

The slide features a central rectangular area with a light beige, textured background, framed by a thin green border. This central area is surrounded by decorative illustrations of tropical foliage, including large monstera leaves and feathery palm fronds, in various shades of green. A thin horizontal green line is positioned above the main title.

# Lab09 架構分享

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A decorative border of tropical plants and flowers surrounds the central text. It includes purple flowers at the top left, a pink rose on the right, white orchids at the bottom right, and various green leaves like monstera and palm fronds throughout.

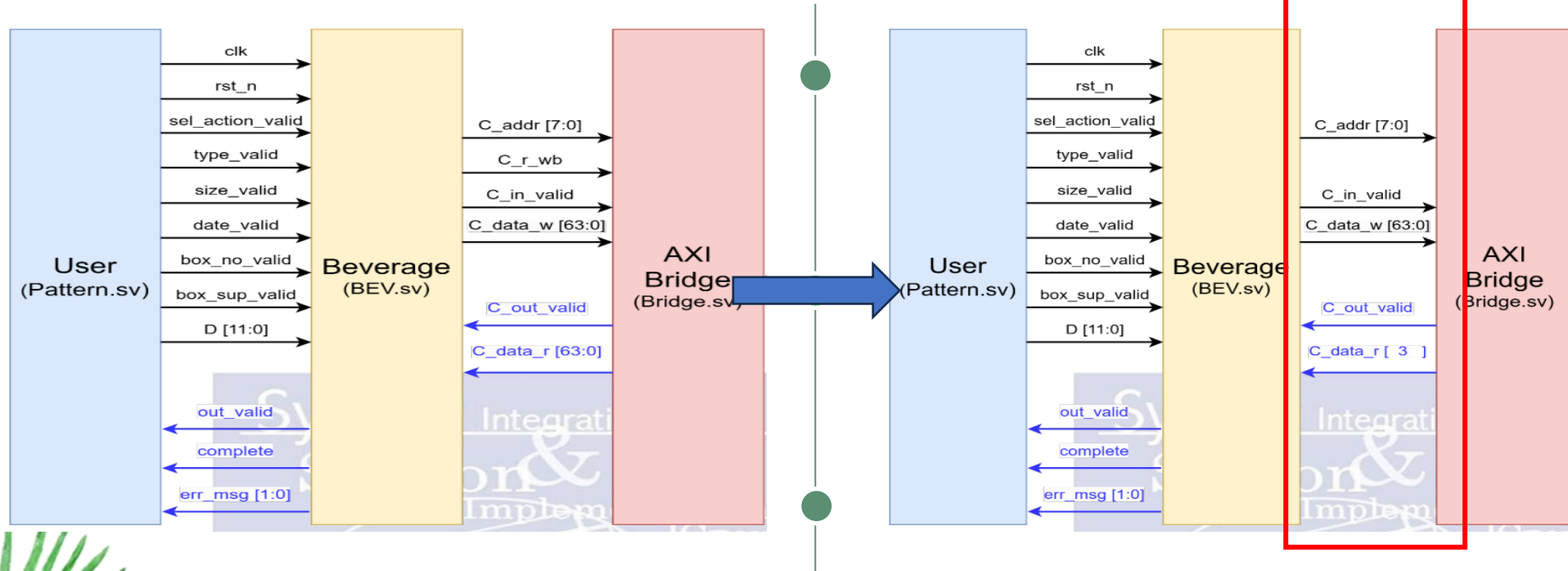
# **Part 01**

## Architecture



# Architecture

1. Check Date , Ingredient and Overflow in Bridge.sv
2. C\_data\_r [1:0] transmits err\_msg



# B e v e r a g e

## 1 . Save all information in C\_data\_w

```
case(c_state)
  IDLE: begin
    inf.out_valid <= 0;
    inf.complete <= 0;
    inf.err_msg <= 0;
    if (inf.sel_action_valid) begin
      inf.C_data_w[63:62] <= inf.D.d_act[0];
      case(inf.D.d_act[0])
        Make_drink:
          c_state <= MAKE_DRINK;
        Supply:
          c_state <= SUPPLY;
        Check_Valid_Date:
          c_state <= CHECK_DATE;
      endcase
    end
  end
  MAKE_DRINK: begin
    if(inf.type_valid)
      inf.C_data_w[13:11] <= inf.D.d_type[0];
    if(inf.size_valid)
      inf.C_data_w[10: 9] <= inf.D.d_size[0];
    if(inf.date_valid)
      inf.C_data_w[ 8: 0] <= inf.D.d_date[0];
    if(inf.box_no_valid) begin
      inf.C_addr <= inf.D.d_box_no[0];
      c_state <= WAIT_BUSY;
    end

    inf.C_data_w[61:52] <= black;
    inf.C_data_w[49:40] <= green;
    inf.C_data_w[37:28] <= milk;
    inf.C_data_w[25:16] <= pineapple;
  end
  SUPPLY : begin
    if(inf.date_valid)
      inf.C_data_w[ 8: 0] <= inf.D.d_date[0];
    if(inf.box_no_valid)
      inf.C_addr <= inf.D.d_box_no[0];
    if(inf.box_sup_valid) begin
      inf.C_data_w[ 25: 14] <= inf.D.d_ing[0];
