

CSCI 4370 Project 5

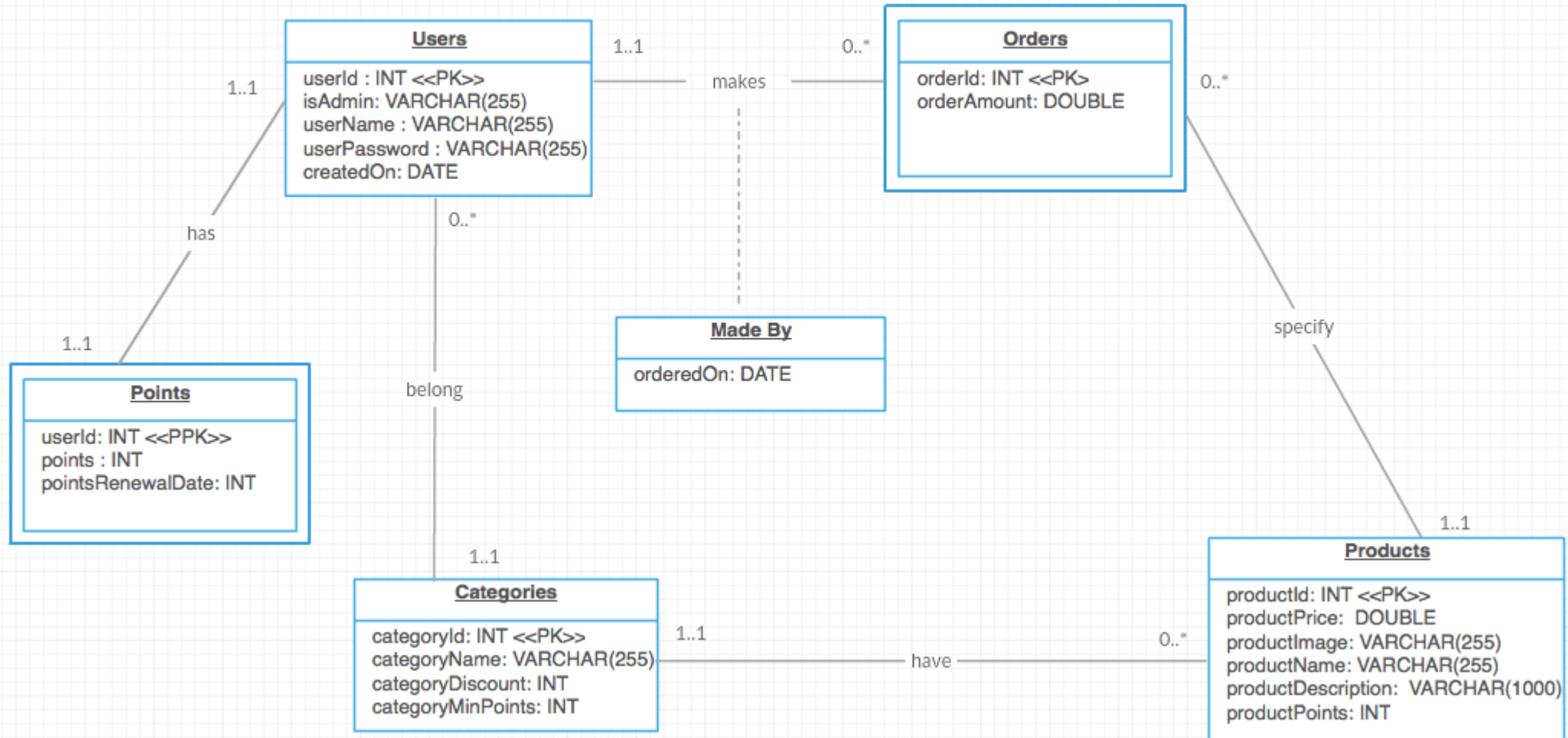
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Project Overview

- Database holding information for a company's rewards program
 - Real world application
 - Widely used system
- Our version
 - For buying shoes
 - Users put into tiers based on number of points
 - Higher tiers have more discounts given
 - Points reset every quarter, when the "coupons" are sent out
- Java Server Pages (JSP)
 - Allows communication between database and website via servlets

