
CALCULATOR

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AUTHOR

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Define the calculator

```
classdef calculator < matlab.apps.AppBase
```

Properties that correspond to app components

```
properties (Access = public)
    UIFigure          matlab.ui.Figure
    Button             matlab.ui.control.Button
    Button_2           matlab.ui.control.Button
    Button_3           matlab.ui.control.Button
    Button_4           matlab.ui.control.Button
    Button_5           matlab.ui.control.Button
    Button_6           matlab.ui.control.Button
    Button_7           matlab.ui.control.Button
    Button_8           matlab.ui.control.Button
    Button_9           matlab.ui.control.Button
    Button_10          matlab.ui.control.Button
    Button_11          matlab.ui.control.Button
    Button_12          matlab.ui.control.Button
    Button_15          matlab.ui.control.Button
    Button_14          matlab.ui.control.Button
    Button_13          matlab.ui.control.Button
    CButton            matlab.ui.control.Button
    sinButton          matlab.ui.control.Button
    cosButton          matlab.ui.control.Button
    tanButton          matlab.ui.control.Button
    logButton          matlab.ui.control.Button
    factorialButton    matlab.ui.control.Button
    Button_16          matlab.ui.control.Button
    expButton          matlab.ui.control.Button
    sinhButton         matlab.ui.control.Button
```

```

coshButton      matlab.ui.control.Button
tanhButton      matlab.ui.control.Button
TextArea        matlab.ui.control.TextArea
Button_19       matlab.ui.control.Button
Button_20       matlab.ui.control.Button
Button_21       matlab.ui.control.Button
log10Button     matlab.ui.control.Button
sqrtButton      matlab.ui.control.Button
piButton        matlab.ui.control.Button
absButton       matlab.ui.control.Button
asinButton      matlab.ui.control.Button
acosButton      matlab.ui.control.Button
atanButton      matlab.ui.control.Button
Button_23       matlab.ui.control.Button
Button_24       matlab.ui.control.Button
end

```

Callbacks that handle component events

```

methods (Access = private)

    % Button pushed function: Button, Button_10, Button_2,
    % Button_21, Button_3, Button_4, Button_5, Button_6,
    % Button_7, Button_8, Button_9, piButton
    function ButtonPushed(app, event)
        value = app.TextArea.Value;
        app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
    end

    % Button pushed function: CButton
    function CButtonPushed(app, event)
        app.TextArea.Value=" ";
    end

    % Button pushed function: Button_13
    function Button_13Pushed(app, event)
        try
            app.TextArea.Value = [app.TextArea.Value{1}
event.Source.Text num2str(eval(app.TextArea.Value{1}))];
        catch
            app.TextArea.Value='Error!';
        end
    end

    % Button pushed function: Button_11, Button_12, Button_14,
    % Button_15, Button_16, Button_19, Button_20, absButton,
    % expButton, factorialButton, logButton, sqrtButton
    function Button_11Pushed(app, event)
        app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
    end

```

```

        % Button pushed function: cosButton, sinButton, tanButton
        function sinButtonPushed(app, event)
            app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
        end

        % Button pushed function: coshButton, sinhButton, tanhButton
        function sinhButtonPushed(app, event)
            app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
        end

        % Callback function
        function powerButtonPushed(app, event)
            app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
        end

        % Callback function
        function Button_22Pushed(app, event)
            app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
        end

        % Button pushed function: asinButton
        function asinButtonPushed(app, event)
            app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
        end

        % Button pushed function: Button_23
        function Button_23Pushed(app, event)
            app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
        end

        % Button pushed function: Button_24
        function Button_24Pushed(app, event)
            app.TextArea.Value=[app.TextArea.Value{1}
event.Source.Text];
        end
    end
end

```

Component initialization

```

methods (Access = private)

    % Create UIFigure and components
    function createComponents(app)

        % Create UIFigure and hide until all components are
created
        app.UIFigure = uifigure('Visible', 'off');