      inf.C_data_w[ 61: 26] <= inf.C_data_w[ 49: 14];

      supply_cnt <= supply_cnt + 1;
      if(supply_cnt == 3)
        c_state <= WAIT_BUSY;
      end
    end
  end
end
```

C\_data\_w[63:62] : Action

C\_data\_w[13:11] : Type

C\_data\_w[10: 9] : Size

C\_data\_w[ 8: 0] : Date

C\_data\_w[61:50] : Black tea ingredient

C\_data\_w[49:38] : Green tea ingredient

C\_data\_w[37:26] : Milk ingredient

C\_data\_w[25:14] : Pineapple ingredient

```

Overflow_check: begin // Overflow check
    inf.C_data_r[2] <= 1; // busy
    if( Overflow_flag || add_result[12]) begin
        inf.C_data_r[1:0] <= 2'b11; // img_OF
    end

    if( add_result [12]) // Overflow
        inf.W_DATA[19: 8] <= 4095;
    else
        inf.W_DATA[19: 8] <= add_result;

    inf.C_out_valid <= 1;
    c_state <= Write_address;
end

Expire_check: begin
    inf.W_DATA[63:54] <= sub_result;
    No_ing_flag <= No_ing_flag || sub_result[10];

    if( Exp_flag ) begin// inf.C_data_w[8:5] < inf.W_D
        if(inf.C_data_w[63] == 1'b0) begin // make
            c_state <= Sub1;
        end
        else begin
            inf.C_out_valid <= 1;
            c_state <= Idle; // No_err
        end
    end
end
else begin // expire
    inf.C_out_valid <= 1;
    inf.C_data_r[1:0] <= 1; // No_Exp;

    c_state <= Idle;
end
end

```

## B r i d g e

- 1 . Read , Write dram
- 2 . Check err\_msg
3. Using one adder (12 bits) one subtractor (10 bits)
4. C\_data\_r [2] : busy  
C\_data\_r [1:0] : err\_msg



A decorative border surrounds the central text, featuring various tropical plants and flowers. In the top left, there are purple flowers and green leaves. In the top center, a single green leaf is visible. On the left side, there are white and pink roses, green leaves, and a palm frond. At the bottom left, there are large green leaves and a palm frond. On the right side, there are large green leaves and a white flower. At the bottom right, there are large green leaves, a palm frond, and a blue flower.

