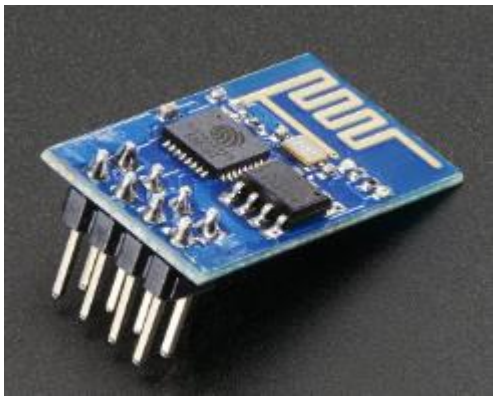
// IoT 8일차,

// nodeMCU 이용하여 wifi 통신.

https://blog.naver.com/roboholic84/221187841348

과거에는 esp8266 사용.



불안정하고, 한계 많음.

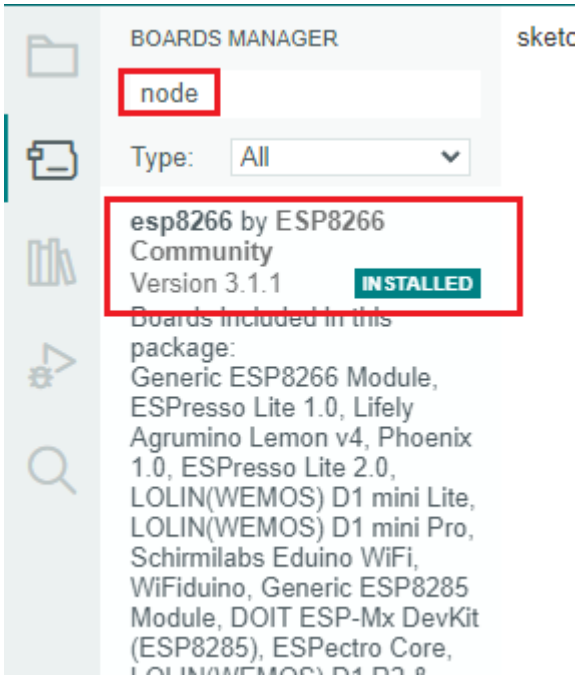
// ch340

https://rockjjy.tistory.com/2876

// 아두이노 명령어 모음

https://reference.arduino.cc/reference/de/

// nodeMCU 아두이노 스케치에 인식 시키기.




```
// 노드엠씨유와 오라클 연동.
// nodeMCU 구현 프로그램.
#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ESP8266WebServer.h>

#define LED LED_BUILTIN
const char* ssid = "you_ssid";
const char* password = "you_password";

ESP8266WebServer server(80);
// 가변저항 이용.

void handleRoot() {
   Serial.println("You called root page");
```

```
// 보여줄 웹페이지와 스크립트 생성.
String s = "<!DOCTYPE html><html><head><meta charset='UTF-8'></head><body>";
s += "<div><h1>NodeMCU_13</h1>";
s += "<button type='button' onclick='sendData(1)'>LED ON</button>";
s += "<button type='button' onclick='sendData(0)'>LED OFF</button><BR></div>";
s += "<div>ADC Value is : <span id='ADCValue'>0</span><br>";
s += "LED State is : <span id='LEDState'>NA</span></div>";
s += "<script src='https://code.jquery.com/jquery-3.6.0.min.js'></script>";
s += "<script>";
s += " function sendGet(param) {";
s += "$.ajax({";
s += "type : 'get',";
s += "url : 'http://192.168.123.135:8090/node?led=' + param,";
s += "success : function(result, status, xhr) {";
s += "console.log(result);";
s += "},});}";
s += "function sendData(led) {";
s += "$.ajax({    type : 'get',";
s += "              url : '/setLED?LEDstate=' + led,";
s += "       success : function(result, status, xhr) { ";
s += "    console.log(result);";
s += "                $('#LEDState').html(result);";
s += "           sendGet(result);";
s += "},          });     }";
s += "setInterval(function() { ";
```

```
  s += "getData();";
  s += "}, 2000);";
  s += "function getData() { ";
  s += "$.ajax({    type : 'get',";
  s += "url : '/readADC',";
  s += "success : function(result, status, xhr) { ";
  s += "                  console.log(result);";
  s += "                  $('#ADCValue').html(result);";
  s += "    },          });";
  s += "}</script><br></body></html>";

  server.send(200, "text/html", s);// 웹 브라우저에 표시.
}

void handleADC() {
  int a = analogRead(A0); // 노드엠의 A0 핀의 갑을 읽어와서 정수형 변수에 대입.
  String adcValue = String(a); // 문자열로 변환.
  Serial.println("adcValue: " + adcValue); // 시리얼 모니터로 출력.

  server.send(200, "text/plane", adcValue); // 웹서버에 전송.
}

// 잘못된 접근시 안내 메세지 생성.
void handleNotFound() {
  String message = "File Not Found₩n₩n";
  message += "URI: ";
```

```
  message += server.uri();
  message += "₩nMethod: ";
  message += (server.method() == HTTP_GET) ? "GET" : "POST";
  message += "₩nArguments: ";
  message += server.args();
  message += "₩n";
  for (uint8_t i = 0; i < server.args(); i++) {
    message += " " + server.argName(i) + ": " + server.arg(i) + "₩n";
  }
  server.send(404, "text/plain", message);
}

void handleLED() {
  String ledState = "OFF";
  String t_state = server.arg("LEDstate");
  //Refer  xhttp.open("GET", "setLED?LEDstate="+led, true);
  Serial.print(t_state + " ");
  if (t_state == "1")
  {
    digitalWrite(LED, LOW); //LED ON
    ledState = "ON"; //Feedback parameter
    Serial.println("led_on");
  }
  else
  {
    digitalWrite(LED, HIGH); //LED OFF
```

