SWE 645 EXTRA CREDIT

IMPLEMENTATION OF ActiveMQ

TEAM MATES:

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Installation of ActiveMQ:

Download ActiveMQ from the given link:
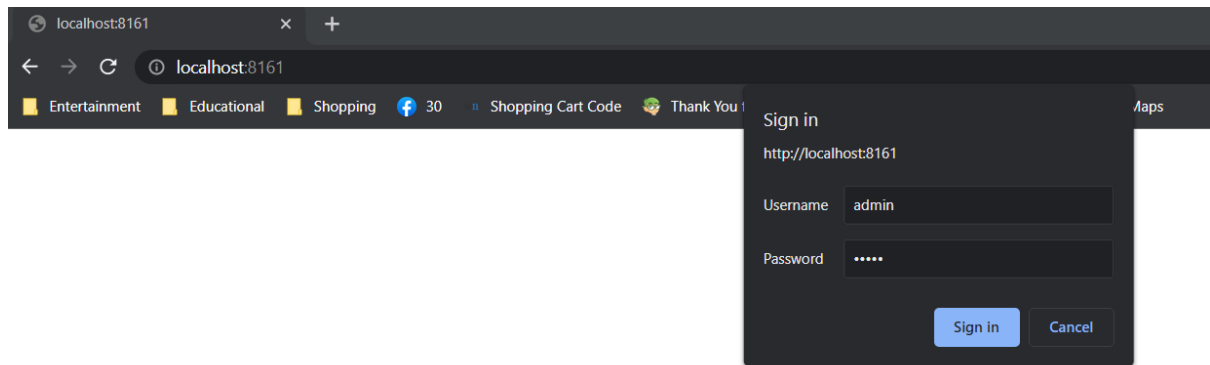https://activemq.apache.org/components/classic/download/

Start ActiveMQ by going the ActiveMQ bin directory and use "activemq start" command to start activeMQ

```
C:\WINDOWS\system32>cd C:\Users\ABC\Downloads\apache-activemq-5.18.1-bin\apache-activemq-5.18.1\bin\

C:\Users\ABC\Downloads\apache-activemq-5.18.1-bin\apache-activemq-5.18.1\bin>activemq start

Warning: JAVA_HOME environment variable is not set.

Java Runtime: Oracle Corporation 19.0.2 C:\Program Files\Java\jdk-19
  Heap sizes: current=1048576k  free=1038846k  max=1048576k
```
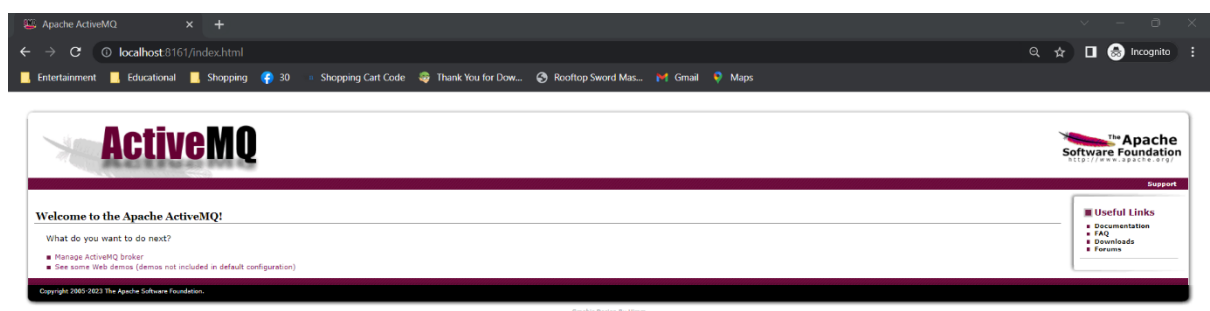
```
INFO | Starting Jetty server
INFO | Creating Jetty connector
WARN | ServletContext@o.e.j.s.ServletContextHandler@2924f1d8{/,null,STARTING} has uncovered http methods for path: /
INFO | Listening for connections at ws://DESKTOP-COQN1HA:61614?maximumConnections=1000&wireFormat.maxFrameSize=104857600
INFO | Connector ws started
INFO | Apache ActiveMQ 5.18.1 (localhost, ID:DESKTOP-COQN1HA-62900-1683573534381-0:1) started
INFO | For help or more information please see: http://activemq.apache.org
WARN | Store limit is 102400 mb (current store usage is 0 mb). The data directory: C:\Users\ABC\Downloads\apache-activemq-5.18.1-bin\apache-activemq-5.18.1\bin\..\data\kahadb only has 29(
- resetting to maximum available disk space: 29609 mb
WARN | Temporary Store limit is 51200 mb (current store usage is 0 mb). The data directory: C:\Users\ABC\Downloads\apache-activemq-5.18.1-bin\apache-activemq-5.18.1\bin\..\data only has
 - resetting to maximum available disk space: 29609 mb
INFO | ActiveMQ WebConsole available at http://127.0.0.1:8161/
INFO | ActiveMQ Jolokia REST API available at http://127.0.0.1:8161/api/jolokia/
```

