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

- A **documentation** (minimum 2000 words, Times New Roman, 10pt, Single Spacing) 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 repository on ***gitlab*** named according to the following template *PT2022_Group_FirstName_LastName_Assignment_1* – the repository should be placed in the group named according to the template below: *PT2022_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: Project Information → Members → Invite Member → and offer Maintainer rights for the gitlab user named **utcn_dsrl**.

3. Evaluation

The assignment will be graded as follows:

Requirement	**Grading**
• 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 (see link) • Good quality documentation addressing all sections from the documentation structure.	5 points (**Minimum to pass**)
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 point

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
- 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