MINISTRY OF EDUCATION AND RESEARCH

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

- **Solution description document** (minimum 2000 words, Times New Roman, 10pt, Single Spacing) organized according to the structure specified in the **Laboratory Description** document.
- **Source files** – will be uploaded on the personal ***gitlab*** account created according to the instructions in the **Lab Resources** document, and following the steps:
    - Create a repository on ***gitlab*** named according to the following template *PT2021_Group_FirstName_LastName_Assignment_1* – the repository should be placed in the group named according to the template below: *PT2021_Group_FirstName_LastName*
    - Push the source code and the documentation (**push the code not an archive with the code**)
- Make sure that you give access to your group, to the PT lab assistants. On your Group page, go to: Members → Invite Member → and offer Maintainer rights for the user: utcn.dsrl@gmail.com.

3. Evaluation

The assignment will be graded as follows:

Requirement	**Grading**
Minimum to pass • Use an object-oriented programming design (use encapsulation, define appropriate classes as a result of problem decomposition such as *Polynomial* and *Monomial*) • Use lists instead of arrays • Use *foreach* instead of *for(int i=0…)* • Implement a graphical user interface using Java Swing or JavaFX • Implement the addition and subtraction operation • Implement classes with maximum 300 lines (except the UI classes) and methods with maximum 30 lines • Use the Java naming conventions • Good quality documentation addressing all sections from the documentation structure and having at least 2000 words.	5 points
Use an architectural pattern (e.g. Model View Controller)	1 point
Implement the multiplication operation	0.5 points
Implement the division operation	1 point
Implement the derivative operation	0.5 points
Implement the integration operation	0.5 points
Use regular expressions and pattern matching for extracting the polynomial coefficients	0.5 points
Use Junit for testing	1

4. Bibliography

- Swing:
  - https://docs.oracle.com/javase/tutorial/uiswing/
- JavaFX
  - https://docs.oracle.com/javafx/2/get_started/jfxpub-get_started.htm
  - https://www.baeldung.com/javafx
- Java Regular Expressions
  - https://docs.oracle.com/javase/tutorial/essential/regex/
  - https://www.baeldung.com/regular-expressions-java
- Junit:
  - https://www.vogella.com/tutorials/JUnit/article.html
  - https://www.baeldung.com/junit-5
- Java naming conventions
  - https://google.github.io/styleguide/javaguide.html