

# American Computer Science League

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## 2022-2023 • Contest 1: Next Base • Junior 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  $b$  will be between 2 and 9 inclusive. We guarantee that  $s$  is a valid number in base  $b$ . Find the base 10 sum of all of the digits in the numbers generated.

**EXAMPLE:** If  $n=15$ ,  $b=8$ , and  $s=2$ , the base 8 numbers generated are 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 20. The base 10 sum of all of their digits is 65.

**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 which will be no longer than 16 digits. We guarantee that the  $b$  will be between 2 and 9 inclusive.

**OUTPUT:** For each set of 3 input values, output a base 10 number representing the sum of all of the digits 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. 65
2. 64
3. 189
4. 212
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. 10948
2. 225
3. 876
4. 675
5. 121
```

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## PROBLEM STATEMENT:

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## EXAMPLE:

If  $n=15$ ,  $b=8$ , and  $s=2$ , the base 8 numbers generated are 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 20. The sum of all of their digits in base 10 is 65.

## TASK:

Complete the function **findDigitSum**

- 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 sum of all of the digits generated

You may create additional functions that are called from **findDigitSum** 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.