Software Engineering Project

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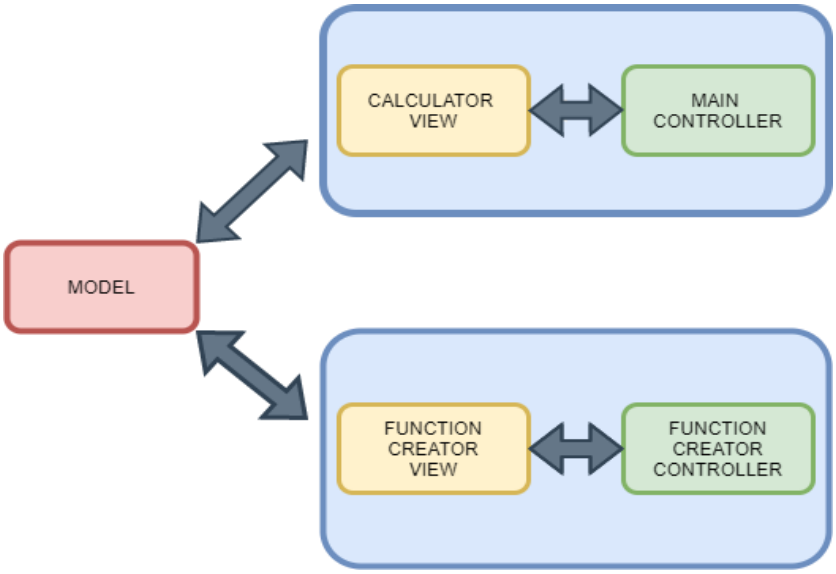
Design of the architecture of the program

Scientific Programmable Calculator

Architectural Pattern

The software is based on a **Model View Controller architecture**.



In particular, **two different views** have been identified with the respective **controllers**.

The first is related to the main features of the program (enter and save numbers, perform operations, save values into variables, access to data etc.), while the other one refers to the

manipulation of user-defined functions. The **controllers** handle the user interface with these two views and with data.

The **model** handles manipulation of data and makes them available to views and controllers.

Classes

ComplexNumber

The class **ComplexNumber** implements the mathematical concept of complex numbers and implements all the required operations.

NumberStack

The class **NumberStack** represents a structure that memorizes the values of numbers entered by the user and handles their manipulation through a LIFO technology.

Variables

The class **Variables** contains all 26 variables with their values and implements the related methods. The structure will be implemented through a Map.