UML Diagram

UML



Convert UML to Relational Model (ρ_1)

- Users(**userID**, isAdmin, userName, userPassword, createdOn)
- Points(**userID**, points, userCategoryID, pointsRenewalDate)
- Categories(**categoryID**, categoryName, categoryDiscount, categoryMinPoints)
- Products(**productID**, productPrice, productImage, ProductName, productDescription, productPoints, productCategoryID)
- Orders(**orderID**, userID, productID, orderAmount)

Functional Dependencies

- $\text{UserId} \rightarrow \text{isAdmin}, \text{userName}, \text{userPassword}, \text{userCreatedOn}, \text{points}, \text{pointsRenewal}$
- $\text{productId} \rightarrow \text{productPrice}, \text{productName}, \text{productDescription}, \text{productCategoryId}, \text{productPoints}, \text{productImage}$
- $\text{categoryId} \rightarrow \text{categoryName}, \text{categoryMinPoints}, \text{categoryDiscount}$
- $\text{orderId} \rightarrow \text{orderedOn}, \text{amount}, \text{orderProductId}, \text{userId}$
- $\text{userName} \rightarrow \text{isAdmin}, \text{userPassword}, \text{userCreatedOn}$

1NF

DBMS Project 5

userId <<PK>>

isAdmin

userName

userPassword

userCreatedOn

points

pointsRenewal

categoryId

categoryName

categoryMinPoints

categoryDiscount

productId

productPrice

productName

productDescription

productCategoryId

productPoints

productImage

orderId

orderedOn

amount

2NF



3NF Synthesis Algorithm (ρ_3)

3NF

USER

userId, userName, isAdmin,
createdOn, userPassword

Functional Dependencies

userId \rightarrow userName, isAdmin,
createdOn, userPassword

userName \rightarrow isAdmin,
createdOn, userPassword

POINTS

userId, points,
pointsRenewalDate, userCatId

Functional Dependencies

userId, points, pointsRenewal \rightarrow
userCategoryId

CATEGORIES

categoryId,
categoryName,
categoryMinPoints,
categoryDiscount

Functional Dependencies

categoryId \rightarrow categoryName,
categoryMinPoints,
categoryDiscount

PRODUCTS

productId, productPrice,
productName,
productDescription,
productCategoryId,
productPoints,
productImage

Functional Dependencies

productId \rightarrow productPrice,
productName,
productDescription,
productCategoryId,
productPoints,
productImage

