**IOT JAVA PE**

**Case study**

Develop a real-time ATM machine monitoring system that collects data from IoT sensors,  
processes the data, and displays the latest readings on a web application.

The system will use Spring Boot for the backend, Azure IoT Hub for device communication,   
and Azure Service Bus and stream analytics job for message routing and processing.

**Features:**  
**IoT Device Communication:**

**Description**: IoT sensors (e.g, current temperature ATM (In Kelvin scale) of a machine and current status of machine including cash left in the counter 100,200,500 notes) send data to the Azure IoT Hub.  
**Implementation**: Use Spring Boot to create a web application UI that allows users to send test messages to the IoT Hub.  
This message can be send from a specific UI

**Message Routing:**

Description: Route messages from the IoT Hub to an Azure Service Bus topic.  
Implementation: Configure Azure IoT Hub to route incoming messages to a Service Bus topic.

**Message Processing:**

Description: Process messages from the Service Bus topic using a Spring Boot listener class.  
Implementation: Use Spring Cloud Stream or Spring Integration to create a listener that processes messages from the Service Bus topic.

Cash details and temperature details should be send to a separate IOT devices.

**UI Display:**  
Description: Display the latest ingested data on a web application screen.  
Implementation: Create a Spring Boot web application with a UI to show the latest message received from the Service Bus.

**Steps to Implement:**

**Set Up IoT Hub and Devices:**  
Register IoT devices in the Azure IoT Hub.  
Obtain device connection strings for communication.  
Create Spring Boot Web Application:

Set up a Spring Boot project with dependencies for Azure IoT Hub and Service Bus.  
Implement a UI to send messages to the IoT Hub.

**Configure Message Routing:**

Set up message routing in Azure IoT Hub to forward messages to a Service Bus topic.

**Implement Message Listener:**

 Use Spring Cloud Stream or Spring Integration to create a listener that processes messages from the Service Bus topic.  
**Display Latest Message:**

Create a REST endpoint in the Spring Boot application to fetch the latest message.  
Update the UI to display the latest message in real-time.

 There can have multiple UI screens for different Users.

 User Roles:

 1 Technician:

 who can have access to UI screen to send the message to IOT device.

 Message format

 2 Admin:

 Who can view the last arrived messages in a tabular from in Degree Celsius format.

 One more UI to see and filter cash left details