DERIVATIVE CALCULATOR

Submitted by :
Tanvir Hasan Abir
BSSE Roll : 1321
Exam Roll : 115516

Supervised by :
Dr. Naushin Nower
Associate Professor,
Institute of Information Technology

What Is Derivative Calculator ?

- Quickly and accurately compute derivatives

- Provide step-by-step solutions

- Save time and effort

Why Derivative Calulator?

serve as educational aids

explore and understand the concept

enable learners to verify their own work and

handle complex functions

BackGroud Study

- Differential Rules
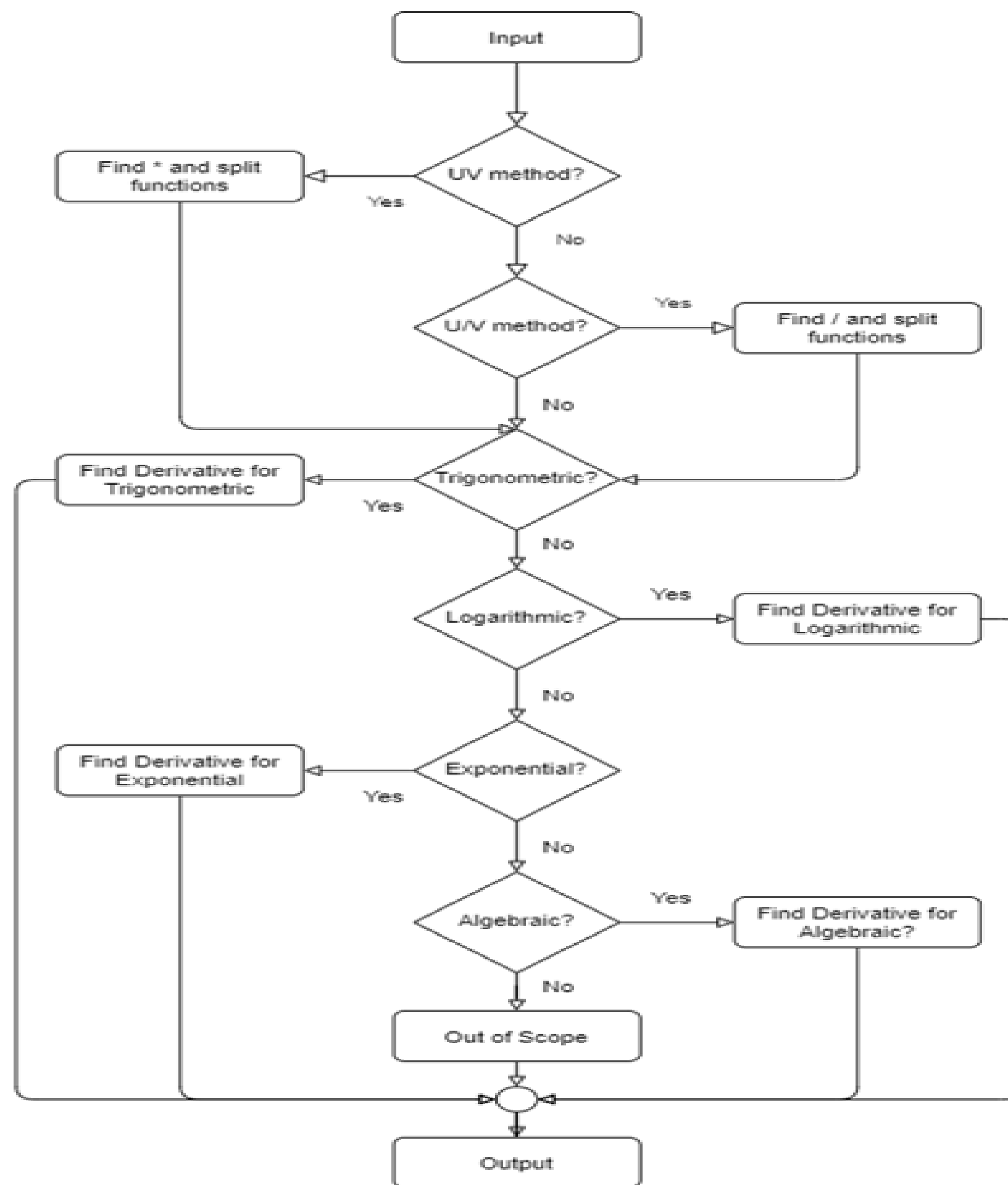- String Manipulation
- Tokenization
- Caching