ORDERS

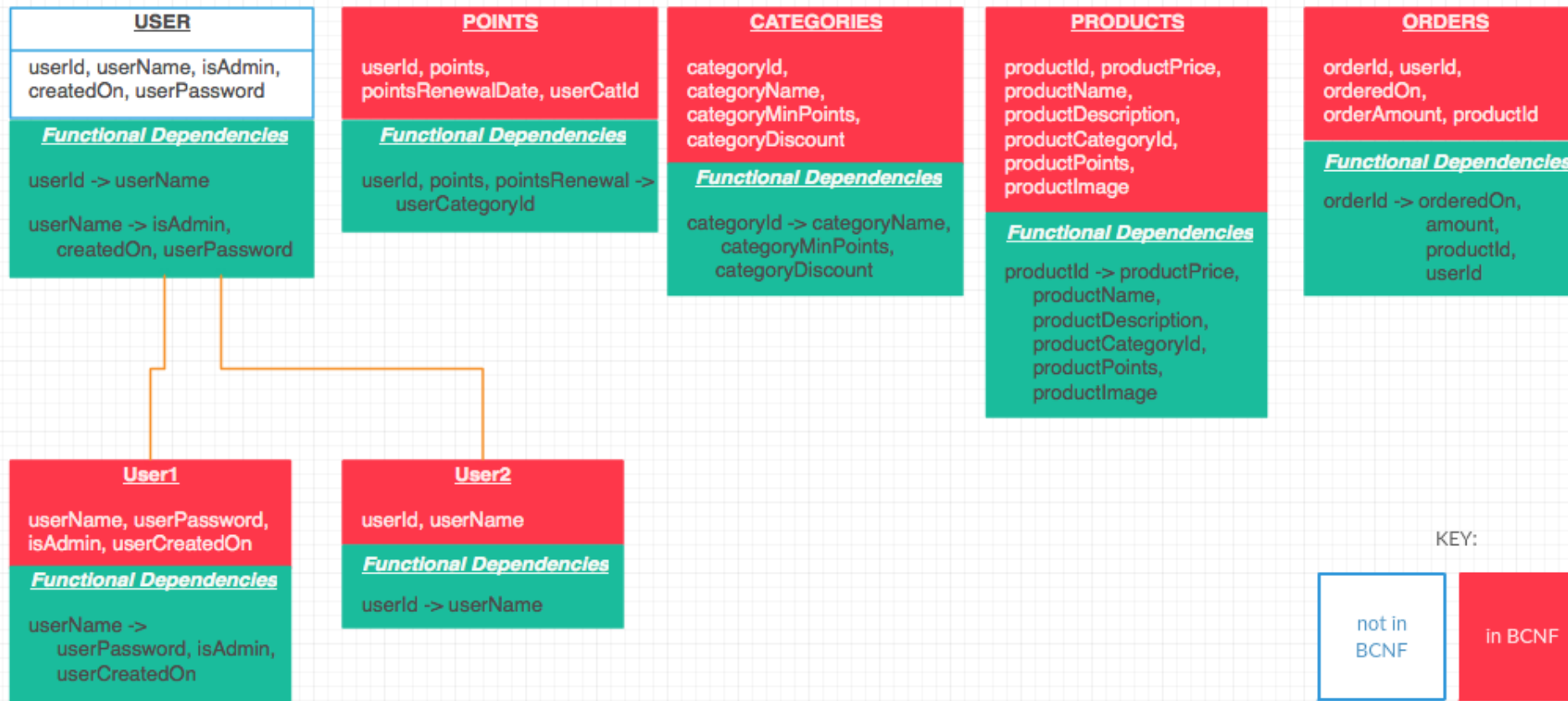
orderId, userId,
orderedOn,
orderAmount, productId

Functional Dependencies

orderId \rightarrow orderedOn,
amount,
productId,
userId

BCNF Decomposition Algorithm (ρ_2)

