Case Study Title: Online Shopping Portal – Order Processing Monitoring

OrderService.java:

```java
package com.example.service;
import org.springframework.stereotype.Component;
@Component
public class OrderService {
public void addToCart(String product) {
System.out.println("Product added to cart: " + product);
}
public void placeOrder(String orderId) {
if ("INVALID_ID".equals(orderId)) {
throw new RuntimeException("OrderNotFoundException");
}
System.out.println("Order placed successfully: " + orderId);
}
public void cancelOrder(String orderId) {
System.out.println("Order cancelled: " + orderId);
}
}
```

OrderLoggingAspect.java:

```java
package com.example.aspect;
import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.*;
import org.springframework.stereotype.Component;@Aspect
@Component
public class OrderLoggingAspect {
@Before("execution(* com.example.service.OrderService.*(..))")
public void logBefore(JoinPoint joinPoint) {
System.out.println("[BEFORE] Method: " +
joinPoint.getSignature().getName());
}
@AfterReturning("execution(* com.example.service.OrderService.*(..))")
public void logAfterReturning(JoinPoint joinPoint) {
System.out.println("[AFTER RETURNING] Method: " +
joinPoint.getSignature().getName());
```

```java
}
@AfterThrowing(pointcut = "execution(*
com.example.service.OrderService.*(..))", throwing = "ex")
public void logException(JoinPoint joinPoint, Throwable ex) {
System.out.println("[EXCEPTION] Method: " +
joinPoint.getSignature().getName() + " | Exception: " + ex.getMessage());
}
@After("execution(* com.example.service.OrderService.*(..))")
public void logAfter(JoinPoint joinPoint) {
System.out.println("[AFTER] Method: " +
joinPoint.getSignature().getName());
}
}
```

AppConfig.java:
```java
package com.example.config;
import org.springframework.context.annotation.ComponentScan;
import org.springframework.context.annotation.Configuration;
import org.springframework.context.annotation.EnableAspectJAutoProxy;
@Configuration
@ComponentScan(basePackages = "com.example")
@EnableAspectJAutoProxy
public class AppConfig {
}
```

MainApp.java:
```java
package com.example;
import
org.springframework.context.annotation.AnnotationConfigApplicationContext;
import com.example.config.AppConfig;
import com.example.service.OrderService;
public class MainApp {
public static void main(String[] args) {
AnnotationConfigApplicationContext context =
new AnnotationConfigApplicationContext(AppConfig.class);
OrderService orderService = context.getBean(OrderService.class);
orderService.addToCart("Laptop");
orderService.placeOrder("ORD123");
```

```
try {
orderService.placeOrder("INVALID_ID");
} catch (Exception ignored) {}
orderService.cancelOrder("ORD456");
context.close();
}
}
```