Solution Review: String to Integer

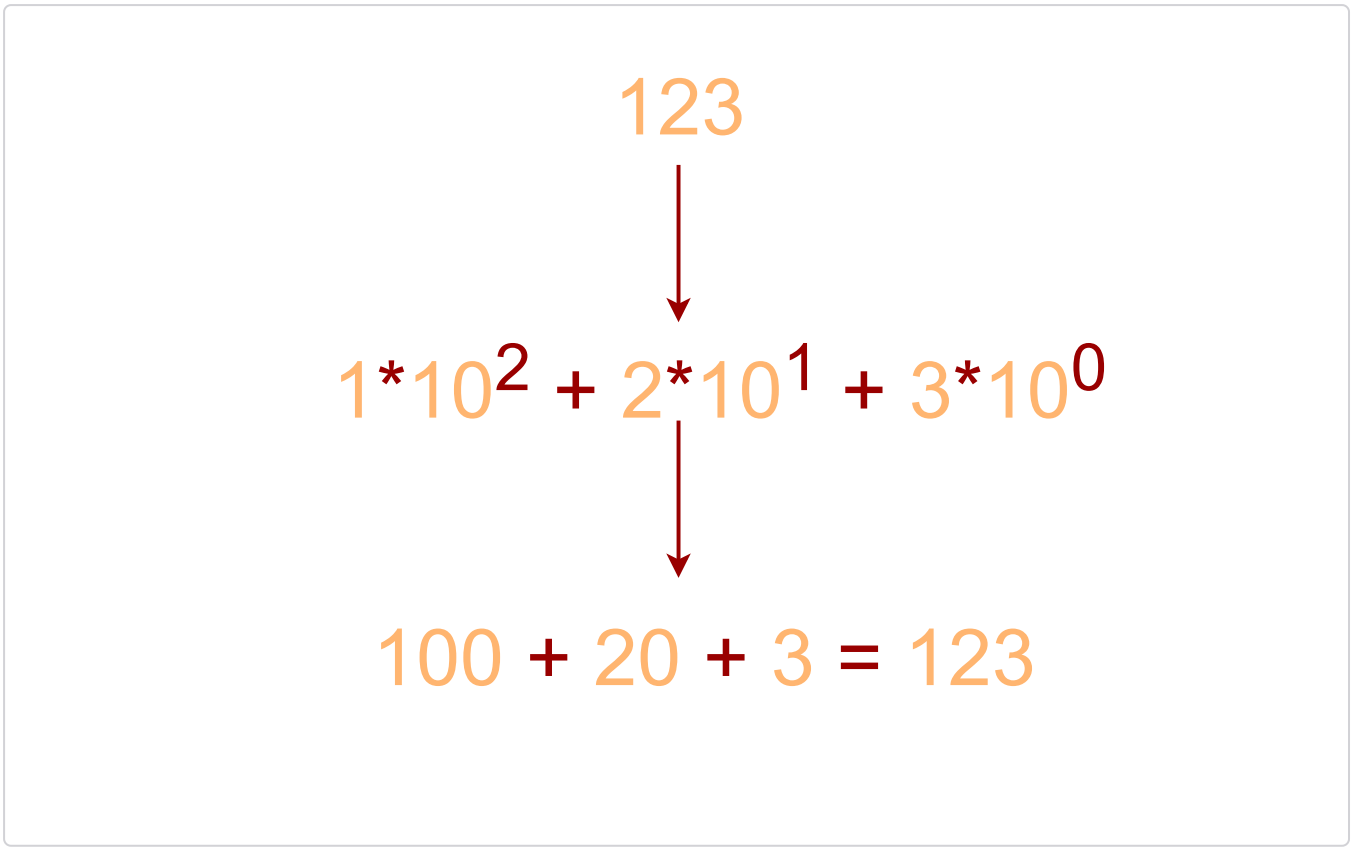
This lesson contains the solution review to convert a string into an integer in Python.