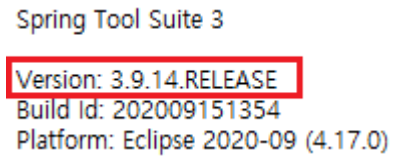
```
    ledState = "OFF"; //Feedback parameter
    Serial.println("led_off");
  }

  server.send(200, "text/plane", ledState); //Send web page
}

void setup() {
  // put your setup code here, to run once:
  Serial.begin(115200);
  pinMode(LED, OUTPUT);
  pinMode(A0, INPUT);

  WiFi.mode(WIFI_STA);
  WiFi.begin(ssid, password);
  Serial.println("");

  // Wait for connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.print("Connected to ");
  Serial.println(ssid);
  Serial.print("IP address: ");
```

```
  Serial.println(WiFi.localIP());

  server.on("/", handleRoot);
  server.on("/setLED", handleLED);
  server.on("/readADC", handleADC);
  server.onNotFound(handleNotFound);

  server.begin();
  Serial.println("HTTP server started");
}

void loop() {
  server.handleClient();
}

// 오라클 디비 구현.
SQL*Plus: Release 11.2.0.2.0 Production on 토 5월 15 04:55:33 2021

// 오라클 개정 생성
create user admin identified by 1234;

// 권한 부여
grant dba to admin;

// 시퀀스 생성
Create sequence seq_led;
```

-- 테이블 생성

```
Create table tbl_led(
Lno number(10,0),
onOff varchar(20) not null,
regDate date default sysdate);
commit;
```

// spring_MVC 서버 구현.



프로젝트명 : nodeMcuNoracleV2

시작패키지 : kr.icia.controller

// 스프링 버전을 3.1.1 에서 5.2.9 로 변경.

```
<org.springframework-version>5.2.9.RELEASE</org.springframework-version>
```

