



Training center

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Training ticket

Session

ID: trainingGE22HP-TFH
Time limit: 120 min.

Status: closed

Created on: 2016-12-28 08:22 UTC
Started on: 2016-12-28 08:22 UTC
Finished on: 2016-12-28 08:37 UTC

Tasks in test

1 | ♀ **BinaryGap**
Submitted in: C

Correctness

100%

Performance

not assessed

Task score

100%

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:

```
int solution(int 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:

Solution

Programming language used: C

Total time used: 15 minutes

?

Effective time used: 15 minutes

?

Notes: *not defined yet*

Task timeline

?



08:22:59

08:37:43

Code: 08:37:43 UTC, c, final,
score: 100

[show code in pop-up](#)

```
1 // you can write to stdout for debugging purposes, e.g.
2 // printf("this is a debug message\n");
3
4 int solution(int N) {
5     int gap = 0;
6     int max = 0;
7     int start = 0;
```

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

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```

8      while (N > 0) {
9          if (N & 0x1) {
10             if (start) {
11                 max = (max > gap) ? max : gap;
12             }
13             else {
14                 start = 1;
15             }
16             gap = 0;
17         }
18         else {
19             gap++;
20         }
21         N >>= 1;
22     }
23     return(max);
24 }
25

```

Analysis summary

The solution obtained perfect score.

Analysis



expand all		Example tests
▶	example1	✓ OK
	example test n=1041=10000010001_2	
▶	example2	✓ OK
	example test n=15=1111_2	
expand all		Correctness tests
▶	extremes	✓ OK
	n=1, n=5=101_2 and n=2147483647=2**31-1	
▶	trailing_zeroes	✓ OK
	n=6=110_2 and n=328=101001000_2	
▶	power_of_2	✓ OK
	n=5=101_2, n=16=2**4 and n=1024=2**10	
▶	simple1	✓ OK
	n=9=1001_2 and n=11=1011_2	
▶	simple2	✓ OK
	n=19=10011 and n=42=101010_2	
▶	simple3	✓ OK
	n=1162=10010001010_2 and n=5=101_2	
▶	medium1	✓ OK
	n=51712=110010100000000_2 and n=20=10100_2	
▶	medium2	✓ OK
	n=561892=10001001001011100100_2 and n=9=1001_2	
▶	medium3	✓ OK
	n=66561=10000010000000001_2	
▶	large1	✓ OK
	n=6291457=110000000000000000001_2	
▶	large2	✓ OK
	n=74901729=1000111011011101000111000 01	
▶	large3	✓ OK
	n=805306373=1100000000000000000000 000101_2	
▶	large4	✓ OK
	n=1376796946=10100100001000001000001 00010010_2	
▶	large5	✓ OK

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