Recursive Conversion From Strings to Integers

1 Introduction

When reading a file, Python reads the lines of text in the file as strings, even when the file clearly contains only numerical data. For this project we will construct a recursive function that will convert strings of digits to integer type objects.

2 Objective

The goal of this activity is to develop a function, named `rec_int`, that converts a positive integer, in the form of a string, to an integer type object, recursively.

Assume that your Python function will accept as an input a string `s` that contains only digit characters. (By digit characters we mean `'0'`, `'1'`, `'2'`, `'3'` ,`'4'`, `'5'`, `'6'`, `'7'`, `'8'`, or `'9'` only.). It is guaranteed that $1 \leq$ `len(s)` ≤ 10. The output of your function should be the same integer as an integer type object.

3 Example

The output of `rec_int('232')` should be the integer type object `232`.

4 Additional Notes

1. The function `rec_in` produces the same output as the built-in function `int`, but does so recursively.
2. The recursion should be based on the length of the input string. You may need several base cases to deal with a string containing only one character.
3. Note that $232 = 23 \times 10 + 2$ and $23 = 2 \times 10 + 3$. This type of decomposition may be helpful when constructing your recursive step.
4. For a string `s='12345'`, `s[1:]='2345'` and `s[:-1]='1234'`. At least one of these will come in handy. (See our discussion on list/string slicing.)
5. Your algorithm must be recursive to earn full credit.

5 Grading Criteria

This project is worth a total of 10 points:

- (3 points) Introduction and Discussion - Introduce the problem and explain how your algorithm/function works.
- (5 points) Algorithm and Implementation - The algorithm designed and implemented in Python solves the problem.
- (2 points) Neatness and Timeliness - Your write-up is neat, clear, and turned in on time. The assignment must be typed (as a Jupyter notebook) and completed by 11:59pm on October 16th.