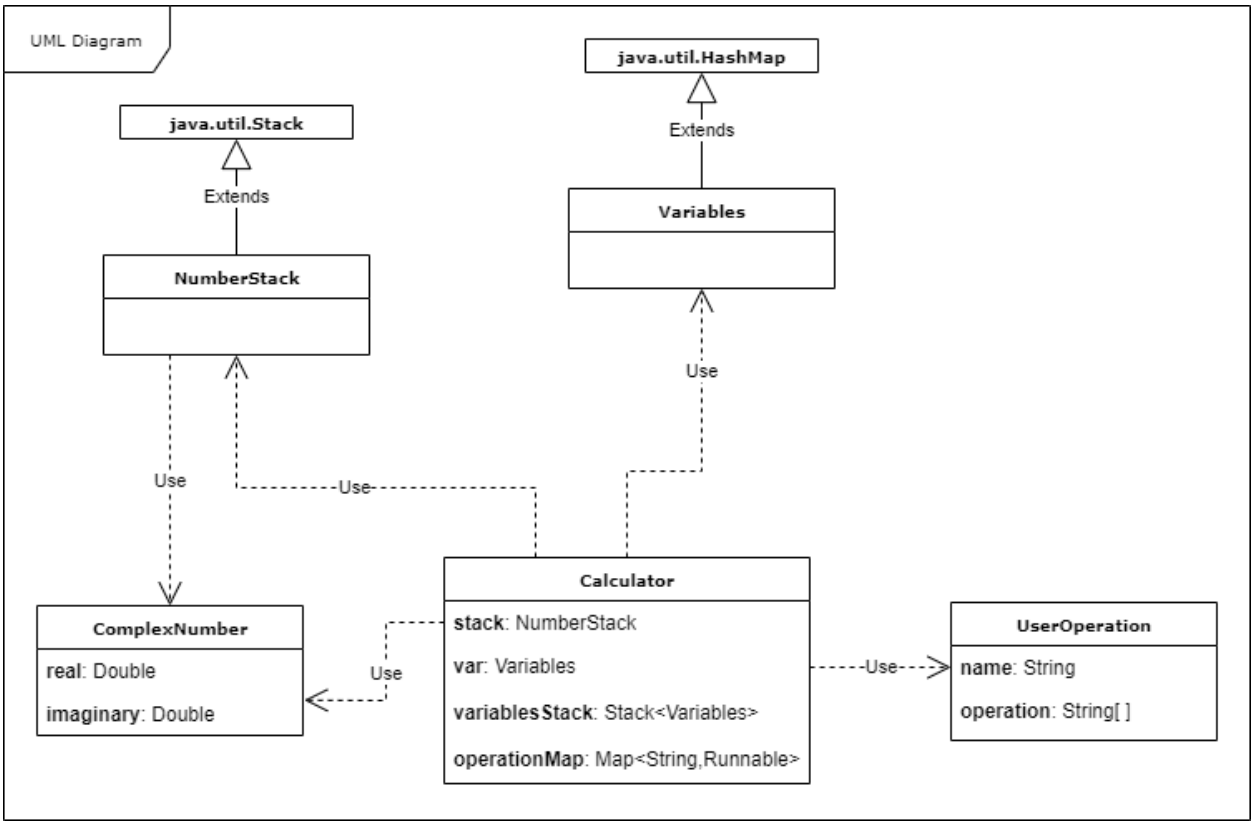
UserOperation

The class **UserOparation** represents the operations defined by the user indicating its name, and its formula.

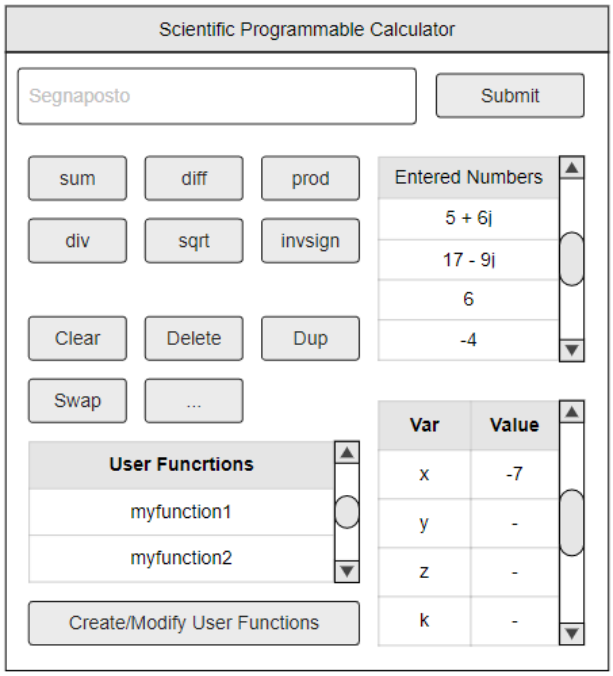
Calculator

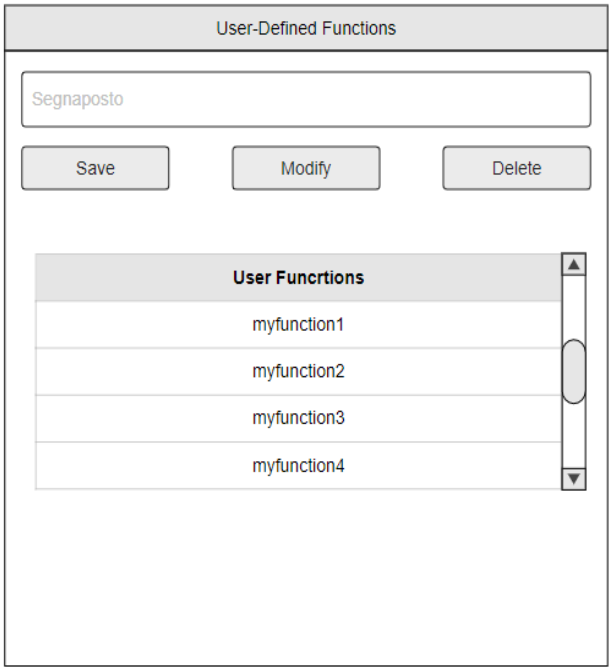
The class **Calculator** manages the communication between the model and the view.

UML Diagram


UML Diagram
java.util.HashMap
java.util.Stack
Extends
Extends
Variables
NumberStack
Use
Use
Use
Calculator
ComplexNumber
real: Double
imaginary: Double
Use
stack: NumberStack
var: Variables
variablesStack: Stack<Variables>
operationMap: Map<String,Runnable>
Use
UserOperation
name: String
operation: String[ ]

MockUps


Scientific Programmable Calculator
Segnaposto
Submit
sum
diff
prod
div
sqrt
invsign
Clear
Delete
Dup
Swap
...
Entered Numbers
5 + 6j
17 - 9j
6
-4
User Funcrtions
myfunction1
myfunction2
Create/Modify User Functions
Var
Value
x
-7
y
-
z
-
k
-


User-Defined Functions
Segnaposto
Save
Modify
Delete
User Funcrtions
myfunction1
myfunction2
myfunction3
myfunction4