

MINISTRY OF EDUCATION



TECHNICAL UNIVERSITY
OF CLUJ-NAPOCA, ROMANIA

FUNDAMENTAL PROGRAMMING TECHNIQUES

ASSIGNMENT 1

POLYNOMIAL CALCULATOR

1. Requirements

Design and implement a polynomial calculator with a dedicated graphical interface through which the user can insert polynomials, select the mathematical operation (i.e., addition, subtraction, multiplication, division, derivative, integration) to be performed and view the result.

Note: Consider the polynomials of one variable and integer coefficients.

2. Deliverables

- A **documentation** written in the template provided on the laboratory Web site.
- **Source files** – will be uploaded on the personal **Gitlab** account created according to the instructions in the **Laboratory Resources** document, and following the steps:
 - Create a private repository on **Gitlab** named according to the following template:
PT2024_Group_LastName_FirstName_Assignment_1
 - Push the source code and the documentation (**!!!not an archive with the code!!!**).
 - Share the repository with the user **utcn_dsrl**

3. Evaluation

The assignment will be graded as follows:

Requirement	Grading
<ul style="list-style-type: none">• Use an object-oriented programming design (use encapsulation, define appropriate classes e.g., <i>Polynomial</i> and optionally <i>Monomial</i>).• Use Map for modelling the Polynomial.• Use <i>foreach</i> instead of <i>for(int i=0...)</i>.• Implement a graphical user interface using Java Swing or JavaFX.• Implement the addition and subtraction operations.• Implement classes with maximum 300 lines (except the UI classes) and methods with maximum 30 lines.• Use the Java naming conventions (see link).• Good quality documentation addressing all sections from the documentation template.	5 p
Good organization of the source code	1 p
Implement the multiplication operation	0.5 p
Implement the division operation	1 p
Implement the derivative operation	0.5 p
Implement the integration operation	0.5 p
Use regular expressions and pattern matching for extracting the polynomial coefficients	0.5 p
Use Junit for testing	1 p

4. Bibliography

- **Swing:** <https://docs.oracle.com/javase/tutorial/uiswing/index.html>
- **Junit:** <https://www.baeldung.com/junit-5>