We can Access ActiveMQ at http://localhost:8161/ in your browser

It would ask a dialogue box with username and password which are both "admin"

Then we will be directed to ActiveMQ Dashboard

Creating Pom.xml file:

Here we have defined dependencies of spring-Jms and activemq-spring

```xml
    http://maven.apache.org/xsd/maven-4.0.0.xsd (xsi:schemaLocation with catalog)
 1<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 2     xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
 3     <modelVersion>4.0.0</modelVersion>
 4
 5     <groupId>com.ram</groupId>
 6     <artifactId>SpringDemo</artifactId>
 7     <version>1.0.0</version>
 8     <packaging>jar</packaging>
 9     <name>SpringDemo</name>
10
11     <properties>
12         <springframework.version>5.1.3.RELEASE</springframework.version>
13     </properties>
14
15     <dependencies>
16         <dependency>
17             <groupId>org.springframework</groupId>
18             <artifactId>spring-core</artifactId>
19             <version>${springframework.version}</version>
20         </dependency>
21         <dependency>
22             <groupId>org.springframework</groupId>
23             <artifactId>spring-context</artifactId>
24             <version>${springframework.version}</version>
25         </dependency>
26         <dependency>
27             <groupId>org.springframework</groupId>
28             <artifactId>spring-jms</artifactId>
29             <version>${springframework.version}</version>
30         </dependency>
31         <dependency>
32             <groupId>org.apache.activemq</groupId>
33             <artifactId>activemq-spring</artifactId>
34             <version>5.13.3</version>
35         </dependency>
36         <dependency>
37             <groupId>ch.qos.logback</groupId>
38             <artifactId>logback-classic</artifactId>
39             <version>1.1.7</version>
40         </dependency>
```

Creating Message Configuration Class:

```java
import java.util.Arrays;

@Configuration
public class MessagingConfiguration
{
    private static final String DEFAULT_BROKER_URL = "tcp://localhost:61616";
    private static final String MESSAGE_QUEUE = "message_queue";

    @Autowired
    MessageReceiver messageReceiver;

    @Bean
    public ConnectionFactory connectionFactory()
    {
        ActiveMQConnectionFactory connectionFactory = new ActiveMQConnectionFactory();
        connectionFactory.setBrokerURL(DEFAULT_BROKER_URL);
        connectionFactory.setTrustedPackages(Arrays.asList("com.645"));
        return connectionFactory;
    }

    /*
     * Used here for Sending Messages.
     */
    @Bean
    public JmsTemplate jmsTemplate()
    {
        JmsTemplate template = new JmsTemplate();
        template.setConnectionFactory(connectionFactory());
        template.setDefaultDestinationName(MESSAGE_QUEUE);
        return template;
    }

    @Bean
    MessageConverter converter()
    {
        return new SimpleMessageConverter();
    }
```