// pom.xml에 ojdbc8 의존성 추가.

```
		<!-- https://mvnrepository.com/artifact/org.projectlombok/lombok --
>
		<dependency>
			<groupId>org.projectlombok</groupId>
			<artifactId>lombok</artifactId>
			<version>1.18.20</version>
			<scope>provided</scope>
		</dependency>
```

```
		<dependency>
			<groupId>com.zaxxer</groupId>
			<artifactId>HikariCP</artifactId>
			<version>3.4.5</version>
		</dependency>

		<!-- https://mvnrepository.com/artifact/org.mybatis/mybatis -->
		<dependency>
			<groupId>org.mybatis</groupId>
			<artifactId>mybatis</artifactId>
			<version>3.5.3</version>
		</dependency>

		<!-- https://mvnrepository.com/artifact/org.mybatis/mybatis-spring
-->
		<dependency>
			<groupId>org.mybatis</groupId>
			<artifactId>mybatis-spring</artifactId>
			<version>2.0.3</version>
		</dependency>

		<!-- https://mvnrepository.com/artifact/org.springframework/spring-
jdbc -->
		<dependency>
			<groupId>org.springframework</groupId>
			<artifactId>spring-jdbc</artifactId>
			<version>5.2.9.RELEASE</version>
		</dependency>

		<!-- https://mvnrepository.com/artifact/org.springframework/spring-
test -->
		<dependency>
			<groupId>org.springframework</groupId>
```

```
                        <artifactId>spring-test</artifactId>
                        <version>5.2.8.RELEASE</version>
                        <scope>test</scope>
                </dependency>

                <!--
https://mvnrepository.com/artifact/com.oracle.database.jdbc/ojdbc8 -->
                <dependency>
                        <groupId>com.oracle.database.jdbc</groupId>
                        <artifactId>ojdbc8</artifactId>
                        <version>19.7.0.0</version>
                        <scope>test</scope>
                </dependency>

                <!-- https://mvnrepository.com/artifact/org.bgee.log4jdbc-
log4j2/log4jdbc-log4j2-jdbc4.1 -->
                <dependency>
                        <groupId>org.bgee.log4jdbc-log4j2</groupId>
                        <artifactId>log4jdbc-log4j2-jdbc4.1</artifactId>
                        <version>1.16</version>
                </dependency>

                <!-- https://mvnrepository.com/artifact/org.springframework/spring-
context-support -->
                <dependency>
                        <groupId>org.springframework</groupId>
                        <artifactId>spring-context-support</artifactId>
                        <version>5.2.8.RELEASE</version>
                </dependency>
```

// junit 의존성 버전을 4.7 >> 4.12

// 아래 코드 구성하고, src/test/java

```java
package kr.icia.controller;

import static org.junit.Assert.fail;

import java.sql.Connection;
import java.sql.DriverManager;

import org.junit.Test;

import lombok.extern.log4j.Log4j;

@Log4j
public class JDBCTests {

	static {
		try {
			Class.forName("oracle.jdbc.driver.OracleDriver");
		} catch (ClassNotFoundException e) {
			e.printStackTrace();
		}
	}

	@Test
	public void testConnection() {
		try {
			Connection con =
DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:XE", "admin",
"1234");
			log.info(con);
		} catch (Exception e) {
			fail(e.getMessage());
		}

	}
```

