CS544
Enterprise Architecture Final
Exam 2 May 2016

Name_____

Student ID _____

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1. [10 points]Determine which of the following are TRUE/FALSE concerning Data Binding :

    T   F   Spring security only supports the authentication model HTTP Basic defined by RFC 1945 which is the most popular authentication mechanism in the web.
    EXPLAIN:

    T   F   Spring ACL is used to give permissions to access methods (i.e. specify who can execute which method)
    EXPLAIN:

    T   F   Digest authentication uses Base64 encoding to transmit encrypted usernam/password
    EXPLAIN:

    T   F   Authorization refers to unique identifying information from each system user, generally in the form of a username and password.

    EXPLAIN:

    T   F   The ACLs or access control lists are specifically for assuring domain object security

    EXPLAIN:

2. [15 points] AOP is a Spring Core Technology. It is used in numerous places within the Spring Framework, itself. Explain the fundamentals of Spring's AOP implementation; how it works, how it relates to AspectJ. Give examples of its usage within Spring.

To help in your explanation of how it works consider the following use case:
A client application needs to access a server application over the network. For monitoring purposes, it is necessary to log all calls to all save [save(Object object)] methods at the service tier.
For example:

Class FooServiceImpl {

    public void save (Foo foo) {
      fooDao.save (foo);
    }

    Public List<Foo> findAll() {
      return fooDao.findAll();
    }

    Public Foo findOne(Long id) {
      return fooDao.findOne(id);
    }
}

Using AOP terminology, describe what would need to be implemented. Be as specific as you can with respect to syntax.

ANSWER:

3. [20 points] Enterprise Integration Patterns [EIP] are a fundamental definition of how to do integration in a company of any significant size. Spring Integration implements those patterns.

Explain the fundamental aspects of Spring Integration. Why is it necessary & valuable? Describe the 3 main components. Drawing on the demo from class [Routing an order through the "enterprise"], give details on some of the EIP components.

Be specific. Give examples. Diagrams are good but be sure to explain them.
Here is a diagram that you should use to describe [some] components and an ESB type flow:
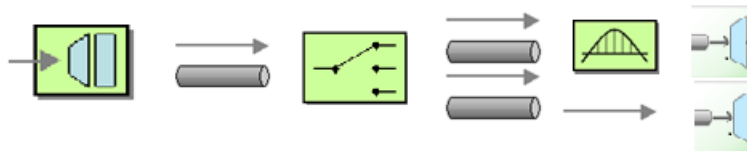
4. **[15 Points]** Annotate for validation both the User and UserCredentials from the Auction System. The action that triggers validation is an invocation of - userService.save(user);

It is NOT necessary to invoke validation, just annotate the domain Models AND externalize the messages in errorMessages.properties [space left at end of question.]
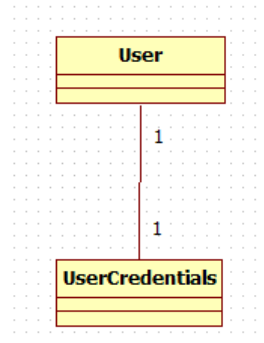
Here are the generated error messages when validation fails:

```
First Name field must have a value
Size of the Last Name must be between 5 and 9
Email must have valid syntax
Ranking must be between 4 and 6

Password must have at least 6 characters
Size of the Login User Name must be between 6 and 16
```

Here is the relevant part of the User Domain Class:

```java
@Entity
@Table(name = "USERS")
 public class User implements Serializable  {

    @Id @GeneratedValue(strategy=GenerationType.AUTO)
    @Column(name = "USER_ID")
    private Long id = null;


    @Version
    private int version = 0;


    @Column(name = "FIRSTNAME", nullable = false)
    private String firstName;


    @Column(name = "LASTNAME", nullable = false)
    private String lastName;


    @Column(name = "EMAIL", nullable = false)
    private String email;


    @Column(name = "RANK", nullable = false)
    private int ranking = 0;


    @Column(name = "IS_ADMIN", nullable = false)
    private boolean admin = false;


        @OneToOne(fetch=FetchType.EAGER,  cascade = CascadeType.ALL)
        @JoinColumn(name="userId")
        private UserCredentials userCredentials;
```

Here is the UserCredentials:

```java
@Entity(name = "Authentication")
public class UserCredentials {


    @Id
    @Column(name = "USER", nullable = false, unique = true, length = 127)
    String userName;


    @Column(name = "PASSWORD", nullable = false, length = 32)
    String password;


    @Column( nullable = false, length = 32)
    String verifyPassword;
    Boolean enabled;



    @OneToOne(mappedBy="userCredentials", cascade = {CascadeType.PERSIST, CascadeType.MERGE})
    private User user;
```

ErrorMessage.properties

5. [15 points]
   Messaging is basic to scalable enterprise architectures. We covered two messaging technologies, JMS & AMQP. Explain the fundamentals of messaging.

   Be sure to cover: the 2 types of messages, the messaging architecture, and the differences between the two technologies, JMS & AMQP and how they are implemented.

   Be specific. Give examples. Diagrams are good but be sure to explain them.

6. [20 points] The Spring framework is the "example" architecture that we used in this course. It emphasizes good design, best practices and use of design patterns.

    Explain the value of the framework. Things you might consider:
    N-Tier; Separation of Concerns; Different types of N-tier [Monolith, etc.]; Distributed capabilities; the characteristics & value of any good framework.
    How does Spring "facilitate" a good Enterprise architecture?

    Be specific. Give examples. Diagrams are good but be sure to explain them.