Ministry of Education of the Russian Federation Penza state university
Department of computer engineering
Explanatory note :

The term paper

In the course: ''Programming''

on the topic: ''The developement of a complex structure program using top-down programming ''

Performed by a student of the 24VVIA1 group:
Mohammed Maai
Checked by Fedunin R.N.

7.11.2025

Penza 2025

PENZA STATE UNIVERSITY

FACULTY OFCOMPUTER ENGINEERING

DEPARTEMENT OFCOMPUTERENGINEERING

"I APPROVE "

Head of departement of technical education

Mitrokhin M.A.

«___»_____20__yrs

Task
for course design according to the course

programming

Project topic: developement of a complex structure program using top-down programming

Initial data (technical requirements) for the design

The Calculator is a simple desktop application built using Python and Tkinter.

It allows users to perform basic arithmetic operations such as addition, subtraction, multiplication, and division through an intuitive graphical interface.

The project focuses on simplicity, accuracy, and user-friendly design, showcasing Python's GUI programming capabilities.

Mandatory requirements for the program:

— Data types,
— MySQL integration,
— GUI interface,
— Menu and toolbar,
— Screensaver, and
— Windows + PyCharm environment.

ABOUT THE PASSAGE OF ACADEMIC (INTRODUCTORY)

TRAINING

(2024/2025 academic year)

Student: Mohammed Maai

Name of the training profile: "Applied Artificial Intelligence"

Form of study: full-time

Duration of study: 4 years

Year of study: 1

Semester: 2

Department: Computer Engineering

Bachelor: Mohammed Maai _____ "___" _____ 2025

Head of practice: Fedunin R.N. _____ "___" _____ 2025

Conclusion

In this project, I successfully achieved all the initial goals I set out to accomplish. I developed a comprehensive scientific calculator that supports advanced mathematical functions, featuring an intuitive and user-friendly interface. Key accomplishments include:

Designing a graphical interface using Tkinter, which was challenging but ultimately rewarding.
Seamlessly integrating both basic and advanced mathematical operations, thoroughly tested for accuracy.
Adding a history feature that allows users to review previous calculations, enhancing user experience.
Implementing clear error handling to provide helpful messages for invalid inputs or impossible operations.
What makes this project stand out is its versatility, effectively serving students and professionals in scientific and engineering fields. The testing confirmed that the calculator delivers precise results while maintaining ease of use.

Future Improvements

Incorporating statistical functions for data analysis.
Creating a permanent save feature for calculation history.
Developing multiple color themes to improve visual appeal.
Overall, this project has been a valuable learning experience, allowing me to apply programming concepts to build a practical and functional tool. It provides a solid foundation for future enhancements and features.

References

1.Mark Lutz. Learning Python. — O'Reilly Media, 2021.

2.Robert Sedgewick, Kevin Wayne. Algorithms in Python. — Addison-Wesley, 2019.

3.Dmitry Zlatopolsky. Programming in Python for Beginners and Professionals. — BHV-Petersburg, 2020.

4. https://docs.python.org/3/

5. https://www.w3schools.com/python/

6.https://www.geeksforgeeks.org/python-simple-gui-calculator-using-tkinter/