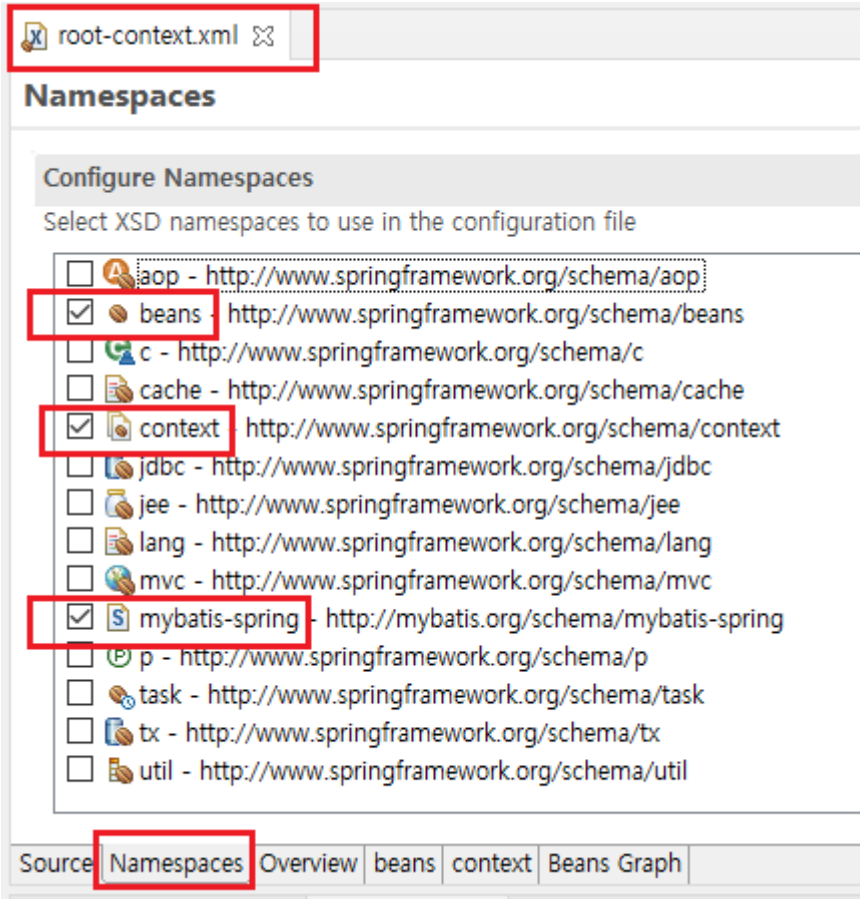
}

// 롬복 적용후, 프로젝트 클린, maven update project, ctrl + shift + O (auto import)

// run as >> junit test 숫자는 다르지만 아래와 같은 객체명이 콘솔에 출력.

INFO : kr.icia.controller.JDBCTests - oracle.jdbc.driver.T4CConnection@5ce81285

// root-context.xml 추가 작성

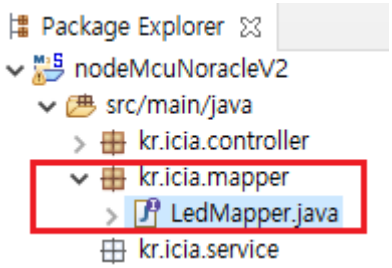



```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:context="http://www.springframework.org/schema/context"
```

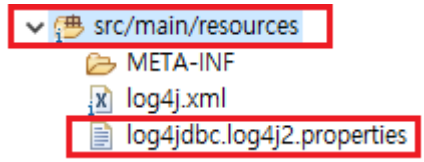
```
        xmlns:mybatis-spring="http://mybatis.org/schema/mybatis-spring"
        xsi:schemaLocation="http://mybatis.org/schema/mybatis-spring
http://mybatis.org/schema/mybatis-spring-1.2.xsd
                http://www.springframework.org/schema/beans
https://www.springframework.org/schema/beans/spring-beans.xsd
                http://www.springframework.org/schema/context
http://www.springframework.org/schema/context/spring-context-3.1.xsd">


        <!-- Root Context: defines shared resources visible to all other web
components -->
        <bean id="hikariConfig" class="com.zaxxer.hikari.HikariConfig">
                <property name="driverClassName"
                        value="net.sf.log4jdbc.sql.jdbcapi.DriverSpy"></property>
                <property name="jdbcUrl"
                        value="jdbc:log4jdbc:oracle:thin:@localhost:1521:XE">
                </property>
                <property name="username" value="admin"></property>
                <property name="password" value="1234"></property>
        </bean>


        <bean id="dataSource" class="com.zaxxer.hikari.HikariDataSource"
                destroy-method="close">
                <constructor-arg ref="hikariConfig"></constructor-arg>
        </bean>


        <bean id="sqlSessionFactory"
                class="org.mybatis.spring.SqlSessionFactoryBean">
                <property name="dataSource" ref="dataSource" />
        </bean>


        <mybatis-spring:scan base-package="kr.icia.mapper" />


        <context:component-scan
                base-package="kr.icia.service">
        </context:component-scan>
```

```
</beans>
```

// 아래 처럼 패키지를 생성하고, 인터페이스 생성.



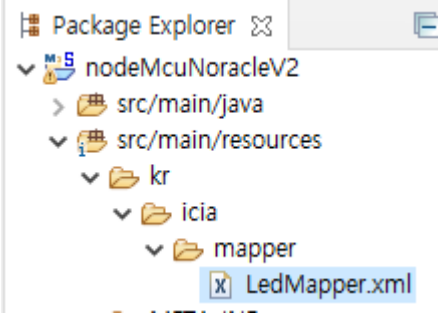

```
package kr.icia.mapper;


public interface LedMapper {
	public void insert(String onOff);
}
```



// 아래와 같이 작성

```
log4jdbc.spylogdelegator.name=net.sf.log4jdbc.log.slf4j.Slf4jSpyLogDelegator
```

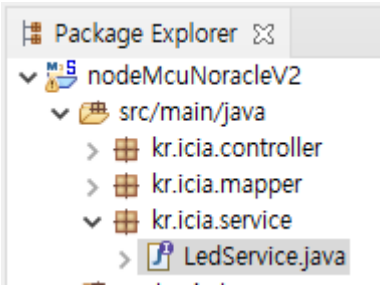
// 아래와 같이 폴더를 3개 생성하고, xml 파일 생성.



