



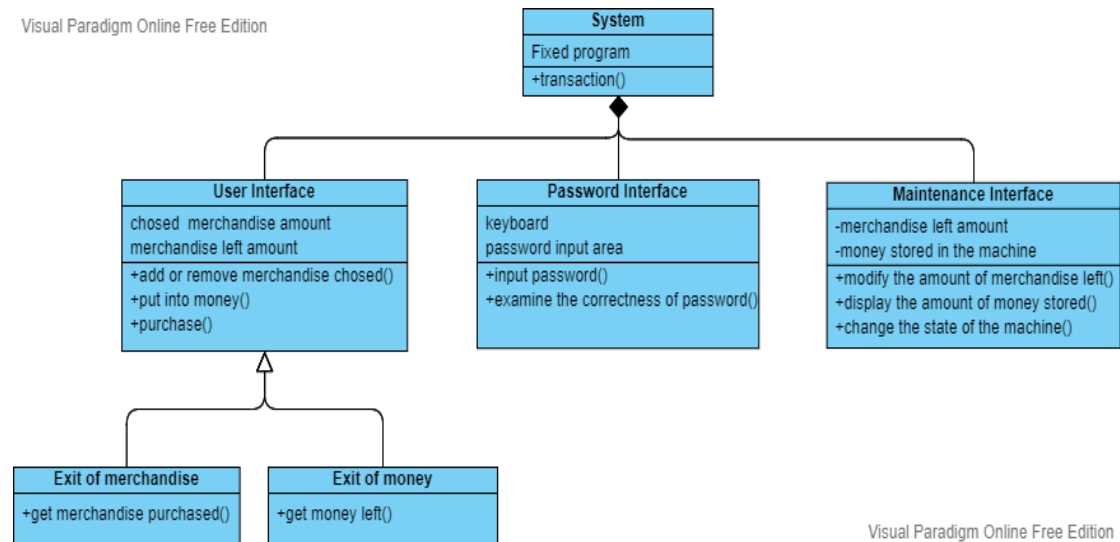
# SOFTWARE VALIDATION

Vending Machine

Team 7

# System Architecture

The system architecture is shown below:



## T1: Main Interface Test

### T1.1: Test buttons for modifying amounts of chosen items

```
function ButtonPushed(app, event)
    app.c1=app.c1+1;% amount + 1
    app.ChosenEditField.Value = app.c1;
    app.p = app.p+2;% cost + 2
    app.TotalCostEditField.Value = app.p;
end

% Button pushed function: Button_3
function Button_3Pushed(app, event)
    if(app.c1==0)
        return;
    end
    app.c1=app.c1-1;
    app.ChosenEditField.Value = app.c1;
    app.p = app.p-2;
    app.TotalCostEditField.Value = app.p;
end
```

For item1, when pressing button +, the parameter representing the amount

of chosen item1 will be added by one. And when pressing button -, the parameter representing the amount of chosen item1 will be subtracted by one. Then these changes will be shown on the pane. No need to show every figure presenting its changes, which will be too tedious.

It's the same for other items.

## T1.2: Test buttons for inputting money in certain denomination.

```
function InputmoneyButtonPushed(app, event)
    if app.a1>=999||app.a5>=999||app.a10>=999||app.a20>=999||app.a50>=999||app.a100>=999
        app.TextArea_2 = "Error3"; % 在某种钱币在上一次达到999张后 或 在塞第1000张时, 状态会变Error3, 为了防止恶意塞钱
        app.TextArea_2.FontColor = [1.00,0.00,0.00];
    end

    if isequal(app.TextArea_2.Value,"Error3") % if state is error3, can't input 任意一种钱币达到999后, 无法再继续投入钱币, 但可以继续购买
        errordlg('Money in the machine is full laden, can not input, please call the staff','Error');% couldn't input
        return;
    end

    if app.EditField_5.Value ~= 100 &&...
        app.EditField_5.Value ~= 50 &&...
        app.EditField_5.Value ~= 20 &&...
        app.EditField_5.Value ~= 10 &&...
        app.EditField_5.Value ~= 5 &&...
        app.EditField_5.Value ~= 1 &&...
        app.EditField_5.Value ~= 0.5&&...
        app.EditField_5.Value ~= 0
        errordlg('Wrong Amount','Error'); % if money cast is ...
                                         % not 100,50,20...
                                         % ,10,5,1,0.5,0,
                                         % then it's wrong
                                         % amount
        app.EditField_5.Value = 0; % the money will be swallowed.
        return;
    end

    if app.EditField_5.Value == 1
        app.a1 = app.a1+1;
        app.another.another.EditField_2.Value = app.a1; % the surplus of money1 +1 anbd display it in the maintenance interface
    end

    if app.EditField_5.Value == 5
        app.a5 = app.a5+1;
        app.another.another.EditField_3.Value = app.a5; % the surplus of money5 +1 anbd display it in the maintenance interface
    end
end
```

```

if app.EditField_5.Value == 10
    app.a10 = app.a10+1;
    app.another.another.EditField_4.Value = app.a10; % the surplus of money10 +1 anbd display it in the maintenance interface
end

if app.EditField_5.Value == 20
    app.a20 = app.a20+1;
    app.another.another.EditField_5.Value = app.a20; % the surplus of money20 +1 anbd display it in the maintenance interface
end

if app.EditField_5.Value == 50
    app.a50 = app.a50+1;
    app.another.another.EditField_6.Value = app.a50; % the surplus of money50 +1 anbd display it in the maintenance interface
end

if app.EditField_5.Value == 100
    app.a100 = app.a100+1;
    app.another.another.EditField_7.Value = app.a100; % the surplus of money100 +1 anbd display it in the maintenance interface
end

app.lft = app.lft + app.EditField_5.Value; % put into new money and display the amount
app.EditField_5.Value = 0;
app.ThereareEditField.Value = app.lft;

