shown.

Jen has a purely rectangular garden. Her neighbour, Sid, has a purely triangular garden. Jen thinks her garden has a larger surface area than Sid's. Write a program that will tell her whose is the largest and by how much.

Input Format

3 positive whole numbers in sequence:

The width of Jen's garden in metres (marked x on the diagram)

The width of Sid's garden in metres (marked y)

The length of their gardens in metres (marked z – which is the same for both Jen & Sid)

Output Format

Output a single name (Jen or Sid) followed by a number on the next line which indicates how much larger the bigger garden is in squared metres, <u>always</u> written <u>to 1 decimal place</u>.

Constraints

- All garden measurements will be provided as whole numbers in the range 1 to 50 inclusive
- There will always be a larger garden

Example Input

```
3
5
7
```

Example Output

```
Jen
3.5
```

Example Explanation:

3 * 7 = 21

(5 * 7) / 2 = 17.5

So Jen's garden is bigger and by 3.5 square metres.

Question 5

WIBBLE WOBBLE

Consider the famous poem:

wibble wobble wibble wobble jelly on the plate

Your first input will be a single word from this poem.

Your second input will be a whole number *n* either 1, 2 or 3 to specify how many further words from the poem are requested.

You should print as output the next *n* words following on from the <u>first</u> occurrence of the specified word. Your output should be space separated and on the same line.

Input Format:
Two lines of input:
A single word
A whole number, 1, 2 or 3

Output Format

A single line: one, two or three space separated words

Constraints

- Only valid requests (where there are sufficient remaining words) will be made

Example Input

```
jelly
2
```

Example Output

```
on the
```

Question 6

ECO CARS

You are first given a first line of input which tells you the type of car being bought, which is one of petrol, diesel, hybrid or electric.

If the car is not electric, a second line of input is also given, which is the engine size. You must print how much tax is due to be paid, given by the following rules based on pollution levels:

electric:	$0
hybrid with engine lower than 1.8:	$120
hybrid with engine 1.8 or more:	$140
petrol with engine lower than 1.8:	$150
petrol with engine 1.8 or more:	$170
diesel with engine lower than 1.8:	$180
diesel with engine 1.8 or more:	$200

Input Format

One word; petrol, diesel, hybrid or electric
A second line if not electric which is a decimal number

Output Format

An amount of tax in whole $, correctly formatted

Example Input 1

```
electric
```

Example Output 1

```
$0
```

### Example Input 2

```
petrol
2.0
```

Example Output 2

```
$170
```

Question 7

POSTMAN

Our road is an 'L' shape. On the north-south part of the road are house numbers 51-100. Odd number houses are on the west side of the road and even numbered houses are on the east side. On the east-west part of the road are house numbers 1-50 as shown. Odd number houses are on the south side of the road and even numbered houses on the north side.

```
      ..
    |  54
..  |  52
53  |    50 48 ..
51  |_____
       49 47 ..
```
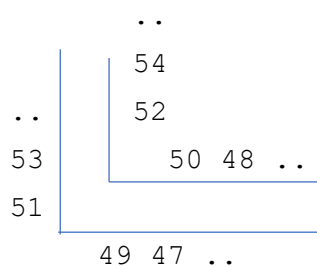
You are given three house numbers on separate lines, and must print, again on separate lines, whether each is on the north, south, east or west side of the road respectively.

Input Format

3 whole numbers from 1 to 100 inclusive on separate lines

Output Format

3 lines, each of one lower-case word: north, south, east or west.

Constraints

- Each input will be positive whole numbers less than or equal to 100

Example Input

```
52
31
1
```

Example Output

```
east
south
south
```

Question 8

ROTTING FRUIT

Jonathan has some pieces of fruit, each of which will only be good for the number of days given as input. For example if 2 is given then the fruit must be eaten on day 1 or day 2. The first number input will be how many days from now Jonathan plans to have his big fruit-eating day. The eat-by day numbers for each of his pieces of fruit will then be input, being terminated by the input -1 which is the signal to stop. Output how many pieces of fruit would still be good to eat when his big fruit-eating day arrives.

Input Format

A sequence of positive whole numbers, one on each line and then a final terminator of -1

Output Format

A single non-negative whole number: the number of pieces of edible fruit

Constraints

- Each input number will be a whole number less than 30

Example Input

```
4
3
4
3
5
2
-1
```

Example Output

```
2
```

Example Explanation:

Jonathan's fruit-eating day is day 4 (the first input). So the first, third and fifth pieces of fruit will no longer be good to eat because they have gone off by the end of days 3, 3 and 2 respectively. The second and fourth pieces will still be edible however. So two pieces of fruit have survived.

Question 9

LEFT OVER COOKIES

It is your birthday party and you have baked cookies for your guests. As a kind host, you will not allow any cookies for yourself initially, but you may get to eat any spares!

Your first input will be the number of cookies that are in your oven. The second input will be how many guests will end up coming to your party.

Your initial strategy is to give two cookies to each guest as they arrive, if possible. But once you have *half or fewer* of your original cookies left, or not two cookies to give, you will switch to one cookie only for each further guest until you run out or all guests have arrived. Output the number of spare cookies, if any, that you get to eat later.

Input Format

Two positive whole numbers on separate lines:
The number of cookies
The number of guests

Output Format

A single non-negative number: the remaining cookies

Constraints

- The number of cookies and the number of guests will both be less than 100

Example Input

```
16
7
```

Example Output

```
5
```

Example Explanation:

The first four guests get two cookies each. But then you have only eight cookies left which is half of your initial number, so you switch to the one cookie strategy. The remaining three guests get one cookie leaving five cookies remaining at the end of the evening for you to eat.

Question 10

HURDLE TWIST

It is the hurdles at the Olympics but with a couple of twists! The hurdles can be different heights and an athlete is disqualified after <u>their first fall</u>. For this challenge you will be provided strength and stamina of your runner followed by a course.

The strength (a positive whole number) denotes the maximum hurdle height that the runner can jump over. The stamina (a positive whole number) denotes the maximum number of hurdles that the runner can jump over.

The course is encoded as follows:

_   denotes track which occurs before and after each hurdle

| denotes a hurdle of 1 unit height

|| denotes a hurdle of 2 units height

||| denotes a hurdle of 3 units height

On the following example course then, a runner with a strength of 1 and a stamina of 3 would fall on the second hurdle because of their low strength.

_ | _ | | _ | _

Output the number of hurdles that they <u>successfully</u> <u>complete</u> before either their first fail or finishing the course.

Input Format

Three lines of input: two positive whole numbers (strength & stamina respectively) and then a line of text (string) for the course.

Output Format

A non-negative whole number

Constraints

- strength will be 1,2 or 3; stamina will be a whole number between 1 and 10 inclusive
- Hurdles will be a maximum of 3 units high
- A maximum of 10 hurdles will be present in each input

Example Input

```
2
3
_|_||_|_|_
```

Example Output

```
3
```

Example Explanation:

The runner can jump hurdles of maximum height 2 and can jump up to 3 hurdles. Unfortunately, there are four hurdles in this race and so the runner falls on the last hurdle. They jumped 3 successfully.