|  |  |  |
| --- | --- | --- |
| **LAB221Assignment** | **Type:** | **Long Assignment** |
| **Code:** | **J2.L.P0022** |
| **LOC:** | **300** |
| **Slot(s):** | **5** |

**Title: Simple Calculator**

**Background**

A simple calculator is a small program used to perform basic operations of arithmetic. It imitated hardware calculators by implementing the same functionality with mouse-operated, rather than finger-operated, buttons. Such software calculators first emerged in the 1980s as part of the Windows operating system.

**Program Specifications**

The simple calculator can perform basic arithmetic operations such as: Add, Subtract, Multiply and Divide Square root (√), %, and 1/x. The operands are positive/negative integer or decimal numbers.

It also supports:

* M+ add to value stored in memory,
* M- subtract from the value stored in memory,
* MR display the value in memory
* MC clear the value in memory

**Features:**

***Add operation:***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***1*** | ***1*** |
| ***2*** | ***+*** | ***1*** |
| ***3*** | ***2*** | ***2*** |
| ***4*** | ***=*** | ***3*** |

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***1*** | ***1*** |
| ***2*** | ***+*** | ***1*** |
| ***3*** | ***2*** | ***2*** |
| ***4*** | ***+*** | ***3*** |
| ***5*** | ***4*** | ***4*** |
| ***6*** | ***=*** | ***7*** |

*Subtract, Multiply, and Divide operations execute as the Add one.*

***Square root operation***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***4*** | ***4*** |
| ***2*** | **√** | ***2*** |

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***4*** | ***4*** |
| ***2*** | **+/-** | ***-4*** |
| ***3*** | √ | ***Error*** |

***1/x operation***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***10*** | ***10*** |
| ***2*** | **1/x** | ***0.1*** |

***% operation***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***50*** | ***50*** |
| ***2*** | **%** | ***0.5*** |

***+/- operation***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***3*** | ***3*** |
| ***2*** | **+/-** | ***-3*** |
| ***3*** | **+/-** | ***3*** |

***M+, M-, MR and MC***

***M+***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***1*** | ***1*** |
| ***2*** | ***M+*** | ***1*** |
| ***3*** | ***2*** | ***2*** |
| ***4*** | ***M+*** | ***2*** |
| ***5*** | ***MR*** | ***3*** |

***M-***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***1*** | ***1*** |
| ***2*** | ***M-*** | ***1*** |
| ***3*** | ***2*** | ***2*** |
| ***4*** | ***M-*** | ***2*** |
| ***5*** | ***MR*** | ***-3*** |

***M-, M+***

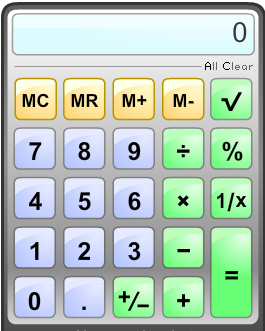
|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***1*** | ***1*** |
| ***2*** | ***M-*** | ***1*** |
| ***3*** | ***2*** | ***2*** |
| ***4*** | ***M+*** | ***2*** |
| ***5*** | ***MR*** | ***1*** |

***MC***

|  |  |  |
| --- | --- | --- |
| ***Input seq*** | ***Input*** | ***Display*** |
| ***1*** | ***1*** | ***1*** |
| ***2*** | ***M+*** | ***1*** |
| ***3*** | ***MC*** | ***1*** |
| ***4*** | ***2*** | ***2*** |
| ***5*** | ***M+*** | ***2*** |
| ***6*** | ***MR*** | ***2*** |

***Expectation of User interface:***

Go to <http://www.online-calculator.com/> to have a deep understand of a simple calculator.



Clear the display, and reset the calculator

**Guidelines**

Use JFrame, JButton, JTextField, JLabel components and Math.sqrt() function.