CS2204 Homework: Balanced Brackets

Objectives

- Demonstrate a use case for stacks
- Work with the `collections.deque` data type
- Have a *rest week*

Background

In this very brief assignment you need to implement a single task/function to decide if a string (`expr`) contains a balanced set of brackets.

There are three types of brackets with matching (opening and closing) character pairs: `[]`, `{}`, and `()`.

Two brackets are considered to be a matched pair if the an opening bracket occurs to the left of a closing bracket of the exact same type. A matching pair of brackets is not balanced if the set of brackets it encloses are not matched.

The `expr` string can contain arbitrary characters. The non-bracket characters can be safely ignored. The sequence of brackets is balanced if the following conditions are met:

- It contains no unmatched brackets.
- The subset of brackets enclosed within the confines of a matched pair of brackets is also a matched pair of brackets.

Examples:

- `{[()]}` is balanced
- `{[(])}` is not balanced
- `({X}(A[++][--])A)[hello](world)` is balanced

Tasks

You need to finish the `brackets.py` source file. Note: you can use the simple test code provided at the end of the file. Feel free to change/add/delete any testing code. The outputs of this testing code are not going to be graded. The validator program will use your code directly.

1. Implement the `is_balanced` function as described above and in the documentation string. **Please, try to use the `collections.deque` datatype as a stack** using its `.append()` / `.pop()` or the `.appendleft()` / `.popleft()` pairs of methods.

Grading

You can use the attached `validator.py` program to check your work (and the instructor's original mistakes). It will also estimate your final score for the homework. The program is in the same folder as your homework assignment. Open the `validator.py` script and run it in the

Spyder environment to track your progress.

Penalties

Points will be deducted if you fail to set `__author__` variable (-10 pts) and for **each PEP 8 style errors** (-1 pt for each) in your program.

Submission

Please, upload the final version of the following file(s) (**and only those files**) to Brightspace:

- `brackets.py`