

American Computer Science League

2022-2023 • Contest 1: Next Base • Intermediate Division

PROBLEM: Given 3 positive integers, n , b , and s , generate the next n numbers in base b starting with s in the given base. We guarantee that the base will be between 2 and 9 inclusive. We guarantee that s is a valid number in base b . Find the base 10 value for the number of times the largest possible digit in the given base is found among all of the digits in the numbers generated.

EXAMPLE: If $n=15$, $b=8$, and $s=2$, the numbers generated are 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 20. The largest possible digit in base 8 is 7 which occurs 2 times.

INPUT: There will be three integers representing the number of values to be found, the base to be used between 2 and 9 inclusive, and the starting value in the base given that will be no more than 16 digits.

OUTPUT: For each set of 3 input values, output a base 10 number representing the number of times the largest digit in the inputted base occurs in the sequence of numbers generated.

SAMPLE INPUT:

1. 15 8 2
2. 20 3 12
3. 25 5 324
4. 13 9 1652
5. 45 2 1111011

SAMPLE OUTPUT:

1. 2
2. 21
3. 24
4. 1
5. 170

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TEST DATA

TEST INPUT:

1. 1000 8 10
2. 50 4 13
3. 75 9 384
4. 100 6 555
5. 25 2 1100001110

TEST OUTPUT:

1. 357
2. 34
3. 13
4. 31
5. 121

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PROBLEM STATEMENT:

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EXAMPLE:

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TASK:

Complete the function **countLargestDigit**:

- The function has 3 parameters: an integer, num , representing the number of values to be found, an integer, $base$, representing the base to be used between 2 and 9 inclusive, and an integer, $start$, representing the starting value in the base given
- The function returns a base 10 number representing the number of times the largest possible digit in the given base is found among all of the digits in all the numbers generated

You may create additional functions that are called from **countLargestDigit** if needed in solving the problem.

CONSTRAINTS:

All inputs will be integer values. The base will be between 2 and 9 inclusive. We guarantee that $start$ is a valid number in the given base. The starting number will be no more than 16 digits long.

DATA PROVIDED:

There are 5 sets of Sample Data for debugging and 5 sets of Test Data for scoring. You may create additional data sets for debugging your program.