

SOEN 6011: SOFTWARE ENGINEERING PROCESSES

(Function F6 : $a * b^x$)

Overview

- ▶ Implementation of exponential function $a * b^x$ in Java from scratch without the use of any Math function.
- ▶ User Interface was built using JavaFX to provide users with a familiar UI like windows calculator.

Critical Decisions

- ▶ Choice of algorithm for the function was based on the time complexity of the functions, so that the function is not only correct but also gives user the output instantaneously. The idea was no matter how large the input, the function should be able to calculate it quickly.
- ▶ In order to ensure the recursive algorithm works for fractional inputs, the original recursive algorithm was tweaked to use factorial and log functions as well. This was done so that the function satisfies the range and domain of all real numbers, including fractions and negatives.
- ▶ In order to ensure the precedence of operator, an advanced algorithm using stacks was implemented. This was critical because the UI gives user the freedom to enter input with or without the parentheses.

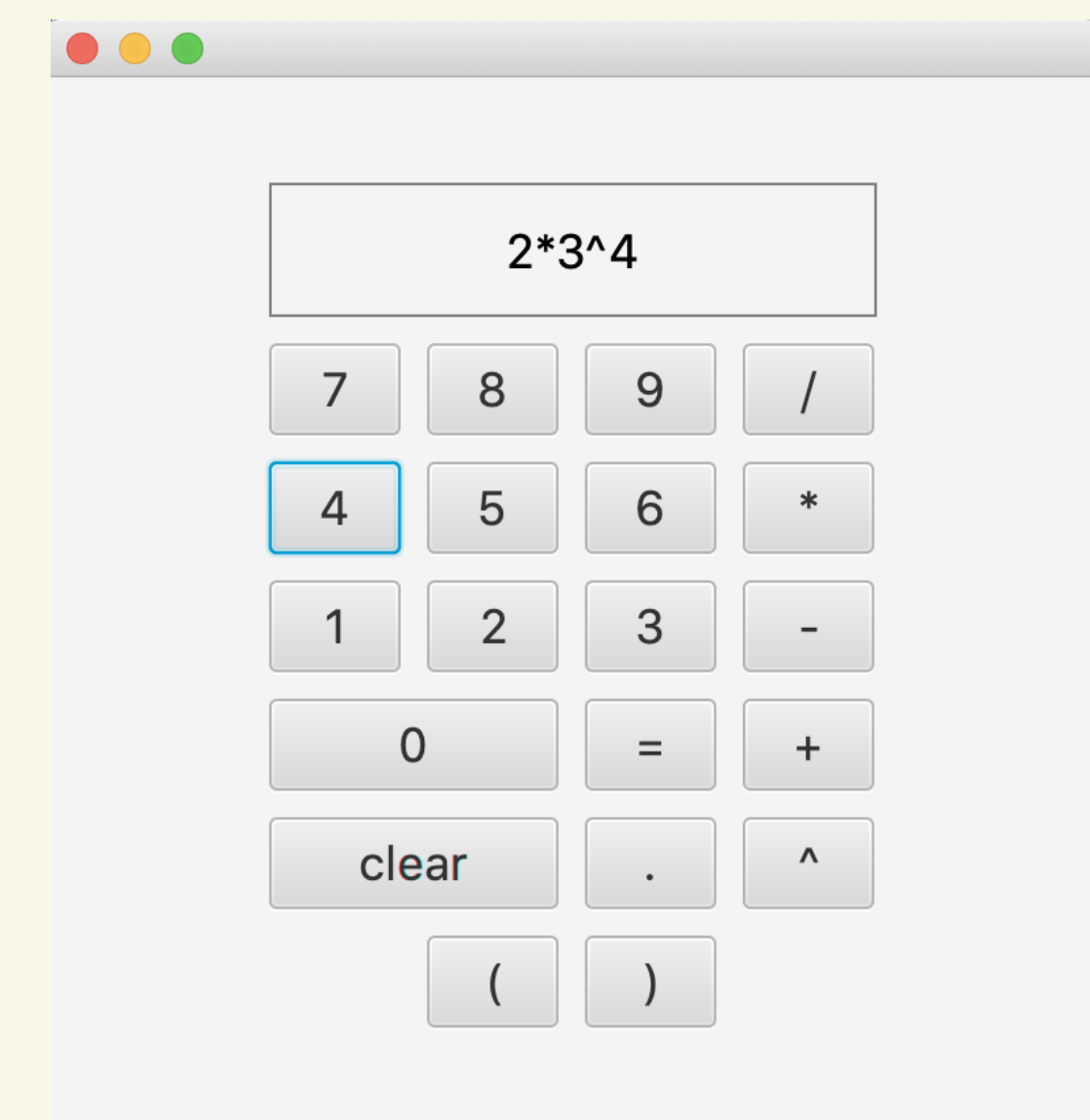
Lessons Learned in Code Review

- ▶ Following a consistent programming style in the group, significantly improves the code review process. It takes a lot of overhead away in asking your teammates to use correct programming style and help turn the focus on reviewing the correctness of the algorithm.
- ▶ Communication is key in software development. The ability to clearly express your ideas helps translate that into better and maintainable code.
- ▶ Code Reviews are intense and both parties should always keep ego and sentiments out of it. Being too attached to code could be a hindrance in changing it.
- ▶ Code Reviews help us understand different perspective of other people and expose us to different ways of doing the same thing, sometimes leading to a better solution.

Lessons Learned during Testing

- ▶ It is important to structure our tests in a Test suite. This takes the overhead of running files one by one and avoid wastage of time.
- ▶ For functional testing, it is important for the tester to understand the persona of the user and record their experience. This helps in taking away the bias of being a programmer and test the product as an end user.

Application User Interface



Conclusion

- ▶ One should always strive to build products that satisfy the following quality attributes: *Correctness, Efficiency, Maintainability, Robustness and Usability*.
- ▶ Software engineers involves engineers to wearing different hats, a developer when implementing the function, an architect when reviewing the code and a QA and end user when testing the product. In order to deliver a good product, one should be versatile and learn these skills.

References

- ▶ <https://mathbitsnotebook.com/Algebra1/FunctionGraphs/FNGTypeExponential.html>
- ▶ https://www.tutorialspoint.com/java/lang/math_pow.htm