```

Typing certain numbers (0, 1, 5, 10, 20, 50, 100) representing money in different denomination. And then press the “Input money” button to input money. Or it will report error.

And as we write in the codes, there will be a parameter in the system to record the money users put in and also record the remaining quantity of their money. And there are 6 numbers to record the amounts of money stored in the machine.

### T1.3: Test Fake money input button

```

function FAKEButtonPushed(app, event)
    if app.EditField_5.Value == 0
        return;
    end
    app.SUMEditField.Value = app.EditField_5.Value;
    app.EditField_5.Value = 0;
    errordlg('Fake money','Error'); % put in fake money and the money will be spat.
end

```

Users could simulate putting in fake money by press the “FAKE” button.

Users could input any amount of fake money they want in the numerical box.

Then press the “FAKE” button.

The system will judge this money as fake money, the parameter in the machine won't change, just like nothing is putting in. And naturally, the fake money cannot be retrieved by “Refund” button.

#### T1.4: Test Buy button

```
% Button pushed function: RefundButton
function RefundButtonPushed(app, event)
    app.SUMEditField.Value = app.lft; % after refunding, the lft should be cleared
    if app.lft >=100

        app.a100 =app.a100 - floor(app.lft/100); % 此时lft值还不能改变，注意与下一语句的顺序；
        app.EditField_11.Value = floor(app.lft/100);
        app.lft = app.lft - floor(app.lft/100)*100;

    end

    if app.lft >=50
        app.a50 =app.a50 - floor(app.lft/50);
        app.EditField_10.Value = floor(app.lft/50);
        app.lft = app.lft - floor(app.lft/50)*50;

    end

    if app.lft >=20
        app.a20 =app.a20 - floor(app.lft/20);
        app.EditField_9.Value = floor(app.lft/20);
        app.lft = app.lft - floor(app.lft/20)*20;

    end

    if app.lft >=10
        app.a10 =app.a10 - floor(app.lft/10);
        app.EditField_8.Value = floor(app.lft/10);
        app.lft = app.lft - floor(app.lft/10)*10;

    end

    if app.lft >=5
        app.a5 =app.a5 - floor(app.lft/5);
        app.EditField_7.Value = floor(app.lft/5);
        app.lft = app.lft - floor(app.lft/5)*5;

    end

end
```

```

if app.lft >=1

    if app.a0 < floor(app.lft/1)
        app.cEditField.Value = app.a0;
        app.a0 =0; %先吐一元硬币，再吐一元纸币
        app.EditField_6.Value = floor(app.lft/1)-app.a0;
        app.a1 = app.a1 - (floor(app.lft/1)-app.a0);
    else
        app.a0 = app.a0 -app.lft;
        app.cEditField.Value = app.lft;
    end

    app.lft = app.lft - floor(app.lft/1)*1;
end

app.ThereareEditField.Value = app.lft;
app.another.another.cEditField.Value = app.a0;
app.another.another.EditField_2.Value = app.a1;
app.another.another.EditField_3.Value = app.a5;
app.another.another.EditField_4.Value = app.a10;
app.another.another.EditField_5.Value = app.a20;
app.another.another.EditField_6.Value = app.a50;
app.another.another.EditField_7.Value = app.a100;

app.ThereareEditField.Value = floor(app.lft/100);
if (app.a0+app.a1)<4||app.a5<1||app.a10<1||app.a20<2||app.a50<1||app.a100<1 % 经过验证，必须满足能够找零
    app.TextArea_2 = "Error2"; % Eorror2 : Money in the machine is not enough
    app.TextArea_2.FontColor = [1.00,0.00,0.00];
end

end
end

```

On the premise of successful purchase, the parameter recording the remaining money will be subtracted by the total cost of all the merchandise purchased after pressing the “Buy” button.