# Part 02

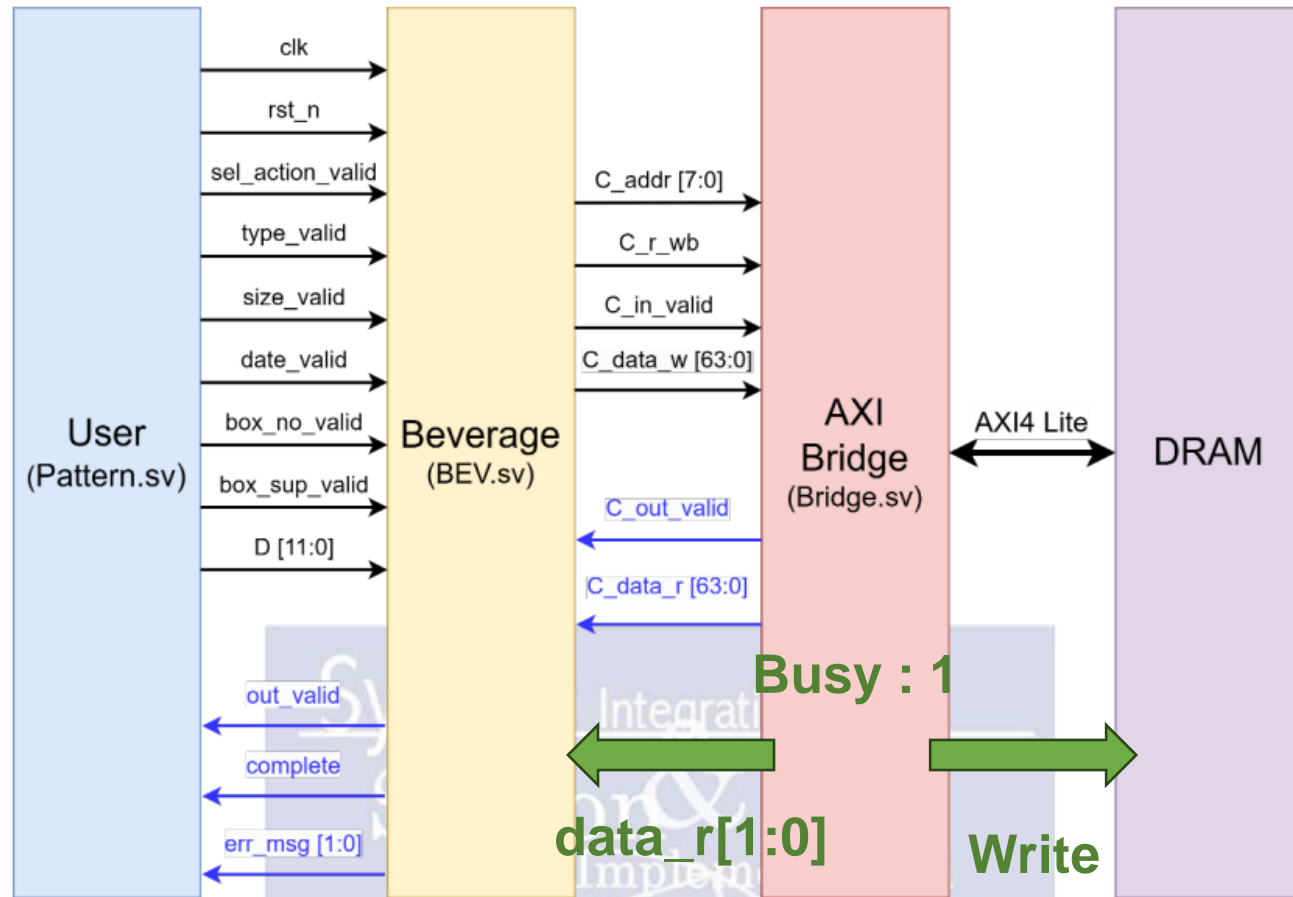
## Latency

## A c t i o n

	Make Drink	Supply	Check expired date
Busy = 0	Read dram	Read dram	Read dram
	check expired date	Add	check expired date
	Subtract	check overflow	
	check ingredient		
Busy = 1			Output err_msg !!
	Write dram	Write dram	



