**CALCULATOR**

**1.1 Objective:**

Create a calculator app that helps to do basic arithmetic operations addition, subtraction, multiplication and division.

**1.2 Design and Implementation:**

**Userstory#1**: Calculator should contain clickable buttons with numbers read from 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0

**Userstory#2**: Calculator should have a display label at the top, when user clicks the equals button “=” in the keypad the label will display the calculated output.

**Userstory#3**: Calculator should have a display textbox at the top, when user clicks any buttons in the keypad the textbox will display the number/symbol user clicked.

**Userstory#4**: Calculator should contain clickable buttons with arithmetic symbols “ + “ , “ – “, “ \* “ , “ / “ and decimal point “.”

**Userstory#5**: Calculator should contain clickable buttons with symbol “ ( “ , “ ) “ brackets which can be used for the arithmetic calculations.

**Userstory#6**: Calculator should contain clickable button with letter “ C “ , when clicks this button value in the textbox and result label will be cleared.

**Userstory#7**: Calculator should contain clickable button with letter “ CE “ , this will act similar to backspace when user clicks this button the last value entered in the textbox will be deleted.

**Userstory#8**: Calculator should contain clickable button with symbol “ = “ , when user clicks this button the result of the textbox expression will be displayed in the result textbox and label.

**Userstory#9**: Validate calculator textbox to accepts only numerical values and arithmetic operator symbols. User should not be allowed to enter alphabets or other symbols.

**Userstory#10**: Calculator should perform the basic arithmetic operations addition, subtraction, multiplication and division for numbers and decimal numbers.

**Userstory#11**: Calculator should display the decimal values precision up to only 6 decimal places. Eg: 2/3 will display the output 0.666667 after the decimal point.

**Userstory#12**: Write automated test cases to test the functionality of the calculator.

**1.3 Technical Specification:**

Using React Js library create a calculator application to do arithmetic operations.

1. Create a component ‘Calculator’.js and the component should be included in the index.html <root/> element.
2. Calculator.js component is stateful component

Calculator class have following states

* “lastclicked” – To check the last performed action if “=” was clicked before than the expression will set to empty to start the new calculation.
* “answer” –To display the result in Result label
* “expression” – to display the expression in result textbox.

1. Calculator component have the following elements,

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sno** | **userstory** | **Element** | **name** | **description** |
| 1 | #2 | Label | lblresult | Display the final output of the expression |
| 2 | #3 | Textbox | txtresult | Display the expression when user clicks the buttons |
| 3 | #5 | Button | ( | Open brackets used for arithmetic operation |
| 4 | #5 | Button | ) | Close brackets used for arithmetic operation |
| 5 | #6 | Button | c | Clear button when clicked  clears the state : expression and answer.  Empty the textbox value and label value |
| 6 | #7 | Button | ce | Backspace button when clicked  Deletes the last entered value from the textbox |
| 7 | #4 | Button | + | Button used for addition |
| 8 | #4 | Button | - | Button used for subtraction |
| 9 | #4 | Button | \* | Button used for multiplication |
| 10 | #4 | Button | / | Button used for division |
| 11 | #1 | Button | 1 | Button enters number 1 |
| 12 | #1 | Button | 2 | Button enters number 2 |
| 13 | #1 | Button | 3 | Button enters number 3 |
| 14 | #1 | Button | 4 | Button enters number 4 |
| 15 | #1 | Button | 5 | Button enters number 5 |
| 16 | #1 | Button | 6 | Button enters number 6 |
| 17 | #1 | Button | 7 | Button enters number 7 |
| 18 | #1 | Button | 8 | Button enters number 8 |
| 19 | #1 | Button | 9 | Button enters number 9 |
| 20 | #1 | Button | 0 | Button enters number 0 |
| 21 | #5 | Button | . | Button enters decimal point . |
| 22 | #8 | Button | = | Button calculates the final output and result is displayed in the result label and textbox |

1. Functions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| s.no | userstory | Function name | Event | descrption |
| 1 | #9 | isNumber | txtresult.onClick() | User can enter numbers into the textbox.  Method prevents the user from entering the non-numeric values. |
| 2 | #6 | doCalculations | Button c.onlick() | When user clicks on the “c” button the textbox value and label value will be set to empty. |
| 3 | #7 | doCalculations | Button ce.onlick() | When user clicks on the “ce” button the last entered value will be deleted from the textbox. |
| 4 | #8 | doCalculations | Button- =.onlick() | When user clicks on the “=” butoon, value entered in the textbox will be calculated based on the expression.  The result will be displayed in the label – lblresult and the textbox - txtresult |
| 5 | #8 | getPrecision | Method called inside the doCalculations. | Method will check the decimal result and returns the number of digits present after the decimal point.  If the return value is greater than >=7 than it will be truncated to 6. |

1. **Userstory#12** :

Automated test should be written in the “calculator.test.js” file.

Testcases:

|  |  |  |
| --- | --- | --- |
| s.no | userstory | description |
| 1 | 4, 5, 6, 7, 8 | Checks the presence of buttons |
| 2 | 3 | Checks the presence of textbox |
| 3 | 2 | Checks the presence of label |
| 4 | 10 | Do the addition and checks the answer. Eg: 2 + 1 = 3 |
| 5 | 10 | Do the subtraction and checks the answer. Eg: 8 - 6 = 2 |
| 6 | 10 | Do the multiplication and checks the answer. Eg: 10 \* 6 = 60 |
| 7 | 10 | Do the division and checks the answer. Eg: 16 / 4 = 4 |
| 8 | 10 | Do the addition with decimal values. Eg. 4.1 + 2.2 = 6.3 |
| 9 | 6 | Click the “c” to check the textbox value goes empty. |
| 10 | 7 | Click the “ce” to check last entered value is deleted in the textbox. |

**1.4 Output:**

Calculator app is created. Using this calculator user can perform the basic arithmetic operations addition, subtraction, multiplication and division.