// LedMapper.xml 에 아래와 같이 작성.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE mapper
  PUBLIC "-//mybatis.org//DTD Mapper 3.0//EN"
  "http://mybatis.org/dtd/mybatis-3-mapper.dtd">

<mapper namespace="kr.icia.mapper.LedMapper">
        <insert id="insert">
                insert into tbl_led(lno,onOff) values
                (seq_led.nextval, #{onOff})
        </insert>
</mapper>
```

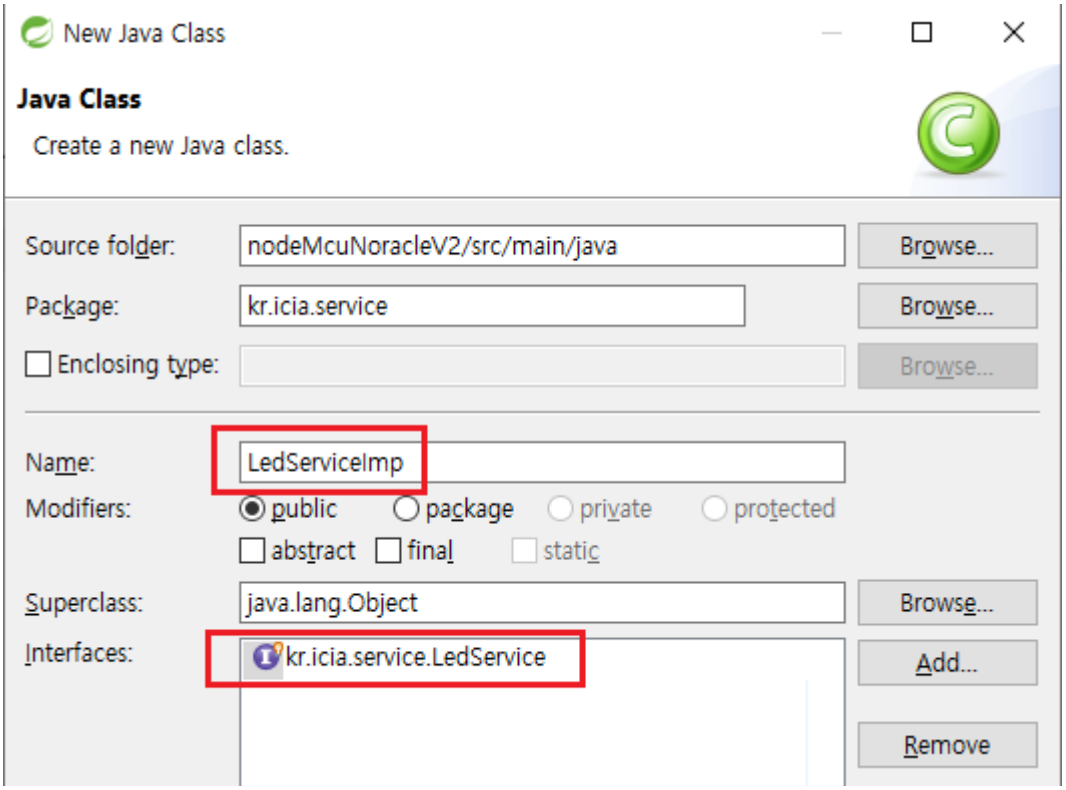
// 아래와 같이 인터페이스 생성



// 아래와 같이 LedService 인터페이스에 작성

```
package kr.icia.service;

public interface LedService {
        public void register(String onOff);
}
```

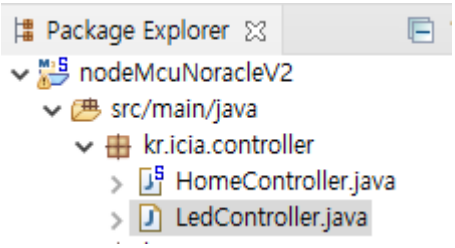
// 동일 패키지에 아래와 같이 서비스를 구현하는 클래스 생성.