In the above given configuration class:

We have provided activemq broker url

We have created jms template object by using connectionfactory object and the message queue

We can send and receive message from the queue using the jms template

Message Sender and Message Receiver Class:

```java
1 package com.ram.producer;
2
3 import javax.jms.JMSException;
2
3 @Component
4 public class MessageSender
5 {
6
7     @Autowired
8     JmsTemplate jmsTemplate;
9
0     public void sendMessage(final String message)
1     {
2
3         jmsTemplate.send(new MessageCreator()
4         {
5             public Message createMessage(Session session) throws JMSException
6             {
7                 ObjectMessage objectMessage = session.createObjectMessage(message);
8                 return objectMessage;
9             }
0         });
1     }
2
3 }
4
```

The sendMessage method in MessageSender class is responsible for sending messages to the queue

```java
package com.ram.receiver;

import javax.jms.Message;

@Component
public class MessageReceiver
{
    @Autowired
    JmsTemplate jmsTemplate;
    @Autowired
    MessageConverter messageConverter;

    public String receiveMessage()
    {
        try
        {
            /*
             * Here we receive the message.
             */
            Message message = jmsTemplate.receive();
            String response = (String) messageConverter.fromMessage(message);
            return response;

        }
        catch (Exception exe)
        {
            exe.printStackTrace();
        }

        return null;
    }
}
```

The recieveMessage method in MessageReciever class is responsible for receiving messages to the queue

The messageConverter in receiveMessage method is for converting java object to jms message and jms message to java object

Message Producer class:

```java
import org.springframework.context.annotation.AnnotationConfigApplicationContext;

public class MessageProducerApp
{

    public static void main(String[] args)
    {
        AbstractApplicationContext context = new AnnotationConfigApplicationContext(
                AppConfig.class);

        MessageSender messageSender = context.getBean(MessageSender.class);

        messageSender.sendMessage("Hi Everyone, How are you?");
        System.out.println("Message has been sent successfully...");

        ((AbstractApplicationContext) context).close();
    }

}
```

The messagesender object in the message producer class is used for sending messages to the queue

```
<terminated> MessageProducerApp [Java Application] C:\Users\ABC\.p2\pool\plugins\org.eclipse.justj.op
03:51:25.246 [main] DEBUG org.springframework.context.annotation.Ann
03:51:25.265 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.344 [main] DEBUG org.springframework.context.annotation.Cla:
03:51:25.345 [main] DEBUG org.springframework.context.annotation.Cla:
03:51:25.346 [main] DEBUG org.springframework.context.annotation.Cla:
03:51:25.477 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.480 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.484 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.493 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.501 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.517 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.519 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.552 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.617 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.620 [main] DEBUG org.springframework.beans.factory.support.l
03:51:25.870 [main] DEBUG org.apache.activemq.transport.WireFormatNe
03:51:25.900 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@50
03:51:25.901 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@50
03:51:25.901 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@50
03:51:25.901 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@50
03:51:25.939 [main] DEBUG org.springframework.jms.core.JmsTemplate -
03:51:25.976 [main] DEBUG org.springframework.jms.core.JmsTemplate -
03:51:25.989 [main] DEBUG org.apache.activemq.util.ThreadPoolUtils -
03:51:25.991 [main] DEBUG org.apache.activemq.transport.tcp.TcpTransp
03:51:25.992 [main] DEBUG org.apache.activemq.thread.TaskRunnerFacto:
03:51:25.994 [ActiveMQ Task-1] DEBUG org.apache.activemq.transport.t
03:51:25.994 [main] DEBUG org.apache.activemq.util.ThreadPoolUtils -
Message has been sent successfully...
03:51:26.004 [main] DEBUG org.springframework.context.annotation.Ann
```

Queue Name [_____] [Create] Queue Name Filter [_____] [Filter]

Queues:

Name	Number Of Pending Messages	Number Of Consumers	Messages Enqueued	Messages Dequeued	Views	Operations
message_queue	1	0	1	0	Browse Active Consumers Active Producers [atom] [rss]	Send To Purge Delete Pause