```

```

app.UIFigure.Position = [100 100 795 480];
app.UIFigure.Name = 'UI Figure';

% Create Button
app.Button = uibutton(app.UIFigure, 'push');
app.Button.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button.Position = [17 176 100 22];
app.Button.Text = '1';

% Create Button_2
app.Button_2 = uibutton(app.UIFigure, 'push');
app.Button_2.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button_2.Position = [144 176 100 22];
app.Button_2.Text = '2';

% Create Button_3
app.Button_3 = uibutton(app.UIFigure, 'push');
app.Button_3.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button_3.Position = [286 176 100 22];
app.Button_3.Text = '3';

% Create Button_4
app.Button_4 = uibutton(app.UIFigure, 'push');
app.Button_4.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button_4.Position = [17 141 100 22];
app.Button_4.Text = '4';

% Create Button_5
app.Button_5 = uibutton(app.UIFigure, 'push');
app.Button_5.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button_5.Position = [144 141 100 22];
app.Button_5.Text = '5';

% Create Button_6
app.Button_6 = uibutton(app.UIFigure, 'push');
app.Button_6.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button_6.Position = [286 141 100 22];
app.Button_6.Text = '6';

% Create Button_7
app.Button_7 = uibutton(app.UIFigure, 'push');
app.Button_7.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button_7.Position = [17 100 100 22];
app.Button_7.Text = '7';

% Create Button_8
app.Button_8 = uibutton(app.UIFigure, 'push');

```

```

        app.Button_8.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
        app.Button_8.Position = [144 100 100 22];
        app.Button_8.Text = '8';

        % Create Button_9
        app.Button_9 = uibutton(app.UIFigure, 'push');
        app.Button_9.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
        app.Button_9.Position = [286 100 100 22];
        app.Button_9.Text = '9';

        % Create Button_10
        app.Button_10 = uibutton(app.UIFigure, 'push');
        app.Button_10.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
        app.Button_10.Position = [17 54 100 22];
        app.Button_10.Text = '0';

        % Create Button_11
        app.Button_11 = uibutton(app.UIFigure, 'push');
        app.Button_11.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
        app.Button_11.Position = [144 54 100 22];
        app.Button_11.Text = '+';

        % Create Button_12
        app.Button_12 = uibutton(app.UIFigure, 'push');
        app.Button_12.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
        app.Button_12.Position = [286 54 100 22];
        app.Button_12.Text = '-';

        % Create Button_15
        app.Button_15 = uibutton(app.UIFigure, 'push');
        app.Button_15.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
        app.Button_15.Position = [413 176 100 22];
        app.Button_15.Text = '*';

        % Create Button_14
        app.Button_14 = uibutton(app.UIFigure, 'push');
        app.Button_14.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
        app.Button_14.Position = [413 141 100 22];
        app.Button_14.Text = '/';

        % Create Button_13
        app.Button_13 = uibutton(app.UIFigure, 'push');
        app.Button_13.ButtonPushedFcn = createCallbackFcn(app,
@Button_13Pushed, true);
        app.Button_13.Position = [654 54 100 109];
        app.Button_13.Text = '=';

```

```

% Create CButton
app.CButton = uibutton(app.UIFigure, 'push');
app.CButton.ButtonPushedFcn = createCallbackFcn(app,
@CButtonPushed, true);
app.CButton.Position = [17 214 100 22];
app.CButton.Text = 'C';

% Create sinButton
app.sinButton = uibutton(app.UIFigure, 'push');
app.sinButton.ButtonPushedFcn = createCallbackFcn(app,
@sinButtonPushed, true);
app.sinButton.Position = [286 249 100 22];
app.sinButton.Text = 'sin(';

% Create cosButton
app.cosButton = uibutton(app.UIFigure, 'push');
app.cosButton.ButtonPushedFcn = createCallbackFcn(app,
@sinButtonPushed, true);
app.cosButton.Position = [413 249 100 22];
app.cosButton.Text = 'cos(';

% Create tanButton
app.tanButton = uibutton(app.UIFigure, 'push');
app.tanButton.ButtonPushedFcn = createCallbackFcn(app,
@sinButtonPushed, true);
app.tanButton.Position = [538 249 100 22];
app.tanButton.Text = 'tan(';

% Create logButton
app.logButton = uibutton(app.UIFigure, 'push');
app.logButton.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
app.logButton.Position = [654 249 100 22];
app.logButton.Text = 'log(';

% Create factorialButton
app.factorialButton = uibutton(app.UIFigure, 'push');
app.factorialButton.ButtonPushedFcn =
createCallbackFcn(app, @Button_11Pushed, true);
app.factorialButton.Position = [538 100 100 22];
app.factorialButton.Text = 'factorial(';

% Create Button_16
app.Button_16 = uibutton(app.UIFigure, 'push');
app.Button_16.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
app.Button_16.Position = [538 176 100 22];
app.Button_16.Text = '10^';

% Create expButton
app.expButton = uibutton(app.UIFigure, 'push');
app.expButton.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
app.expButton.Position = [538 54 100 22];

