A. **Define your own Toy language** (5 points)

For your project, you will define your own toy programming language. You are free to choose and define the syntax and semantics of your language. Your language many be based on an existing language, or it may derive from a combination of multiple existing languages; however, it cannot be an exact simple subset of an existing language.

At the minimum, your language must include the following constructs:

1) **Data Types**

a) Primitive types covering: integer/real/string/boolean values
b) User-defined record types (e.g., struct in C, record in Pascal)
c) Constants – i.e., immutable identifiers
d) Variables – i.e., mutable identifiers
e) Arrays of the above types

2) **Operators and Expressions**

a) Basic arithmetic expressions with operator precedence and associativity, covering the following operators:
   - Addition / Subtraction
   - Multiplication / Division
   - Unary negation operator
   - String concatenation

b) Basic relational expressions with operator precedence and associativity, covering the following operators:
   - Equals / Greater than / less than

c) Basic logic expressions with operator precedence and associativity, covering the following operators:
   - AND / OR / NOT

3) Language Constructs

a) Assignment statement
b) Selection: decision branching; choose between 2 or more alternative paths
c) Repetition: looping; i.e., repeating a piece of code multiple times in a row
d) Function and Procedures calls
e) Comments

4) Built-in Functionality

You are free to implement the below using their own grammar constructs, or you can implement them as functions or, in the case of the command-line parameters, as specialized function arguments. If the latter, there would be no effect on your grammar.

a) Accept command-line inputs
b) Print formatted text to standard output
c) Read formatted text from standard input

Deliverable:

Your first deliverable is a valid ANTLR4 g4 grammar file, along with a valid source text file for your language that can be tokenized and parsed using the ANTLR4 tools set.

Note, you should provide examples that cover each of the language construct, operators and data types.

***YourLanguageName*.g4**	*– the grammar file for your language*
Program.source	*– sample source file to parse*