On the premise of successful purchase, all the merchandise purchased will be dropped out from the “Exit of merchandise”. Precise number will be displayed in the pane.

### T1.5: Test Refund button

```

function RefundButtonPushed(app, event)
    app.SUMEditField.Value = app.lft; % after refunding, the lft should be cleared
    if app.lft >=100

        app.a100 =app.a100 - floor(app.lft/100); % 此时lft值还不能改变，注意与下一语句的顺序；
        app.EditField_11.Value = floor(app.lft/100);
        app.lft = app.lft - floor(app.lft/100)*100;

    end

    if app.lft >=50
        app.a50 =app.a50 - floor(app.lft/50);
        app.EditField_10.Value = floor(app.lft/50);
        app.lft = app.lft - floor(app.lft/50)*50;
    end

    if app.lft >=20
        app.a20 =app.a20 - floor(app.lft/20);
        app.EditField_9.Value = floor(app.lft/20);
        app.lft = app.lft - floor(app.lft/20)*20;
    end

    if app.lft >=10
        app.a10 =app.a10 - floor(app.lft/10);
        app.EditField_8.Value = floor(app.lft/10);
        app.lft = app.lft - floor(app.lft/10)*10;
    end

    if app.lft >=5
        app.a5 =app.a5 - floor(app.lft/5);
        app.EditField_7.Value = floor(app.lft/5);
        app.lft = app.lft - floor(app.lft/5)*5;
    end
end

```

The remaining money will be dropped put from the “Exit of money”. User can see the certain amount of money being displayed on the exit pane. The parameter recording the remaining will be cleared to 0. And many of the other related parameters will also be reset to 0.

## T2: Main Interface Test

### T2.1: Test buttons for modifying amounts of items stored

```
function startupFcn(app)
    app.s1 = 12; %initialization storage of cargo
    app.s2 = 10;
    app.s3 = 8;
    app.s4 = 5;

    app.LeftEditField.Value = app.s1;
    app.LeftEditField_2.Value = app.s2;
    app.LeftEditField_3.Value = app.s3;
    app.LeftEditField_4.Value = app.s4;

    app.a0 = 100; app.a1 = 100; app.a5 = 100;%initialization storage of money
    app.a10 = 100; app.a20 = 100;
    app.a50 = 100; app.a100 = 100;

    app.cEditField.Value = app.a0;
    app.EditField_2.Value = app.a1;
    app.EditField_3.Value = app.a5;
    app.EditField_4.Value = app.a10;
    app.EditField_5.Value = app.a20;
    app.EditField_6.Value = app.a50;
    app.EditField_7.Value = app.a100;
end
```

Set the initial values.



```

function ButtonPushed(app, event)
    app.s1 = app.s1 + 1;           % item1 +
    app.LeftEditField.Value = app.s1;
    app.another.s1 = app.s1; %synchronization
    app.another.LeftEditField.Value = app.another.s1;
end

% Button pushed function: Button_5
function Button_5Pushed(app, event)
    if(app.s1 == 0)               % item1 -
        return;
    end
    app.s1 = app.s1 - 1;
    app.LeftEditField.Value = app.s1;
    app.another.s1 = app.s1; %synchronization
    app.another.LeftEditField.Value = app.another.s1;
end

% Button pushed function: Button_2
function Button_2Pushed(app, event)
    app.s2 = app.s2 + 1;           % item2 +
    app.LeftEditField_2.Value = app.s2;
    app.another.s2 = app.s2; %synchronization
    app.another.LeftEditField_2.Value = app.another.s2;
end

% Button pushed function: Button_7
function Button_7Pushed(app, event)
    if(app.s2 == 0)               % item2 -
        return;
    end
    app.s2 = app.s2 - 1;
    app.LeftEditField_2.Value = app.s2;
    app.another.s2 = app.s2; %synchronization
    app.another.LeftEditField_2.Value = app.another.s2;
end