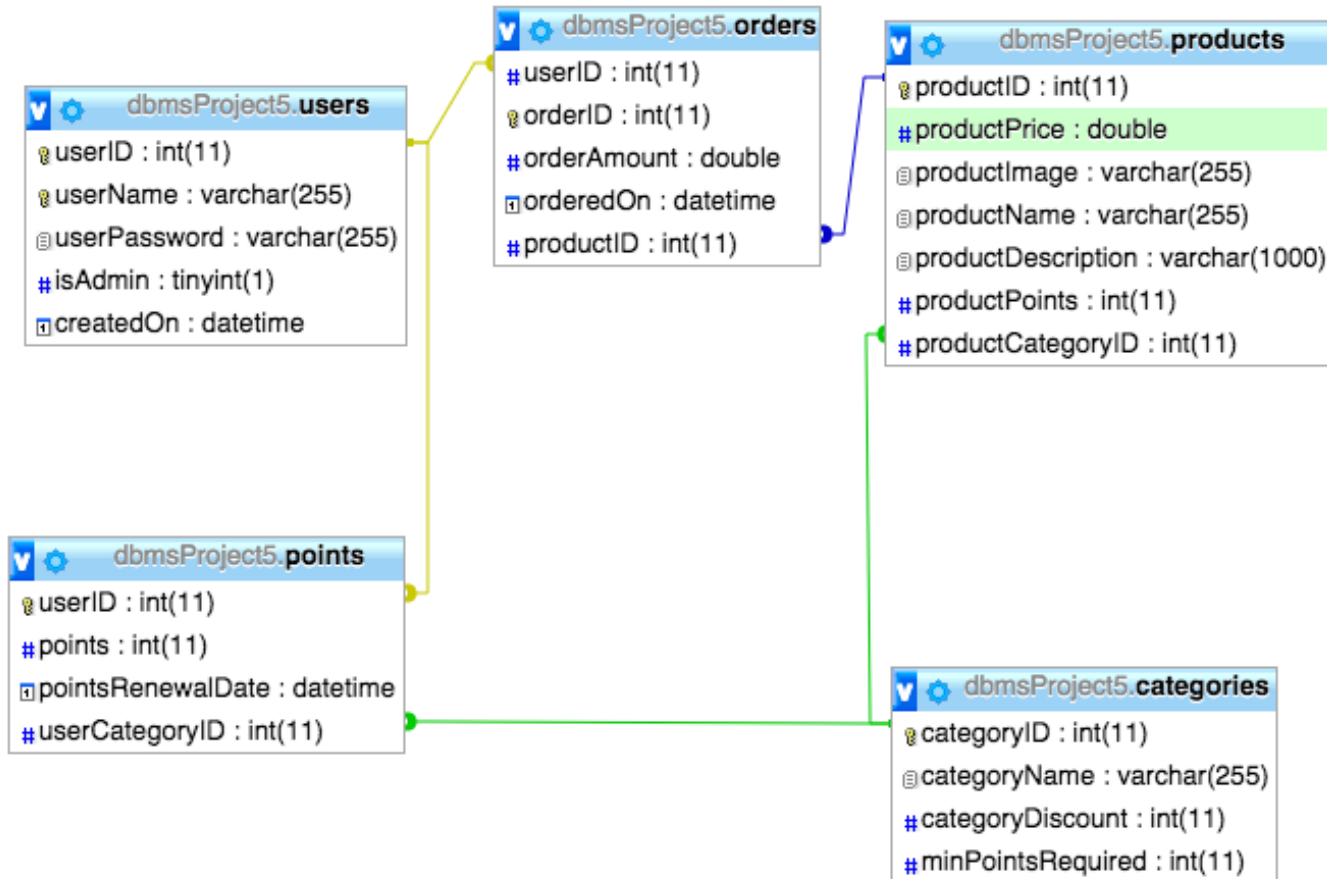
BCNF



Comparison of ρ_1 , ρ_2 , and ρ_3

- $\rho_1 = 5$
- $\rho_2 = 6$
- $\rho_3 = 5$
- $\rho_1 = \rho_3$

Schema



```
--  
-- Table structure for table `products`  
--
```

```
CREATE TABLE IF NOT EXISTS `products` (  
  `productID` int(11) NOT NULL,  
  `productPrice` double NOT NULL,  
  `productImage` varchar(255) NOT NULL,  
  `productName` varchar(255) NOT NULL,  
  `productDescription` varchar(1000) NOT NULL,  
  `productPoints` int(11) NOT NULL,  
  `productCategoryID` int(11) NOT NULL  
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```
--  
-- Dumping data for table `products`  
--
```

```
INSERT INTO `products` (`productID`, `productPrice`, `productImage`, `productName`, `productDescription`, `productPoints`, `productCategoryID`) VALUES  
(1, 70, 'bootstrap/images/pic.jpg', 'Nike', 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et  
(2, 70, 'bootstrap/images/pic1.jpg', 'Adidas', 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore  
(3, 70, 'bootstrap/images/pic2.jpg', 'New balance', 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore  
(4, 70, 'bootstrap/images/pic3.jpg', 'Puma', 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et  
(5, 70, 'bootstrap/images/pic4.jpg', 'Asics', 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et  
(6, 70, 'bootstrap/images/pic5.jpg', 'Fila', 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et
```