Project Overview

Tokenization

Parsing

Derivative

Calculation

Shows Result

```
                          ┌──────────┐
                          │  Input   │
                          └──────────┘
                                │
                                ▽
┌──────────────────┐         ◇ UV method? ◇
│ Find * and split │◁─────────                          
│    functions     │    Yes
└──────────────────┘         │ No
                                ▽
                          ◇ U/V method? ◇ ──Yes──▶ ┌──────────────────┐
                                │                   │ Find / and split │
                                │ No                │    functions     │
                                ▽                   └──────────────────┘
┌──────────────────┐         ◇ Trigonometric? ◇◁──
│ Find Derivative  │◁─────────
│ for Trigonometric│   Yes
└──────────────────┘         │ No
                                ▽
                          ◇ Logarithmic? ◇ ──Yes──▶ ┌──────────────────┐
                                │                    │ Find Derivative  │
                                │ No                 │  for Logarithmic │
                                ▽                    └──────────────────┘
┌──────────────────┐         ◇ Exponential? ◇
│ Find Derivative  │◁─────────
│  for Exponential │   Yes
└──────────────────┘         │ No
                                ▽
                          ◇ Algebraic? ◇ ──Yes──▶ ┌──────────────────┐
                                │                  │ Find Derivative  │
                                │ No               │  for Algebraic?  │
                                ▽                  └──────────────────┘
                          ┌──────────────┐
                          │ Out of Scope │
                          └──────────────┘
                                │
                                ○
                                │
                          ┌──────────┐
                          │  Output  │
                          └──────────┘
```

```
                    Welcome to DERIVATIVE CALCULATOR

                    Enter an Equation (Press '1' )
                    Exit (Press '2')


                    Enter your choice :


                    1
Input Equation : ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(x^3+3*x)



            Answer :

            Given Equation -
                    f = ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(x^3+3*x)

            d/dx(f) = d/dx ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(x^3+3*x)

                    =  First of all, we have to differentiate the part inside ln().

                So-

                    =  First of all, we have to differentiate the part inside ln().

                So-

                    =  First of all, we have to differentiate the part inside ln().
```

```
                So-

                    =  First of all, we have to differentiate the part inside ln().

                So-

                    =  First of all, we have to differentiate the part inside ln().

                So-

                    = d/dx (x^3+3*x)/x^3+3*x)

                    = (3*x^2+3)/x^3+3*x) / ln(x^3+3*x) / ln(ln(x^3+3*x) / ln(ln(ln(x^3+3*x) / ln(ln(ln(ln(x^3+3*x) /
ln(ln(ln(ln(ln(ln(ln(x^3+3*x) / ln(ln(ln(ln(ln(ln(ln(ln(x^3+3*x) / ln(ln(ln(ln(ln(ln(ln(ln(ln(x^3+3*x) / ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(l
3+3*x) / ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(ln(x^3+3*x)  [Answer]
```

```
                    Welcome to DERIVATIVE CALCULATOR

                    Enter an Equation (Press '1' )
                    Exit (Press '2')


                    Enter your choice :


                    1
Input Equation : e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(x^3)


              Answer :

              Given-
                       f = e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(x^3)

               d/dx(f) = d/dx e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(e^(x^3)

                       = d/dx (x^3)*e^(x^3)

                       = First of all, we have to differentiate the part at the power of e^().

              So-

                       = First of all, we have to differentiate the part at the power of e^().
```

```
          So-

             = First of all, we have to differentiate the part at the power of e^().

          So-

             = First of all, we have to differentiate the part at the power of e^().

          So-

             = (3*x^2)*e^(x^3)*e^(e^(x^3)*e^(e^(e^(x^3)*e^(e^(e^(e^(x^3)*e^(e^(e^(e^(e^(x^3)*e^(e^(e^(e^(e^(e^(x^3)*e^
(e^(e^(e^(e^(e^(e^(e^(x^3)*e^(e^(e^(e^(e^(e^(e^(e^(x^3)*e^(e^(e^(e^(e^(e^(e^(e^(x^3)*e^(e^(e^(e^(e^(e^(e^(e^(x^3)*e^(e^(e^(e^(e^(e^(e^(e^(x^3)
[Answer]
```

Challenges

- The characteristics of the given equation

- Variable Identification,Coefficient Detection,Constant Differentiation

- Implementation of differentiation methods

- Chain Rule Implementation

- Derivative of power function

Project Link : SPL1

https://github.com/thabir303/SPL-1

Thank You