```

```

function Button_7Pushed(app, event)
    if(app.s2 == 0)                % item2 -
        return;
    end
    app.s2 = app.s2 - 1;
    app.LeftEditField_2.Value = app.s2;
    app.another.s2 = app.s2; %synchronization
    app.another.LeftEditField_2.Value = app.another.s2;
end

% Button pushed function: Button_4
function Button_4Pushed(app, event)
    app.s3 = app.s3 + 1;          % item3 +
    app.LeftEditField_3.Value = app.s3;
    app.another.s3 = app.s3; %synchronization
    app.another.LeftEditField_3.Value = app.another.s3;
end

% Button pushed function: Button_6
function Button_6Pushed(app, event)
    if(app.s3 == 0)                % item3 -
        return;
    end
    app.s3 = app.s3 - 1;
    app.LeftEditField_3.Value = app.s3;
    app.another.s3 = app.s3; %synchronization
    app.another.LeftEditField_3.Value = app.another.s3;
end

% Button pushed function: Button_3
function Button_3Pushed(app, event)
    app.s4 = app.s4 + 1;          % item4 +
    app.LeftEditField_4.Value = app.s4;
    app.another.s4 = app.s4; %synchronization
    app.another.LeftEditField_4.Value = app.another.s4;
end

```

```

function Button_8Pushed(app, event)
    if(app.s4 == 0)           % item4 -
        return;
    end
    app.s4 = app.s4 - 1;
    app.LeftEditField_4.Value = app.s4;
    app.another.s4 = app.s4; %synchronization
    app.another.LeftEditField_4.Value = app.another.s4;
end

```

Add the amount of the remaining merchandise

1. Press “+” button under the picture of the certain merchandise.
  - a. There is a parameter representing the amount the remaining merchandise which is displayed in the box and set to a certain number initially.
  - b. When the “+” button is put, we will add 1 to the parameter, indicating that the amount of this is added 1.

Subtract the amount of the remaining merchandise

- a. Press “-” button under the picture of the certain merchandise.
 

There is a parameter representing the amount the remaining certain merchandise which is displayed in the pane.
- b. When the “-” button is put, we will subtract this parameter by one, indicating that the amount of this is reduced by 1.

## T2.2: Test the storage of money in different denomination

```
function Button_9Pushed(app, event)
    if app.a0==0
        return;
    end
    app.a0 = app.a0 - 1;
    app.cEditField.Value = app.a0;
end

% Button pushed function: Button_10
function Button_10Pushed(app, event)
    if app.a0==999
        return;
    end
    app.a0 = app.a0 + 1;
    app.cEditField.Value = app.a0;
end
```

Maintainers can modify the amount of money stored in the machine via the two buttons near the screen. But the amount couldn't exceed the limit of [0, 99].

```

if app.EditField_5.Value == 1
    app.a1 = app.a1+1;
    app.another.another.EditField_2.Value = app.a1; % the surplus of money1 +1 anbd display it in the ma
end

if app.EditField_5.Value == 5
    app.a5 = app.a5+1;
    app.another.another.EditField_3.Value = app.a5; % the surplus of money5 +1 anbd display it in the ma
end

if app.EditField_5.Value == 10
    app.a10 = app.a10+1;
    app.another.another.EditField_4.Value = app.a10; % the surplus of money10 +1 anbd display it in the
end

if app.EditField_5.Value == 20
    app.a20 = app.a20+1;
    app.another.another.EditField_5.Value = app.a20; % the surplus of money20 +1 anbd display it in the
end

if app.EditField_5.Value == 50
    app.a50 = app.a50+1;
    app.another.another.EditField_6.Value = app.a50; % the surplus of money50 +1 anbd display it in the
end

if app.EditField_5.Value == 100
    app.a100 = app.a100+1;
    app.another.another.EditField_7.Value = app.a100; % the surplus of money100 +1 anbd display it in th
end

