Computer Science 3A

Practical Assignment 4

7 March 2024

Time: 7 March 2024 — 17h00 Marks: 50

Practical assignments must be uploaded to `eve.uj.ac.za` **before** 17h00. Late submissions **will not be accepted**, and will therefore not be marked. You are **not allowed to collaborate** with any other student.

Stacks are one of the most popular abstract data types that deal with a collection of elements. For this practical, you are required to complete the implementation of a stack. This stack should conform to the implementation specifications provided to you. Some functions have been removed that you should complete.

You must complete the following classes marked by:

```
//TODO: COMPLETE CODE HERE
```

Please note that you should not add any additional methods in the `Main` or the `UndoManager` classes. However, you must complete the implementation in the `Stack` class.

Text-based Undo Operations using a Stack

When implementing a text-based editor, one feature that is required is the ability to undo what the user has just typed using an undo key-stroke (typically Ctrl-Z). Every time a user reaches the end of a specified text block, the text's current state in the editor is pushed onto the undo stack. The moment the user performs the undo key-stroke, the current state of the editor is set to the popped state off the undo stack, and the previous state is pushed onto the redo stack. Therefore, the following needs to be implemented:

1. When the user types a key, it is displayed in the text area until the text block is reached. In our case, it is when the user uses the space bar to denote a space between words.
2. Once the text block has been reached, the current state of the text found in the text area is pushed onto the undo stack.
3. The undo key-stroke is checked for every key pressed, and if it is activated, the current state is pushed onto the redo stack, and the current state is set to state popped off the undo stack.

To solve this problem, you must complete the functions for the JavaFX components with key handling, which uses the UndoManager that uses the DList-based Stack class.

The following files must be submitted to EVE:

1. *studentnumber*_p4.zip

Marksheet

1. Stack: Data members and methods that use a DList [10]
2. UndoManager: record [2]
3. UndoManager: undo [3]
4. Main: TextArea [3]
5. Main: event registration [5]
6. Main: ctrl z key handling [10]
7. Main: GUI setup and display [7]
8. Correctness [10]