Examples

Tue Herlau
tuhe@dtu.dk

October 7, 2022

1 Working with fractions (`fractions.py`)

In this problem, you have to implement the methods in the following class:

```python
# cpp_course/fractions.py
class Fraction:
    def __init__(self, n, m):
        self.n = n
        self.m = m

    def __add__(self, other):
        # Computes f = f1 + f2 (where f1 and f2 are both Fraction-objects and
        ↪  f1=self, f2=other)
        return f

    def __mul__(self, other):
        # Overwrite to implement f = f1 * f2
        return f

    def __truediv__(self, other):
        # Overwrite to implement f = f1/f2, or more specifically self/other.
        return f

    def __str__(self):
        """ Creates a string representation. You can use it as
        ↪  `print(str(Fraction(1,2))) to output 1/2"""
        return f"({self.n} / {self.m})"
```

When done, you should be able to create two fractions objects and add them using the `+`-operator, which will be transformed to a call of the form `f1.__add__(f2)` as so:

```python
# cpp_course/fractions.py
    f1 = Fraction(1, 2)  # Represents 1/2
    f2 = Fraction(3, 5) # Represents 3/5
    print(f"Result of {f1} + {f2} is", f1+f2)
```

This fragment will produce the terminal output:

```
Result of (1 / 2) + (3 / 5) is (11 / 2)
```

You may find it convenient to use the formula:

$$\frac{a}{b} + \frac{n}{m} = \frac{am + bn}{bm} \tag{1}$$

When done, implement the `from_string` function, that can simplify string expressions to fractions:

```python
# cpp_course/fractions.py
    s = " 1 / 4 * 1 / 2"
    print("Result of", s, "is", from_string(s))
    s =  "5 / 2 div 10 / 3"
    print("Result of", s, "is", from_string(s))
```

This fragment will produce the following terminal output:

```
Result of  1 / 4 * 1 / 2 is (1 / 8)
Result of 5 / 2 div 10 / 3 is (15 / 20)
```

```
>>>
>>> f1 = Fraction(1, 2)  # Represents 1/2
>>> f2 = Fraction(3, 5)  # Represents 3/5
>>> print(f"Result of {f1} + {f2} is", f1 + f2)
Result of (1 / 2) + (3 / 5) is (11 / 2)
>>>
>>> # Now do some compound tests:
>>> s = " 1 / 4 * 1 / 2"
>>> print("Result of", s, "is", from_string(s))
Result of  1 / 4 * 1 / 2 is (1 / 8)
>>> s = "5 / 2 div 10 / 3"
>>> print("Result of", s, "is", from_string(s))
Result of 5 / 2 div 10 / 3 is (15 / 20)
```

References