```
// 아래와 같이 코드 작성.
package kr.icia.service;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

import kr.icia.mapper.LedMapper;
import lombok.Setter;

@Service
public class LedServiceImp implements LedService {
	@Setter(onMethod_ = @Autowired)
	private LedMapper mapper;

	@Override
	public void register(String onOff) {
		mapper.insert(onOff);
```

```
	}
}
```

// 아래와 같이 컨트롤러 작성

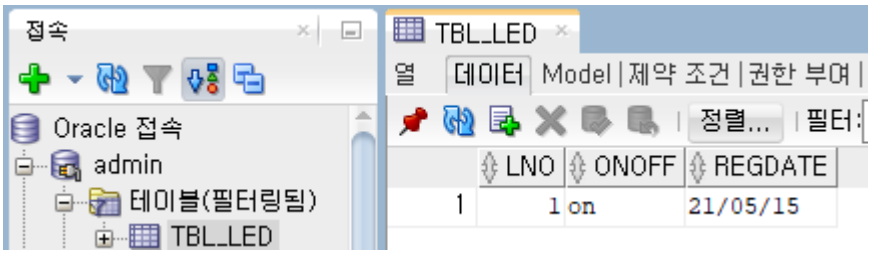


// 아래와 같이 코드 작성.

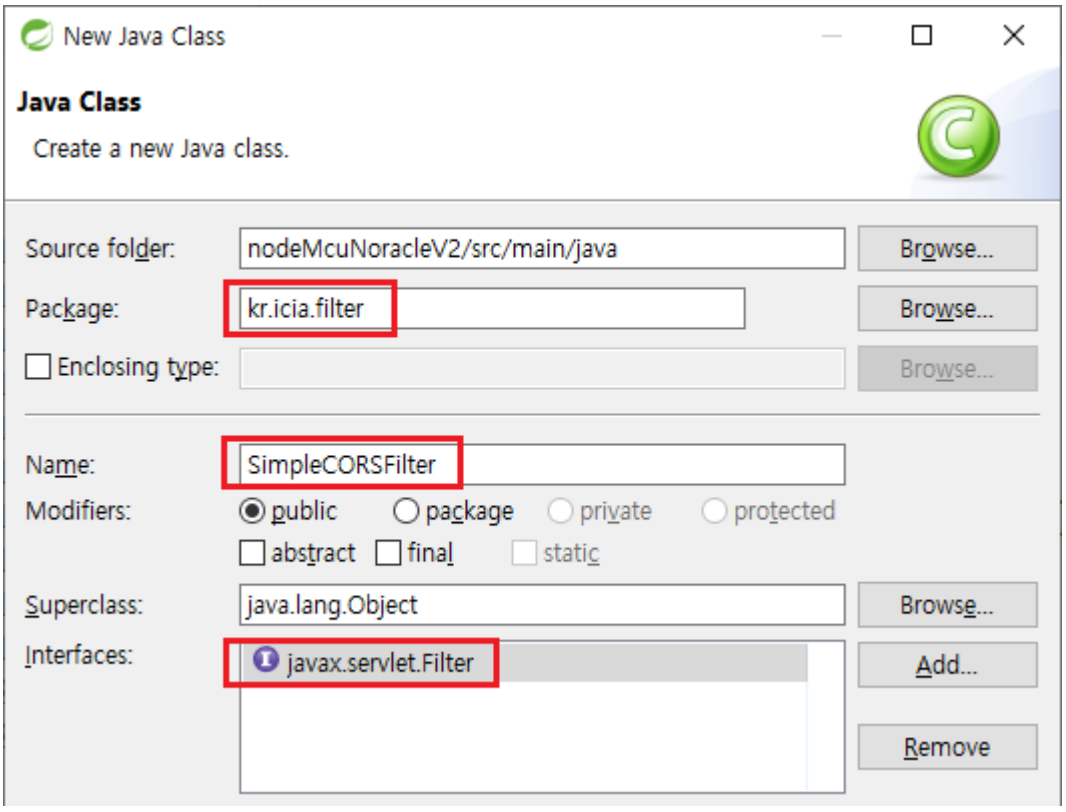
```
package kr.icia.controller;

import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.RequestParam;

import kr.icia.service.LedService;
import lombok.AllArgsConstructor;

