

Model-View-Controller (MVC)

- Most programs have to deal with data, application logic, and final result presentation
 - Data may be stored in a file or database engine, and locally or remotely.
 - Application logic is often independently of where and how data is stored and retrieved
 - The “result” from the application may be presented in different ways depending on the device and/or user
 - Mixing these three “independent” components into one gigantic spaghetti code is often not a good idea
- Develop application into three modular components!
 - *Model*: deals with data storage and access
 - *View*: deals with result presentation
 - *Controller*: deals with “application logic”
 - “Code” for each component may be “owned” by different people
 - * e.g., model: DB engineer, controller: app developer, view: UI designer
- Example

In Java servlet:

```
/* CONTROLLER */
protected void doGet(HttpServletRequest request,
                      HttpServletResponse response)
    throws ServletException, IOException
{
    // retrieve, update, process data
    ...

    // construct data model
    request.setAttribute("data1", XXX);

    // dispatch data model to the view
    request.getRequestDispatcher("/index.jsp").forward(request
        , response);
}
```

```
/* MODEL */
User getUser(int userid)
{
    // retrieve and return the user
}
```

In index.jsp:

```
/* VIEW */
<html>
<head><title>Demo</title></head>
<body>Your data: <%= request.getAttribute("data1") %></body>
</html>
```

- Specialized “tags” exist to add simple logical constructs, such as loop, to the view
 - Example: Java Standard Tag Libraries (JSTL)

```
<%@ taglib uri=<http://java.sun.com/jstl/core> prefix="c" %>
<html>
<title>Contacts</title>
<body>
    <table>
        <c:forEach var="contact" items="${contacts}">
            <tr>
                <td>${contact.name}</td>
                <td>${contact.email}</td>
            </tr>
        <c:forEach>
    </table>
</body>
</html>
```

- Most frameworks supports separation of Model, View, and Controller
 - Java Struts, Python Django, ASP .NET, Ruby on Rails, ...