```

```

app.expButton.Text = 'exp(';

% Create sinhButton
app.sinhButton = uibutton(app.UIFigure, 'push');
app.sinhButton.ButtonPushedFcn = createCallbackFcn(app,
@sinhButtonPushed, true);
app.sinhButton.Position = [286 290 100 22];
app.sinhButton.Text = 'sinh(';

% Create coshButton
app.coshButton = uibutton(app.UIFigure, 'push');
app.coshButton.ButtonPushedFcn = createCallbackFcn(app,
@sinhButtonPushed, true);
app.coshButton.Position = [413 290 100 22];
app.coshButton.Text = 'cosh(';

% Create tanhButton
app.tanhButton = uibutton(app.UIFigure, 'push');
app.tanhButton.ButtonPushedFcn = createCallbackFcn(app,
@sinhButtonPushed, true);
app.tanhButton.Position = [538 290 100 22];
app.tanhButton.Text = 'tanh(';

% Create TextArea
app.TextArea = uitextarea(app.UIFigure);
app.TextArea.HorizontalAlignment = 'right';
app.TextArea.FontName = 'Bodoni MT';
app.TextArea.FontSize = 40;
app.TextArea.FontWeight = 'bold';
app.TextArea.Position = [17 349 737 60];

% Create Button_19
app.Button_19 = uibutton(app.UIFigure, 'push');
app.Button_19.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
app.Button_19.Position = [17 249 100 63];
app.Button_19.Text = '(';

% Create Button_20
app.Button_20 = uibutton(app.UIFigure, 'push');
app.Button_20.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
app.Button_20.Position = [144 249 100 64];
app.Button_20.Text = ')';

% Create Button_21
app.Button_21 = uibutton(app.UIFigure, 'push');
app.Button_21.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.Button_21.Position = [413 100 100 22];
app.Button_21.Text = '.';

% Create log10Button
app.log10Button = uibutton(app.UIFigure, 'push');

```

```

app.log10Button.Position = [654 290 100 22];
app.log10Button.Text = 'log10(';

% Create sqrtButton
app.sqrtButton = uibutton(app.UIFigure, 'push');
app.sqrtButton.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
app.sqrtButton.Position = [654 214 100 22];
app.sqrtButton.Text = 'sqrt(';

% Create piButton
app.piButton = uibutton(app.UIFigure, 'push');
app.piButton.ButtonPushedFcn = createCallbackFcn(app,
@ButtonPushed, true);
app.piButton.Position = [144 214 100 22];
app.piButton.Text = 'pi';

% Create absButton
app.absButton = uibutton(app.UIFigure, 'push');
app.absButton.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);
app.absButton.Position = [414 54 100 22];
app.absButton.Text = 'abs(';

% Create asinButton
app.asinButton = uibutton(app.UIFigure, 'push');
app.asinButton.ButtonPushedFcn = createCallbackFcn(app,
@asinButtonPushed, true);
app.asinButton.Position = [287 214 100 22];
app.asinButton.Text = 'asin(';

% Create acosButton
app.acosButton = uibutton(app.UIFigure, 'push');
app.acosButton.Position = [414 214 100 22];
app.acosButton.Text = 'acos(';

% Create atanButton
app.atanButton = uibutton(app.UIFigure, 'push');
app.atanButton.Position = [538 214 100 22];
app.atanButton.Text = 'atan(';

% Create Button_23
app.Button_23 = uibutton(app.UIFigure, 'push');
app.Button_23.ButtonPushedFcn = createCallbackFcn(app,
@Button_23Pushed, true);
app.Button_23.Position = [538 141 100 22];
app.Button_23.Text = '^';

% Create Button_24
app.Button_24 = uibutton(app.UIFigure, 'push');
app.Button_24.ButtonPushedFcn = createCallbackFcn(app,
@Button_24Pushed, true);
app.Button_24.VerticalAlignment = 'top';
app.Button_24.Position = [654 176 100 22];

```



```

        app.Button_24.Text = '^-1';

        % Show the figure after all components are created
        app UIFigure.Visible = 'on';
    end
end

```

App creation and deletion

```

methods (Access = public)

    % Construct app
    function app = calculator

        % Create UIFigure and components
        createComponents(app)

        % Register the app with App Designer
        registerApp(app, app UIFigure)

        if nargin == 0
            clear app
        end
    end
end

```

Code that executes before app deletion

```

function delete(app)

    % Delete UIFigure when app is deleted
    delete(app UIFigure)
end

end

end

```

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