@Controller
@AllArgsConstructor
public class LedController {
	private LedService service;

	@GetMapping("/node")
	public void node(@RequestParam("led") String s) {
		service.register(s);
	}

}
```

// 아래 주소 접근시, 디비에 데이터 등록됨.

http://localhost:9090/controller/node?led=on



// nodeMCU 웹서버에서 스프링 서버 접근시 cors 오류가 발생하므로, 필터를 추가하서 개선.



// 다음과 같이 클래스 작성.

```
package kr.icia.filter;


import java.io.IOException;
```

```
import javax.servlet.Filter;
import javax.servlet.FilterChain;
import javax.servlet.FilterConfig;
import javax.servlet.ServletException;
import javax.servlet.ServletRequest;
import javax.servlet.ServletResponse;
import javax.servlet.http.HttpServletResponse;

public class SimpleCORSFilter implements Filter {

	@Override
	public void init(FilterConfig filterConfig) throws ServletException {
		// TODO Auto-generated method stub

	}

	@Override
	public void doFilter(ServletRequest request, ServletResponse response, FilterChain chain)
			throws IOException, ServletException {
		// TODO Auto-generated method stub
		HttpServletResponse res = (HttpServletResponse) response;

		res.setHeader("Access-Control-Allow-Origin", "*");
		res.setHeader("Access-Control-Allow-Methods", "POST, GET, DELETE, PUT");
		res.setHeader("Access-Control-Max-Age", "3600");
```

```
                res.setHeader("Access-Control-Allow-Headers", "x-requested-with, origin,
content-type, accept");

                chain.doFilter(request, response);

        }

        @Override
        public void destroy() {
                // TODO Auto-generated method stub

        }

}

// web.xml 에 한글필터와 cors 필터 적용.
<?xml version="1.0" encoding="UTF-8"?>
<web-app version="2.5" xmlns="http://java.sun.com/xml/ns/javaee"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://java.sun.com/xml/ns/javaee
https://java.sun.com/xml/ns/javaee/web-app_2_5.xsd">

        <!-- The definition of the Root Spring Container shared by all Servlets
and Filters -->
        <context-param>
                <param-name>contextConfigLocation</param-name>
                <param-value>/WEB-INF/spring/root-context.xml</param-value>
        </context-param>

        <!-- Creates the Spring Container shared by all Servlets and Filters -->
```

```
	<listener>
		<listener-class>org.springframework.web.context.ContextLoaderListener</listener-class>
	</listener>

	<!-- Processes application requests -->
	<servlet>
		<servlet-name>appServlet</servlet-name>
		<servlet-class>org.springframework.web.servlet.DispatcherServlet</servlet-class>
		<init-param>
			<param-name>contextConfigLocation</param-name>
			<param-value>/WEB-INF/spring/appServlet/servlet-context.xml</param-value>
		</init-param>
		<load-on-startup>1</load-on-startup>
	</servlet>

	<servlet-mapping>
		<servlet-name>appServlet</servlet-name>
		<url-pattern>/</url-pattern>
	</servlet-mapping>

	<!-- 한글 필터 시작 -->
	<filter>
		<filter-name>encoding</filter-name>
		<filter-class>
			org.springframework.web.filter.CharacterEncodingFilter
		</filter-class>
		<init-param>
			<param-name>encoding</param-name>
			<param-value>UTF-8</param-value>
		</init-param>
		<init-param>
```

```
                        <param-name>forceEncoding</param-name>
                        <param-value>true</param-value>
                </init-param>
        </filter>

        <filter-mapping>
                <filter-name>encoding</filter-name>
                <servlet-name>appServlet</servlet-name>
                <url-pattern>/*</url-pattern>
        </filter-mapping>
        <!-- 한글 필터 끝 -->

        <filter>
                <filter-name>SimpleCORSFilter</filter-name>
                <filter-class>kr.icia.filter.SimpleCORSFilter</filter-class>
        </filter>

        <filter-mapping>
                <filter-name>SimpleCORSFilter</filter-name>
                <url-pattern>/*</url-pattern>
        </filter-mapping>

</web-app>
```