**Lab No. 4**

Problem No 1

Create a calculator as a **JavaFXML application** in Scene Builder. The **Calculator** should allow the user to input numbers in a textbox and choose an operation to perform on them (addition, multiplication, division, subtraction) with **Buttons** as it is done with a usual calculator (*see the design of the* **Calculator** *application in the Accessories Program group in the MS Windows environment*) . Design the **Layout** of the buttons and the textbox to execute these operations, as well as, add support for handling the following events:

a) to remember the currently displayed number (**M** operation)

b) to add the currently displayed number with the number stored in memory and display the result (**M+** operation)

c) to subtract the currently displayed number with the number stored in memory and display the result (**M-** operation)

d) to clear the memory (**MC-** operation

The methods performing the Calculator operations must be **public.** There should be also **two** *public set* **properties** for the user numeric input, necessary to complete the calculator operations**.** There should be a *public get* **property** for the Calculator result.

Test **the Calculator component**.
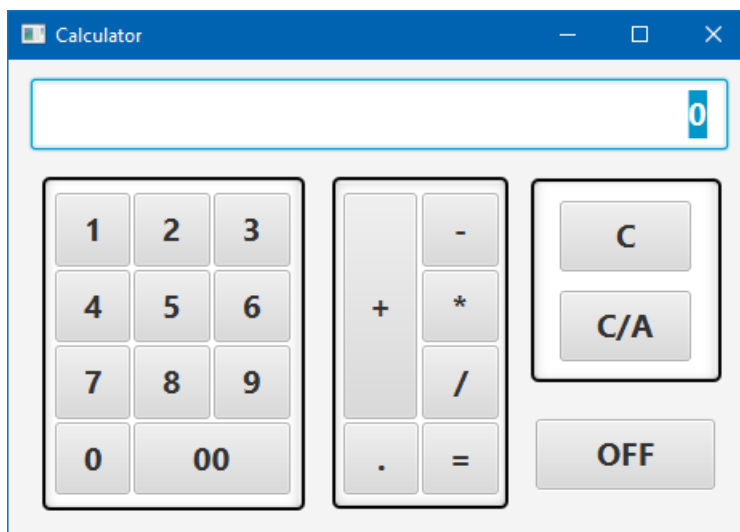
Problem No 2

Develop a program that implements a **prototype user interface** for **composing an email message**. The application should have text fields for the **To**, **CC**, and **Bcc** address lists and **subject line**, and **one for**

the message body. Include a **button** labeled **Send**. When the **Send** button is pushed, the program should **display the contents** of all fields in the content section of an Alert message box of type **Information**. There should be a button **Cancel** allowing the user to **quit the application**.

Problem No 3

Write a **JavaFXML** application **with the given GUI.**

The program should let the user **enter the loan amount** and **loan period** in the number of years from text fields, and it should **display the monthly and total payments for each interest rate** starting from 5 percent to 8 percent, with increments of one-eighth, in a text area.

Write a class LoanComponent to make the necessary computations of the loan. The class LoanComponent has datamembers

```
annualInterestRate // yearly interest rate of the loan
numberOfYears      // number of years of the loan
loanAmount         // the loan amount
```

In addition to the general purpose constructor, write SET/GET methods for the datamembers and a method to compute the total loan amount   (loan amount plus the total of payments paid during the numberOfYears) for the given values of annualInterestRate, numberOfYears and loanAmount making use of the formula

$$\frac{\text{loanAmount} * \text{monthlyInterestRate}}{1 - \left(\frac{1}{1 + \text{monthlyInterestRate}}\right)^{\text{numberOfYears} * 12}}$$

Problem No 4

Write a **JavaFXML** application that converts between decimal, hex, and binary numbers, as shown below. When you enter a decimal value in the decimal value text field and press the Enter key, its corresponding hex and binary numbers are displayed in the other two text fields. Likewise, you can enter values in the other fields and convert them accordingly. (Hint: Use the

`Integer.parseInt(s, radix)` method to parse a String to a decimal and use

Integer.toHexString(**decimal**) and Integer.**toBinaryString**(**decimal**) to obtain a hex number or a binary number from a decimal.)