## Design Block Diagram



## Design Block Diagram

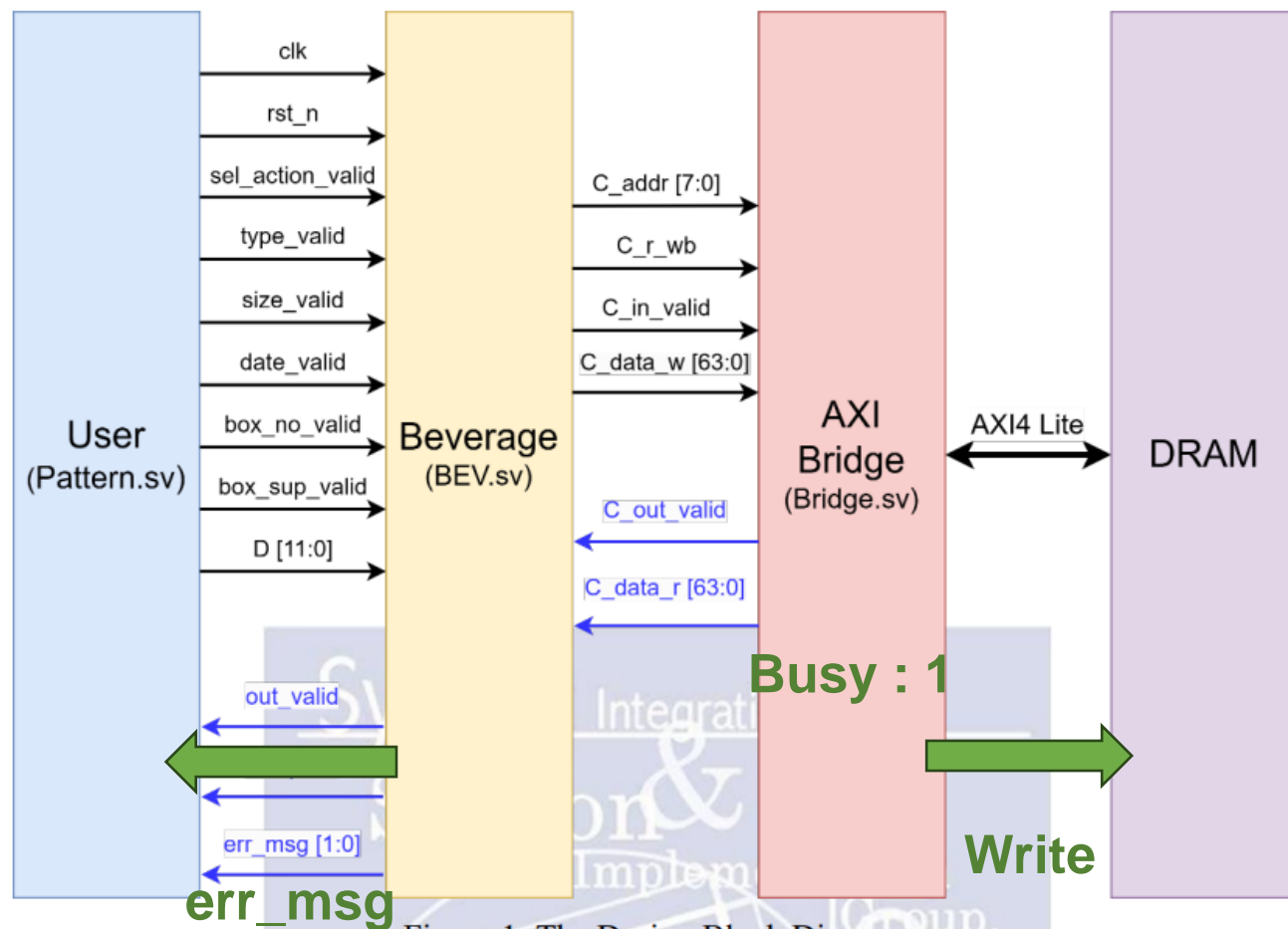


Figure 1: The Design Block Diagram

### Design Block Diagram

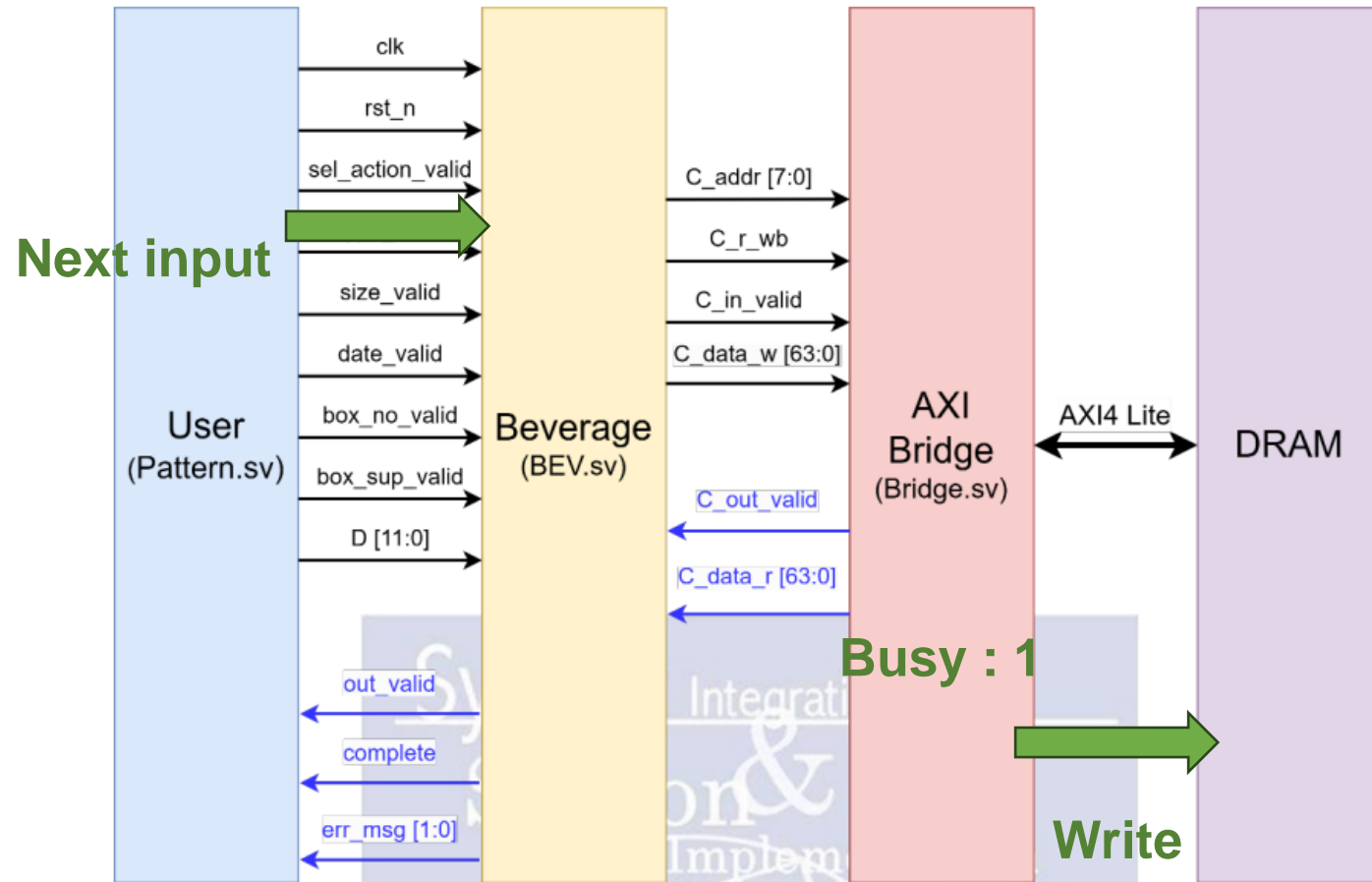


Figure 1: The Design Block Diagram



## Design Block Diagram

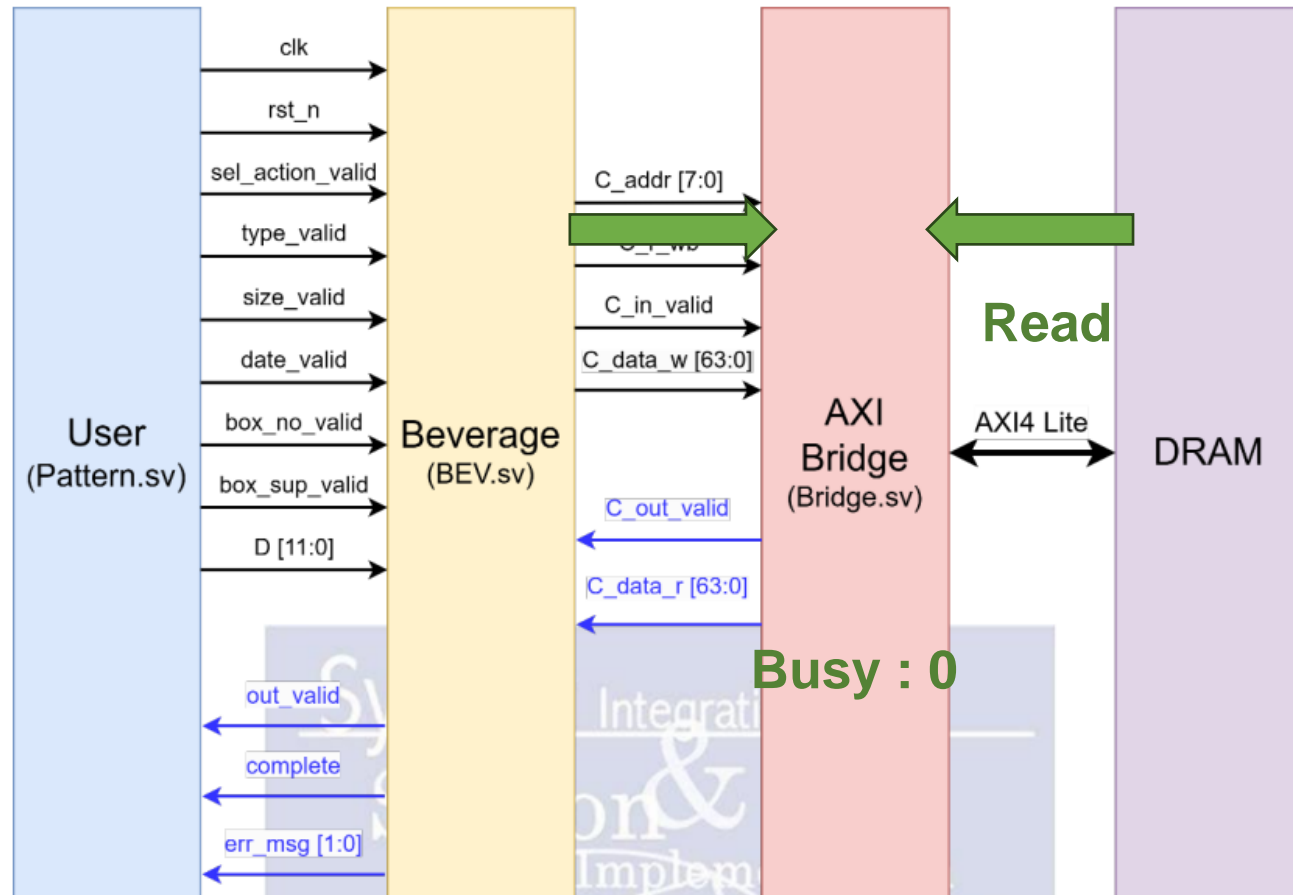


Figure 1: The Design Block Diagram



# Performance

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Beverage : 9236

Bridge : 18158

Cycle time : 2.2 ns





The image features a central rectangular area with a light beige, textured background, resembling recycled paper. This area is framed by a thin, double-lined border in a muted sage green color. Above the text, a single horizontal line of the same color spans the width of the text area. The phrase "Thank you" is written in a dark green, classic serif typeface, with each letter spaced out. The entire composition is set against a white background and is artistically framed by various tropical plants. In the top-left corner, there are large, dark green monstera leaves with characteristic splits and several feathery green fern fronds. The bottom-right corner is also decorated with a large monstera leaf and more fern fronds. Small portions of these plants are visible at the bottom-left and top-right edges, creating a lush, natural border around the central message.

Thank you