WE'LL COVER THE FOLLOWING

In this lesson, we will review the solution to the challenge in the last lesson. The problem is as follows:

Given some numeric string as input, convert the string to an integer.

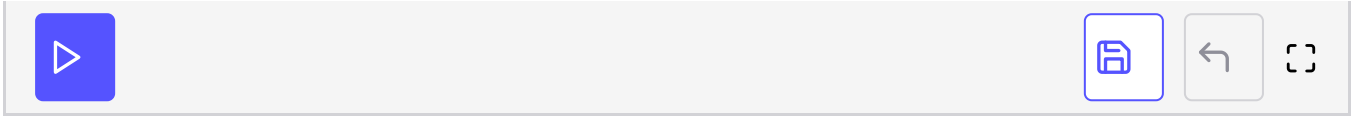
You already know that we are not allowed to use the built-in `int()` function. Now to convert a string into an integer, we can make use of the following arithmetic:



As you can see, by multiplying each digit with the appropriate base power, we can get the original integer back. Let's implement this in Python.

Implementation

```
def str_to_int(input_str):

    output_int = 0

    if input_str[0] == '-':
        start_idx = 1
        is_negative = True
    else:
        start_idx = 0
        is_negative = False

    for i in range(start_idx, len(input_str)):
        place = 10**(len(input_str) - (i+1))
        digit = ord(input_str[i]) - ord('0')
        output_int += place * digit

    if is_negative:
        return -1 * output_int
    else:
        return output_int



s = "554"
x = str_to_int(s)
print(type(x))

s = "123"
print(str_to_int(s))

s = "-123"
print(str_to_int(s))
```



Explanation

On **line 3**, `output_int` is initialized to `0`. The code on **lines 5-10** deal with the polarity of the number represented by `input_str`:

```
    if input_str[0] == '-':
        start_idx = 1
        is_negative = True
    else:
        start_idx = 0
        is_negative = False
```

If the first character of `input_str` is `-`, `start_idx` is set to `1` and `is_negative` is set to `True` (**lines 6-7**). `start_idx` is to indicate that we'll start processing `input_str` from the first index as `-` is on the zeroth index. However, if `input_str[0]` is not equal to `-`, `start_idx` and `is_negative` are set to `0` and `False` respectively on **lines 9-10**.

Next, let's discuss the `for` loop on **line 12**:

```
    for i in range(start_idx, len(input_str)):
        place = 10**(len(input_str) - (i+1))
        digit = ord(input_str[i]) - ord('0')
        output_int += place * digit
```

This `for` loop will run from `start_idx` to `len(input_str) - 1`. On **line 13**, `place` is set to `10` raised to the power of `len(input_str - (i+1))`. For example, if `input_str` is `123`, `place` will have the following values:

```
input_str = 123
len(input_str) = 3

i = 0
place = 10** (3 - (0+1)) = 10** (2) = 100
i = 1
place = 10** (3 - (1+1)) = 10** (1) = 10
i = 2
place = 10** (3 - (2+1)) = 10** (0) = 1
```

You may notice that `place` is the base power calculated according to the place of the digit in the number. For the unit place, `place` will equal `1`. Once we have calculated the base power, we need to extract the digit as a number. Therefore, **on line 13**, we get the digit as an integer type by subtracting the Unicode code point of `0` from the Unicode code point of `input_str[i]`. The Unicode code points are calculated using the `ord` function.

Finally, all that is left for us is to multiply `digit` with `place` and add it to `output_int` which is done on **line 15**.

Lines 17-20 return `output_int` with its corresponding polarity.

```
```

```
    if is_negative:
        return -1 * output_int

    else:
        return output_int
```

If `is_negative` is `True`, `output_int` is returned after multiplication with `-1` on **line 18**; otherwise, it is returned as it is on **line 20**.

That's all, folks! Now we have come to an end to the course. I hope you had an amazing learning experience!