COS30043 Interface Design and Development

Lecture 4 – View and ViewModel

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- MVVM
- View
- ViewModel

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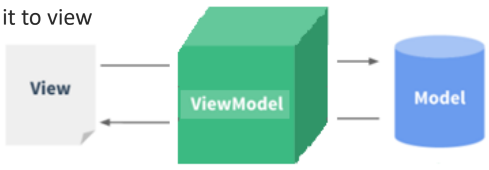
MVVM

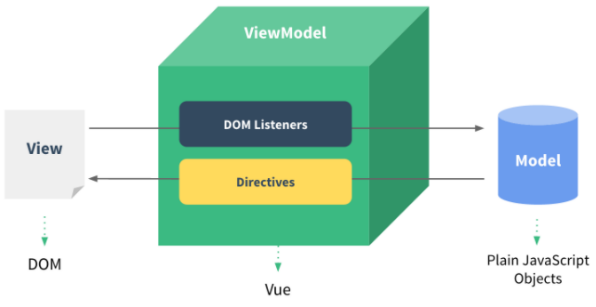
MVVM is an architectural pattern that separates an application into three main logical components: the model, the view and the view model

- Model: It holds the data/information of the app which is to be presented to the user for manipulation or interaction.
- View: It is used to render the information to the user.
  - the View doesn't know about the Model and vice-versa.
  - The View passes user input to the VM for processing.
  - The View presents 'state' defined by the VM to user.
- VieModel: The VM is the link between the Model and the View. It defines all business logics, such as
  - manipulate the data contained in the model
  - handle user interaction
  - Format data in the model and pass it to view



VueJS and MVVM

- Vue.js is a framework for building interactive web interfaces.
- Vue.js is focused on the ViewModel layer of the MVVM pattern. It connects the View and the Model via two way data bindings.



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View – Updating Model

- View not only shows but also provides user interactive through
  - Input elements
  - v-on:click
- Note that all interactions relate only to updating the values of the model through
  - user Input
  - expression (assignment operator)

View – Updating View

- Conditional and loop directives updates the view based the value in the model
- Note that the view is only updated if some value in the model changes
- For example,

```
<p>Enter string #1:
   <input type = "text" name = "strVar"
    v-model = "strVar" /></p>
<p>Immediate effect : {{strVar}}</p>
```

- The view change as you update strVar

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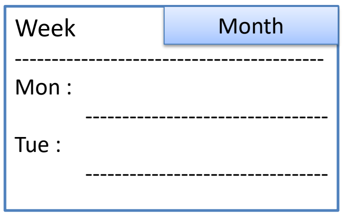
View – Design Process

- To update the view, link it to a model
- To update the model, use HTML input element, expression or the Vue instance
- Consider the calendar web app that has 2 display options (Week and Month)



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View – Design Process

- Design 2 views
- Create a model to the views e.g. use “sele” to indicate whether month or week is selected
- Link the model to view i.e. v-if, v-else or v-show
- To switch between week and month view, you update the value of “sele”, using
  - Input element, e.g. radio
  - Anchor/Button with v-on:click

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ViewModel

- Provides the business logic to manage view behaviour
- Prepares/initialises the model for the view
- Responds to user interaction

ViewModel – Execution

- A new instance of the Vue app is created every time it is used
- Prepares/initialises properties and methods
- Mostly assignment/method set operations
  - (Properties) prepare/initialise values to model through ViewModel
  - (Methods) Inject functions to model (i.e. `data`), these functions only execute when called/triggered

`N.B.` ***`data`*** `can be of type object or function`

View – Template

- Link View to ViewModel

```
<html>
:
<body>
   <div id="app">
        {{strVar}}
   </div>
</body>
<html>
```

- In this example `strVar` is accessible by the `myCtrl` function using `this` keyword

ViewModel – Template

- Access Model from ViewModel

```
methods: {
 myCtrl() {
    this.strVar = "new value";
        }
   }
);
```

myCtrl() {…}
is the shorthand for
myCtrl: function () {   }

- Multiple functions can be declared inside `methods` object

ViewModel – Template - HTML

```
File: ctrldemo.html

<!DOCTYPE html>
<html lang="en">
<head>
   <title>Template that uses Bootstrap</title>
   <meta charset="utf-8" />
   <meta name="viewport" content="width=device-width,
                          initial-scale=1.0" />
   <!-- Bootstrap -->
   <link href="css/bootstrap.min.css" rel="stylesheet" />
   <!-- HTML5 Shim and Respond.js IE8 support of HTML5
                   elements and media queries -->
   <!-- WARNING: Respond.js doesn't work if you view the
                   page via file:// -->
   <!--[if lt IE 9]>
     <script src="js/html5shiv.js"></script>
     <script src="js/respond.min.js"></script>
   <![endif]-->
</head>
```

ViewModel – Template (continued) - HTML

```
<body >
   <div id="app">
      <p> {{strVar}} </p>
      <button v-on:click="myCtrl">Change</button>
   </div>

    <!-- jQuery - required for Bootstrap plugins) -->
    <script src="js/jquery.min.js"></script>
    <!-- All Bootstrap  plug-ins  file -->
    <script src="js/bootstrap.min.js"></script>
    <!-- Basic VueJS -->
    <script src="js/vue.min.js"></script>
    <!-- Your Component -->
    <script src="js/app.js"></script>
</body>
</html>
```

ViewModel – Template (continued) - JS

```
File: app.js
Vue.createApp({  //create a new application instance
      data() {
            return {strVar:'Hello World!' }
      },

      methods: {
            myCtrl:function() {
                  this.strVar = "Hello New World!";
            }
      }
}).mount('#app')
```

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ViewModel – Methods

- Objects

```
 data() {
        return {<object names>}
 }
```

- Methods

```
methods: {
 <methodName>:function(<parameters>) {
      <JavaScript program>
       [return <expression>;]
   },
```

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ViewModel– Examples (User Method)

- Object (initialisation)

```
data() {
   return {  name: “Dr Caslon Chua.”,
         };
   }
```

- Method (update through method –no parameter)

```
methods:{
   getName(){
         return this.name;
         }
   }
```

N.B. In this example data is a function, not object

ViewModel – Examples (User Method)

- Method (update through method with parameter)

```
methods: {
   getName(bio){
         return (this.name + bio);
         }
   }
```

- HTML

```
     <body id=“app”>
       <p> {{ getName(“I am a senior lecturer
at Swinburne”) }} </p>
     </body>
```

ViewModel – Putting it together

```
File app.js
Vue.createApp ({
        data(){
          return { name: "Dr Caslon Chua.",
                };
        },
        methods: {
        getName: function(bio) {
           return (this.name + bio)    },
                       },
        }).mount('#app');
HTML
<html>
 <body id="app">
  <div><p>{{getName("I am a senior lecturer at Swinburne")}}</p>
</div> </body>  </html>
```

ViewModel – watch

- Object ($watch)

```
watch: {
  <modelNametoWatchforChanges>:
     function (newValue, oldValue){
        <your code>,
     }
   }
```

- $watch triggers on change when the model value it is watching changes

ViewModel – Example(Built-in Object)

- HTML

```
  <body id="app">
   <input type="text" v-model.lazy="strVar"/>      {{
strVar }}
  </div>
  </body>
```

- JavaScript

```
   Vue.createApp({
      data() { return {strVar: 10} },
      methods: {},
      watch: {
             strVar(newVal, oldVal) {
                    alert(oldVal + " " + newVal);
                    }
      },
   }).mount('#app') ;
```

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WHAT'S NEXT? – WORKING WITH MODULES AND ROUTES

KNOWING