Fibonacci Sequence

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Class name: Algoritma dan Komputasi

The Fibonacci Sequence is **a series of numbers where each number is the sum of the two preceding numbers.** Generally defined as:

$$F_0 = 0, F_1 = 1$$

and for $n \geq 2$:

$$F_n = F_{n-1} + F_{n-2}$$

This results in the following sequence of numbers:

$$0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...$$

Most important part of the Fibonacci Sequence

- **Recrisive Characteristic:** always depends on the two previous values.
- **Found in many places in nature:** For example, in flower patterns, leaf arrangements, shell spirals, and body proportions.
- **Related to the Golden Ratio:** $\varphi \approx 1.618$ because of the ratio of two consecutive terms $\frac{F_{n+1}}{F_n} \rightarrow \varphi$ when $n \rightarrow \infty$

Flowchart

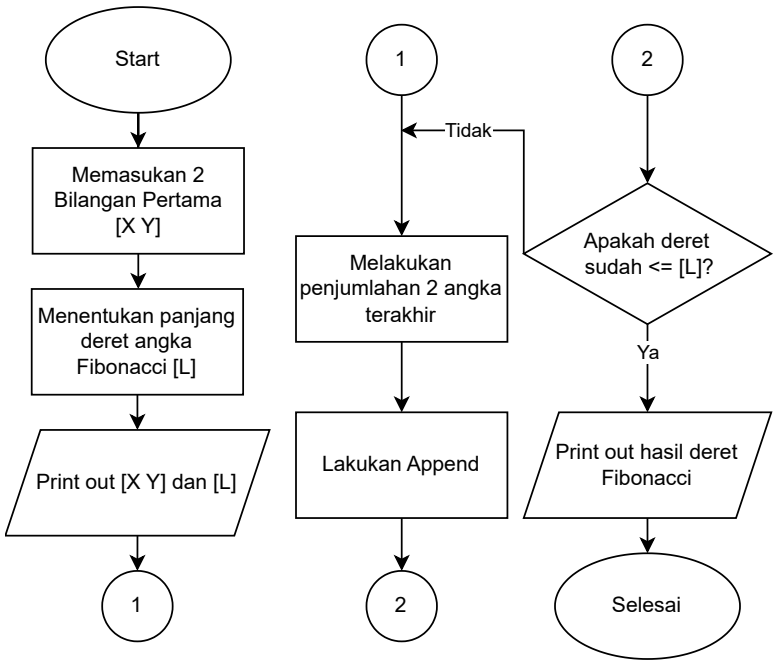

Figure 1: Flowchart program Fibonacci

Code

Listing 1: Code for Fibonacci Sequence

```
% Callbacks that handle component events
    methods (Access = private)

        % Button pushed function: GenerateButton
        function GenerateButtonPushed(app, event)
            % 1. Nilai dari Edit Field
    X = app.MasukanAngkaXEditField.Value;
    Y = app.MasukanAngkaYEditField.Value;
    L = app.MasukanPanjangDeretEditField.Value;

    % 2. Validasi input dari User
    if L < 1
        app.HasilEditField.Value = 'Panjang deret harus lebih dari 0.';
        return;
    end

    % 3. Perhtungan Deret Fibonacci
    if L == 1
        fibo = [X];
    elseif L == 2
        fibo = [X, Y];
    else
        fibo = [X, Y];
        for i = 3:L
            bilangan_berikutnya = fibo(i-1) + fibo(i-2);
            fibo = [fibo, bilangan_berikutnya];
        end
    end

    % 4. Print OUt
    app.HasilEditField.Value = mat2str(fibo);
        end
    end
```

