

Exercise Session n. 1 (24 February 2023)

Algorithms and Data Structures

Median Value

Write a function `median_value(a, b, c)` that, given three numbers a, b, c returns their median value.

Examples

```
>>> median_value(1,2,3)
2
>>> median_value(3,2,1)
2
>>> median_value(7, 3, 21)
7
>>> median_value(7, 3, 5)
5
>>> median_value(7, 3, 3)
3
>>> median_value(7, 3, 7)
7
```

Leap Year

Write a function `leap_year(y)` that, given a year number y in the Gregorian calendar, return `True` if y is a leap year, or `False` otherwise. Recall that a leap year is one whose number is divisible by 4, excluding the year numbers divisible by 100, but including the year numbers divisible by 400.

Examples

```
>>> leap_year(2000)
True
>>> leap_year(1969)
False
>>> leap_year(2023)
```

```
False
>>> leap_year(1984)
True
>>> leap_year(2022)
False
>>> leap_year(2200)
False
>>> leap_year(2400)
True
>>> leap_year(1900)
False
```

Classify Triangle

Write a function `classify_triangle(a,b,c)` that, given three positive numbers representing the lengths of three segments, respectively, output a classification of the triangle obtained by connecting the three segments. The output consists of one or two words printed on a single line and separated by a single space. The first word is one of `acute`, `right`, `obtuse`, or `impossible`. `impossible` indicates that it is impossible to form a triangle with the given segment lengths, in which case the output ends there. `acute`, `right`, and `obtuse` indicate that the resulting triangle has all acute angles, one right angle, or one obtuse angle. In these cases, the output must contain a second word that can be either `scalene`, `isosceles`, or `equilateral`, indicating the type of triangle.

Examples

```
>>> classify_triangle(10,10,10)
acute equilateral
>>> classify_triangle(4,3,5)
right scalene
>>> classify_triangle(4,3,8)
impossible
>>> classify_triangle(3,4,3)
acute isosceles
>>> classify_triangle(3,5,3)
obtuse isosceles
>>> classify_triangle(5,5,7)
acute isosceles
```