```

Meanwhile, when inputting money, the system will also count the amount of money being stored, and store it into correct container.

```

function RefundButtonPushed(app, event)
    app.SUMEditField.Value = app.lft; % after refunding, the lft should be cleared
    if app.lft >=100

        app.a100 =app.a100 - floor(app.lft/100); % 此时lft值还不能改变，注意与下一语句的顺序；
        app.EditField_11.Value = floor(app.lft/100);
        app.lft = app.lft - floor(app.lft/100)*100;

    end

    if app.lft >=50
        app.a50 =app.a50 - floor(app.lft/50);
        app.EditField_10.Value = floor(app.lft/50);
        app.lft = app.lft - floor(app.lft/50)*50;

    end

    if app.lft >=20
        app.a20 =app.a20 - floor(app.lft/20);
        app.EditField_9.Value = floor(app.lft/20);
        app.lft = app.lft - floor(app.lft/20)*20;

    end

    if app.lft >=10
        app.a10 =app.a10 - floor(app.lft/10);
        app.EditField_8.Value = floor(app.lft/10);
        app.lft = app.lft - floor(app.lft/10)*10;

    end

    if app.lft >=5
        app.a5 =app.a5 - floor(app.lft/5);
        app.EditField_7.Value = floor(app.lft/5);
        app.lft = app.lft - floor(app.lft/5)*5;
    end
end

```

```

if app.lft >=1

    if app.a0 < floor(app.lft/1)
        app.cEditField.Value = app.a0;
        app.a0 =0; %先吐一元硬币，再吐一元纸币
        app.EditField_6.Value = floor(app.lft/1)-app.a0;
        app.a1 = app.a1 - (floor(app.lft/1)-app.a0);
    else
        app.a0 = app.a0 -app.lft;
        app.cEditField.Value = app.lft;
    end

    end
    app.lft = app.lft - floor(app.lft/1)*1;
end

app.ThereareEditField.Value = app.lft;
app.another.another.cEditField.Value = app.a0;
app.another.another.EditField_2.Value = app.a1;
app.another.another.EditField_3.Value = app.a5;
app.another.another.EditField_4.Value = app.a10;
app.another.another.EditField_5.Value = app.a20;
app.another.another.EditField_6.Value = app.a50;
app.another.another.EditField_7.Value = app.a100;

app.ThereareEditField.Value = floor(app.lft/100);
if (app.a0+app.a1)<4||app.a5<1||app.a10<1||app.a20<2||app.a50<1||app.a100<1 % 经过验证，必须满足能够找零
    app.TextArea_2 = "Error2"; % Eorrer2 : Money in the machine is not enough
    app.TextArea_2.FontColor = [1.00,0.00,0.00];
end

```

When refunding, the system will start the process at 100 ¥ , and then 50 ¥ , and then 20 ¥ ……… In this case, we can guarantee the refund process efficient and correct. And the money being retrieved will also will be recorded in order to make the amount of money stored precise.

### T3: Password Interface Test

#### T3.1: Test Correctness

```

properties (Access = public)
    another; % Description
    pswd = "123456"; % password!
end

```

```

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

    % Button pushed function: EnterButton
    function EnterButtonPushed(app, event)
        if app.PleasetypepasswordTextArea.Value ~= app.pswd
            errordlg('Wrong Password!', 'Error');
            return;
        end
        app.another = Maintenance_Interface;
    end
end

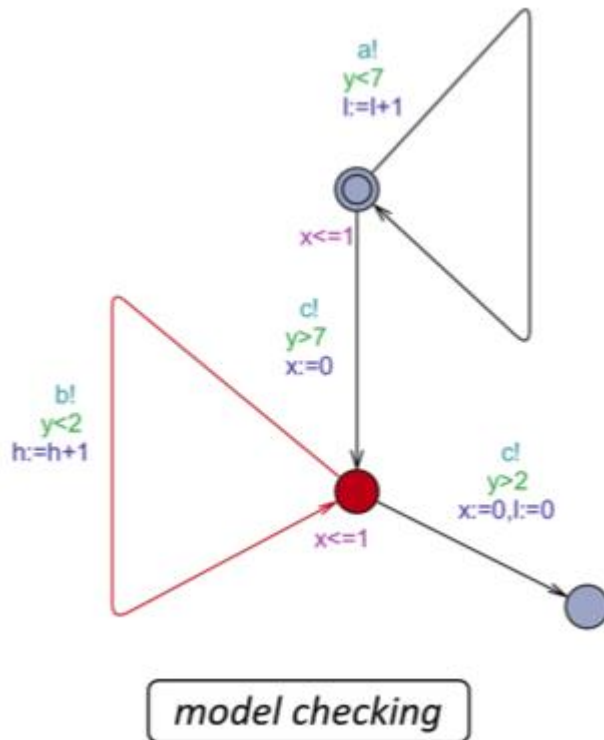
```

If the numbers users input are the same with the right password, the system will open another interface, or the system will report error, and won't do anything.

#### T4: Validation Test

##### T4.1: Test the correctness money inputting





#### T4.2: Test the machine error condition

