

CS544
Enterprise Architecture Final
Exam 2 December 2016

Name _____

Student ID _____

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1. [15 points] Determine which of the following are TRUE/FALSE concerning REST :

T **F** RESTful web services are based on well-defined industry standards

EXPLAIN: REST is not about any standards. It is architectural style.

T **F** An XML payload offers an advantage in a RESTful web service in that provides data validation via XML schema definition.

EXPLAIN:

T **F** RESTful operations map directly to HTTP Methods.

EXPLAIN:

T **F** Both a PUT and a POST REST operation modify data on the server. Therefore neither of them are idempotent.

EXPLAIN:

T **F** REST security requires authenticating the user on every request.

EXPLAIN: Since REST is stateless it doesn't hold any information.

2. [10 points] Consider the following AOP Aspect:

AuditAspect.java

```
@Pointcut("execution(* edu.mum.service..*(..))")
public void auditMethod() {}

@Pointcut("execution(* edu.mum.service..list(Integer))")
public void auditMethodList() {}

@Pointcut("@annotation(edu.mum.validation.Audit)")
public void audit() {}

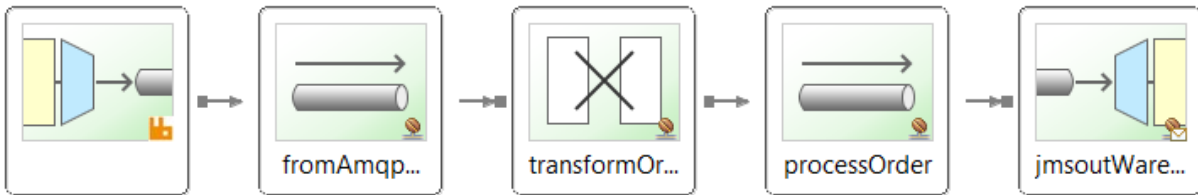
@Pointcut("args(Object)")
public void argsMethod(Object object) {}

@Before("auditMethod() && argsMethod(Object)")
public void doAudit( Object object) throws Throwable {
```

- A. Implement example application code where the Advice method is applied.
Be sure to identify the package, the class & the join point.**

3. [15 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.

Here is a diagram describing a basic ESB flow:



A. Itemize step by step what happens in this flow.

List 5 steps – one step per component

Identify the component and detail what it does.

If a step requires Java code to be implemented, give a code example

4. [15 Points] The following screen displays the member entry screen. Annotate The Member & User Credentials domain objects to reflect the Validation requirements. The provided Member Controller also needs to be annotated. Also the controller methods need to be completed as necessary [including validation support].

http://localhost:8080/MemberMVC/members/add

Valued Members

Add a new one

Add new member

Member Number
 Member Number is a required field

First Name
 First Name must have value

Last Name
 Size of the Last Name must be between 6 and 16

Age
 Age must have a value of at least 18

Title
 Size of the Title must be between 6 and 32

User Name
 User Name must have value

Password
 Size of the Password must be between 6 and 32

Verify Password

Role

Here is the relevant part of the Member Domain Class:

```
@Entity
public class Member {

    @Id
    @GeneratedValue(strategy=GenerationType.AUTO)
    private long id;

    @Column(length = 16)
    private String firstName;

    @Column(length = 16)
    private String lastName;

    private Integer age;

    @Column(length = 32)
    private String title;

    private Integer memberNumber;

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

Here is the UserCredentials:

