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codility

Training center

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Demo ticket

Session

ID: demoA7YTQJ-Y8E
Time limit: 120 min.

Status: closed

Created on: 2014-03-17 08:16 UTC
Started on: 2014-03-17 08:16 UTC
Finished on: 2014-03-17 08:20 UTC

Tasks in test

Task score

Test score

100%

100 out of 100 points

EASY

1. BinaryGap

Find longest sequence of zeros in binary representation of an integer.

score: 100 of 100

Task description

A *binary gap* within a positive integer N is any maximal sequence of consecutive zeros that is surrounded by ones at both ends in the binary representation of N.
For example, number 9 has binary representation `1001` and contains a binary gap of length 2. The number 529 has binary representation `1000010001`) and contains two binary gaps: one of length 4 and one of length 3. The number 20 has binary representation `10100` and contains one binary gap of length 1. The number 15 has binary representation `1111` and has no binary gaps.
Write a function:

```
def solution(N)
```

that, given a positive integer N, returns the length of its longest binary gap. The function should return 0 if N doesn't contain a binary gap.
For example, given N = 1041 the function should return 5, because N

has binary representation `10000010001` and so its longest binary gap is of length 5.
Assume that:

- N is an integer within the range [1..2,147,483,647].

Complexity:

- expected worst-case time complexity is O(log(N));
- expected worst-case space complexity is O(1).

Solution

Programming language used: Python

Total time used: 4 minutes

Effective time used: 4 minutes

Notes: correct functionality and scalability

Task timeline

08:16:28 08:20:20

Code: 08:20:20 UTC, py, final, score: **100.00**

```
01. def solution(N):
02.     max_grap = 0
03.     start = end = -1
04.     for i in xrange(30, -1, -1):
05.         if N & (1 << i):
06.             end = i
07.             max_grap = max(max_grap, start - end - 1)
08.             start = i
09.     return max_grap
```

Analysis

Detected time complexity:

O(log(N))

test	time	result
example1 example test n=1041=10000010001_2	0.050 s.	OK

example2 example test n=15=1111_2	0.050 s.	OK
extremes n=1, n=5=101_2 and n=2147483647=2**31-1	0.050 s.	OK
trailing_zeroes n=6=110_2 and n=328=101001000_2	0.050 s.	OK
power_of_2 n=5=101_2, n=16=2**4 and n=1024=2**10	0.050 s.	OK
simple1 n=9=1001_2 and n=11=1011_2	0.050 s.	OK
simple2 n=19=10011 and n=42=101010_2	0.050 s.	OK
simple3 n=1162=10010001010_2 and n=5=101_2	0.050 s.	OK
medium1 n=51712=110010100000000_2 and n=20=10100_2	0.050 s.	OK
medium2 n=561892=10001001001011100100_2 and n=9=1001_2	0.050 s.	OK
medium3 n=66561=10000010000000001_2	0.050 s.	OK
large1 n=6291457=11000000000000000000001_2	0.050 s.	OK
large2 n=74901729=10001110110111010001100001	0.050 s.	OK
large3 n=805306369=11000000000000000000000000101_2	0.050 s.	OK
large4 n=1376796946=10100100001000001000001000010010_2	0.050 s.	OK
large5 n=1073741825=10000000000000000000000000001_2	0.050 s.	OK
large6 n=1610612737=11000000000000000000000000001_2	0.050 s.	OK

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