Headers		Properties
Message ID	ID:DESKTOP-COQN1HA-50430-1683584485751-1:1:1:1:1	
Destination	queue://message_queue	
Correlation ID		
Group		
Sequence	0	
Expiration	0	
Persistence	Persistent	
Priority	4	
Redelivered	false	
Reply To		
Timestamp	2023-05-09 03:51:25:976 IST	
Type		

Message Actions

Delete

Copy   [-- Please select -- ▾]

Move

Message Details

Hi Everyone, How are you?

You can see the message sent in the message details given above

Message Consumer class:

```java
import org.springframework.context.annotation.AnnotationConfigApplicationContext;

public class MessageConsumerApp
{
    public static void main(String[] args)
    {
        AbstractApplicationContext context = new AnnotationConfigApplicationContext(
                AppConfig.class);

        MessageReceiver messageReceiver = (MessageReceiver) context.getBean("messageReceiver");
        String response = messageReceiver.receiveMessage();
        System.out.println("Messgae Received = " + response);

        ((AbstractApplicationContext) context).close();
    }

}
```

This class is used for receiving messages from the queue

```
<terminated> MessageConsumerApp [Java Application] C:\Users\ABC\.p2\pool\plugins\org.eclipse.justj.ope
04:00:09.889 [main] DEBUG org.springframework.context.annotation.Annot ▲
04:00:09.911 [main] DEBUG org.springframework.beans.factory.support.De
04:00:09.993 [main] DEBUG org.springframework.context.annotation.Class
04:00:09.994 [main] DEBUG org.springframework.context.annotation.Class
04:00:09.995 [main] DEBUG org.springframework.context.annotation.Class
04:00:10.123 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.125 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.129 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.136 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.144 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.156 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.158 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.185 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.235 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.238 [main] DEBUG org.springframework.beans.factory.support.De
04:00:10.485 [main] DEBUG org.apache.activemq.transport.WireFormatNego
04:00:10.490 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@5121
04:00:10.490 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@5121
04:00:10.491 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@5121
04:00:10.491 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@5121
04:00:10.518 [main] DEBUG org.springframework.jms.core.JmsTemplate - E
04:00:10.531 [ActiveMQ Transport: tcp://localhost/127.0.0.1:61616@5121
04:00:10.539 [main] DEBUG org.apache.activemq.ActiveMQMessageConsumer
04:00:10.545 [main] DEBUG org.apache.activemq.util.ThreadPoolUtils - S
04:00:10.545 [main] DEBUG org.apache.activemq.util.ThreadPoolUtils - S
04:00:10.546 [main] DEBUG org.apache.activemq.transport.tcp.TcpTranspo
04:00:10.546 [main] DEBUG org.apache.activemq.thread.TaskRunnerFactory
04:00:10.547 [ActiveMQ Task-1] DEBUG org.apache.activemq.transport.tcp
04:00:10.547 [main] DEBUG org.apache.activemq.util.ThreadPoolUtils - F
Messgae Received = Hi Everyone, How are you?
04:00:10.564 [main] DEBUG org.springframework.context.annotation.Annot
```


So, the message has been received now, so there are no more pending messages and there is one Dequeued message This is a Basic implementation of Active MQ.

ROLES OF TEAM MATES:

Aditee, Ramya Shree and Anurag – Worked on Presentation of Active MQ, presentation video and Documentation.

Bhaskar, Abhishek, and Sanjana – Worked on Implementation of Active MQ, documentation of Active MQ pdf and video recording of the implemetation

REFERENCES:

- https://aws.amazon.com/ec2/instance-types/
- https://www.tutorialspoint.com/inter_process_communication/inter_process_communication_message_queues.htm
- https://activemq.apache.org/
- https://activemq.apache.org/producer-flow-control
- https://www.tutorialspoint.com/apache_activemq/apache_activemq_consumer_application.htm