GUI

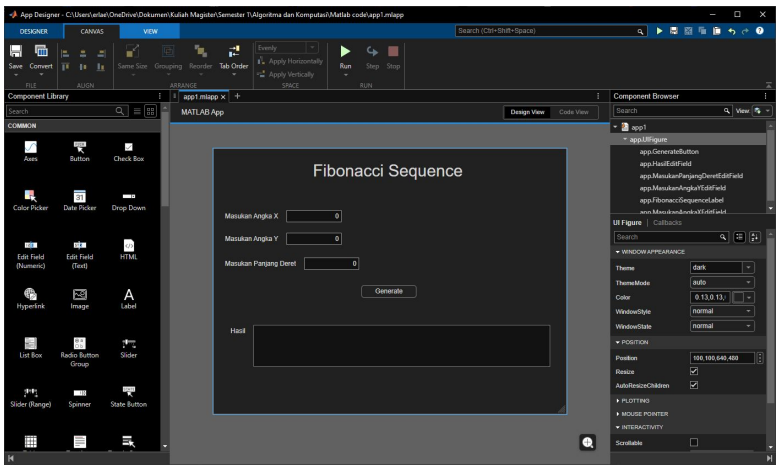

Figure 2: AppDesigner on Matlab

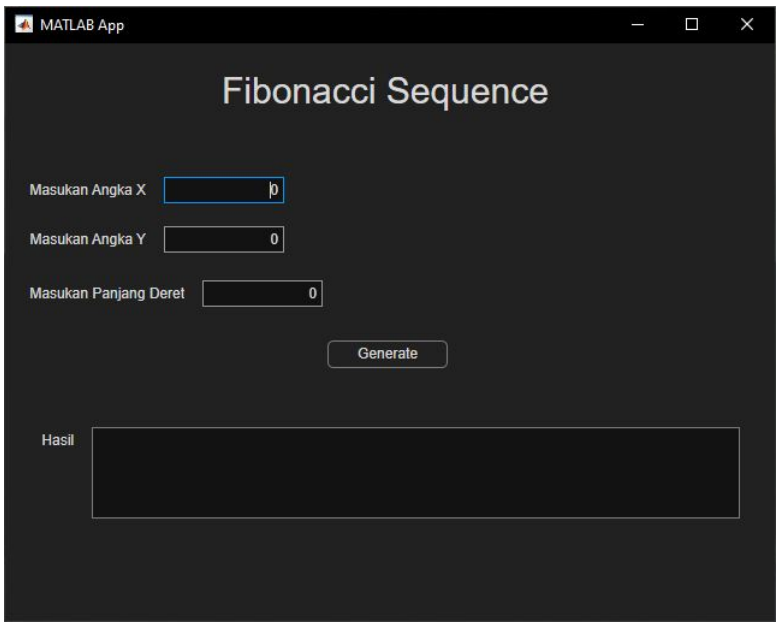

Figure 3: GUI Fibonacci Sequence

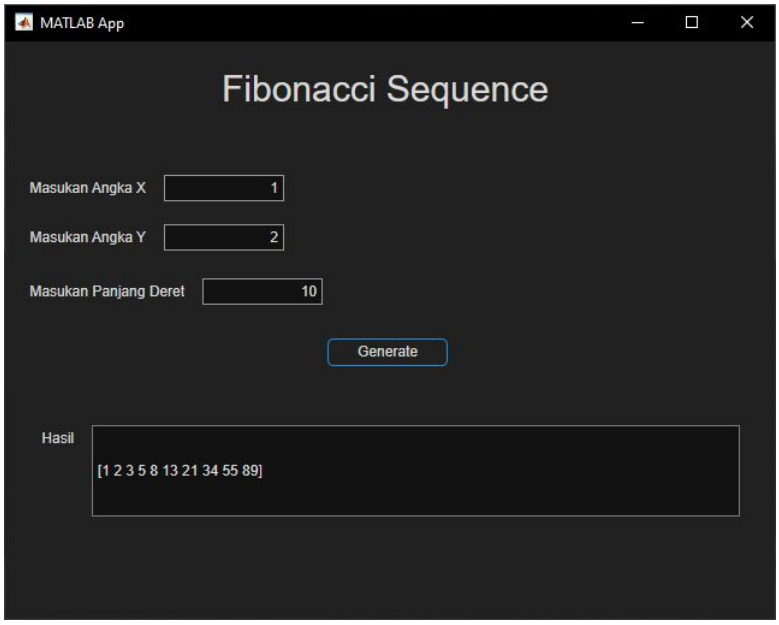

Figure 4: The Result of Fibonacci Calc

Link

Github : Silakan kunjungi Github