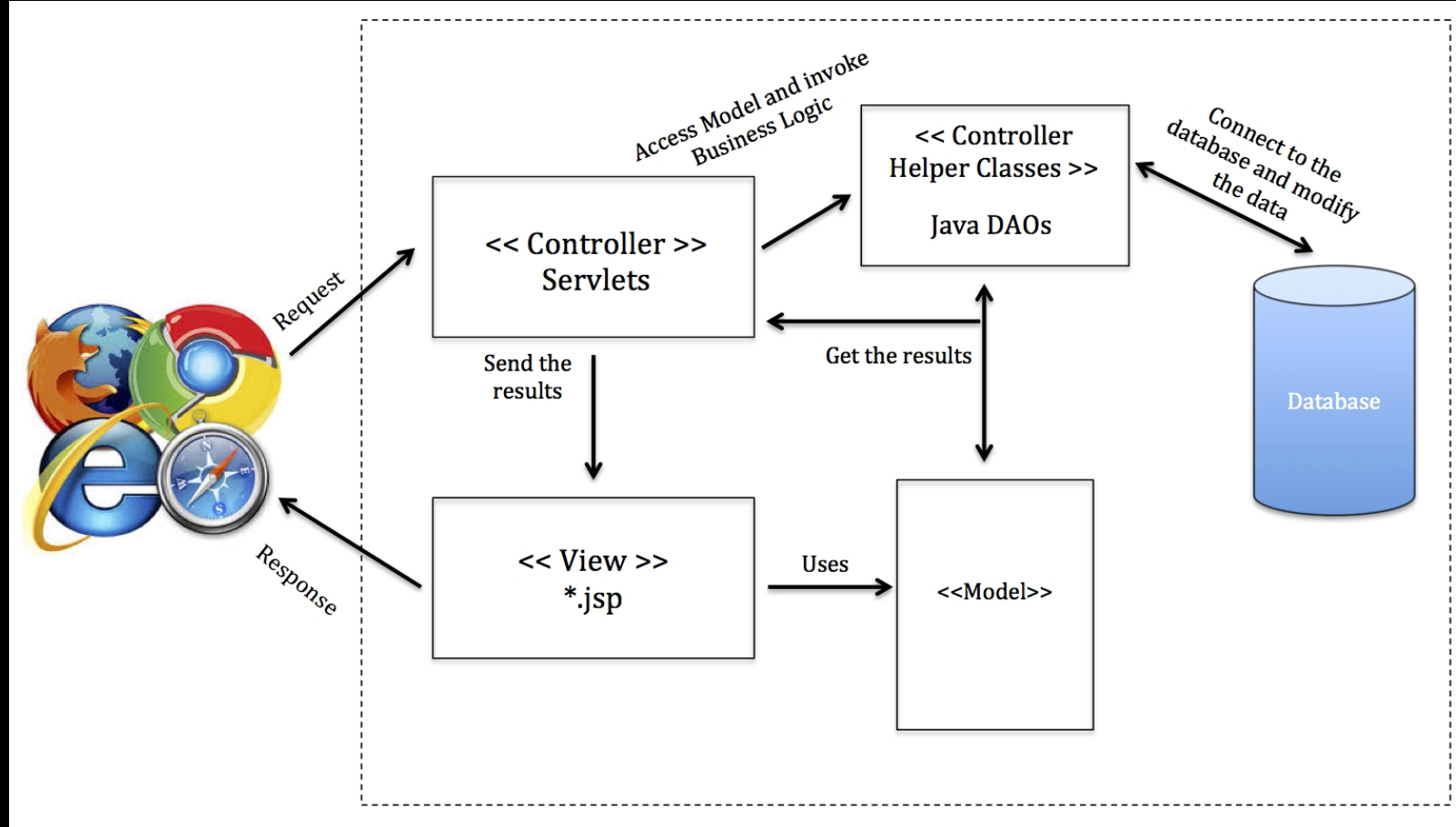
```
--  
-- Table structure for table `users`  
--
```

```
CREATE TABLE IF NOT EXISTS `users` (  
  `userID` int(11) NOT NULL,  
  `userName` varchar(255) NOT NULL,  
  `userPassword` varchar(255) NOT NULL,  
  `isAdmin` tinyint(1) NOT NULL,  
  `createdOn` datetime NOT NULL  
) ENGINE=InnoDB AUTO_INCREMENT=9 DEFAULT CHARSET=latin1;
```

```
--  
-- Dumping data for table `users`  
--
```

```
INSERT INTO `users` (`userID`, `userName`, `userPassword`, `isAdmin`, `createdOn`) VALUES  
(1, 'admin@uga.edu', '5baa61e4c9b93f3f0682250b6cf8331b7ee68fd8', 1, '2015-07-22 12:00:00'),
```

Architecture and Components



Demo time

Questions?