```
@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

MemberController.java

```
public class MemberController {

    @Autowired
    private MemberService memberService;

    public String getAddNewMemberForm(@ModelAttribute("newMember") Member newMember) {
        return "addMember";
    }

    public String processAddNewMemberForm(

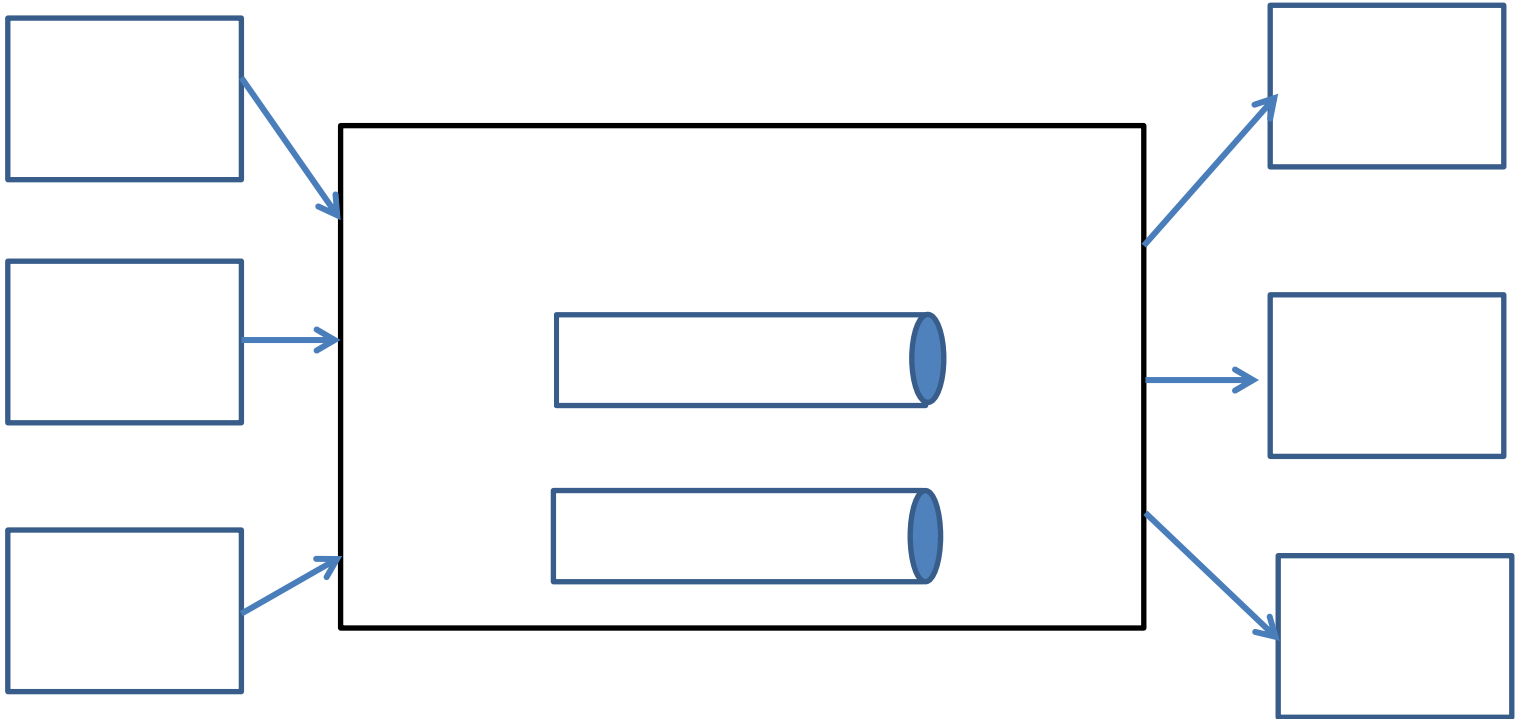
        memberService.save(memberToBeAdded);

        return "redirect:/members";

    }
```

5. [20 points]

Distributed Messaging is basic to scalable enterprise architectures. We covered two messaging technologies, JMS & AMQP. The following diagram represents, at a deployment level [network connected “machines”], possible messaging scenarios. Each “box” is a different computer, representing messaging components.



Implement the following use case:

At close of business, every day, a report is sent asynchronously, from the Accounting department to everyone in the Sales Department; Managers, Supervisors, and Representatives.

1. Using JMS terminology, “modify” the above diagram to identify the components necessary to implement the appropriate messaging. Cross out [delete] components that are NOT necessary.
2. Give Step-by-Step pseudo-code definition of the configuration/setup [Both Sender[s] & Receivers].
3. Give details [code or pseudo code] concerning the implementation necessary to perform the operation. Specifically how the sender[s] send & how the receiver[s] receive.

6. [20 points] RBAC [Role Based Access Control] is widely used in Corporate Enterprises. It has its limitations, in that it is ONLY Role based.

1. Explain the alternative Access Control Methodology, ABAC.
2. Be specific.
3. **Give an example [use case/scenario].**
4. Diagrams are excellent but be sure to explain them.
5. What are the Authorization features of Spring that accommodate an ABAC implementation?