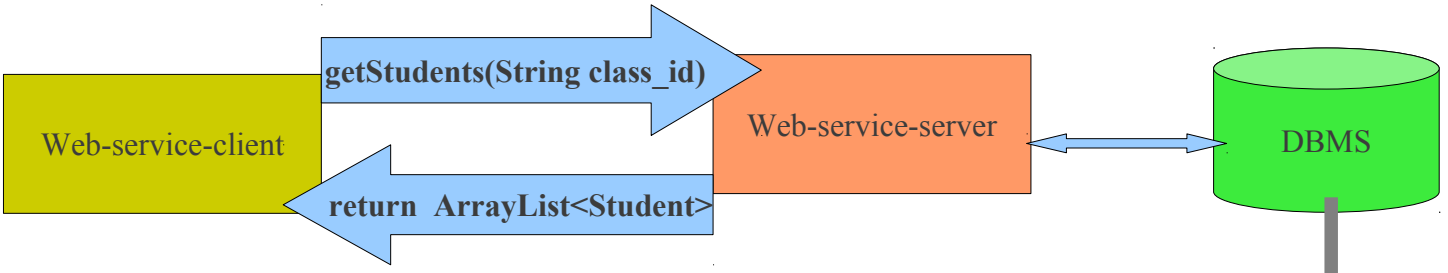
NONG LAM UNIVERSITY
FACULTY OF IT
WEBSITE SPECIAL SUBJECT
Instructor: Le Nhat Tung

WEB SERVICES– EXAMPLE 2

1. REQUIREMENTS:

Building a dynamic web application (J2EE), it support web-services to other website. The web-services–client can call a method to get ***list of student*** based on ***class -id***.



STUDENT TABLE

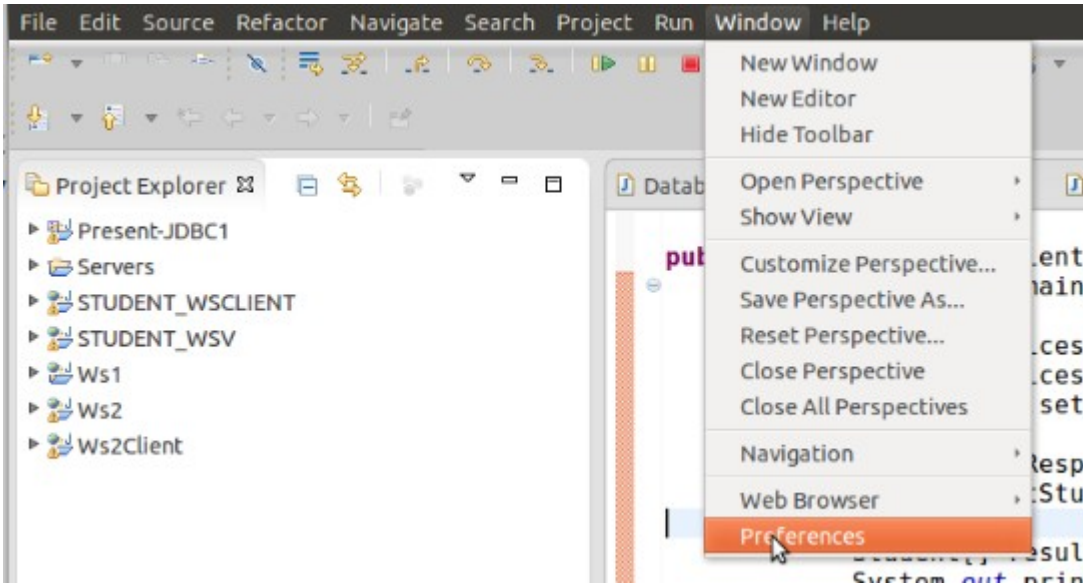
#	STUDENT_ID	CLASS_ID	STUDENT_NAME	STUDENT_ADDRESS	STUDENT_PHONE
1	MITM03019	MITM03	Nguyen Van A	33, Hai Ba Trung	0934130035
2	MITM04015	MITM04	Le Nhat Tung	11, Le Van Viet, Q.9	01267508930
3	MITM04017	MITM04	Tran Van Thanh	22, Truong Chinh	01674568701
*	NULL	NULL	NULL	NULL	NULL

2. PREPARE TOOL & DATABASE:

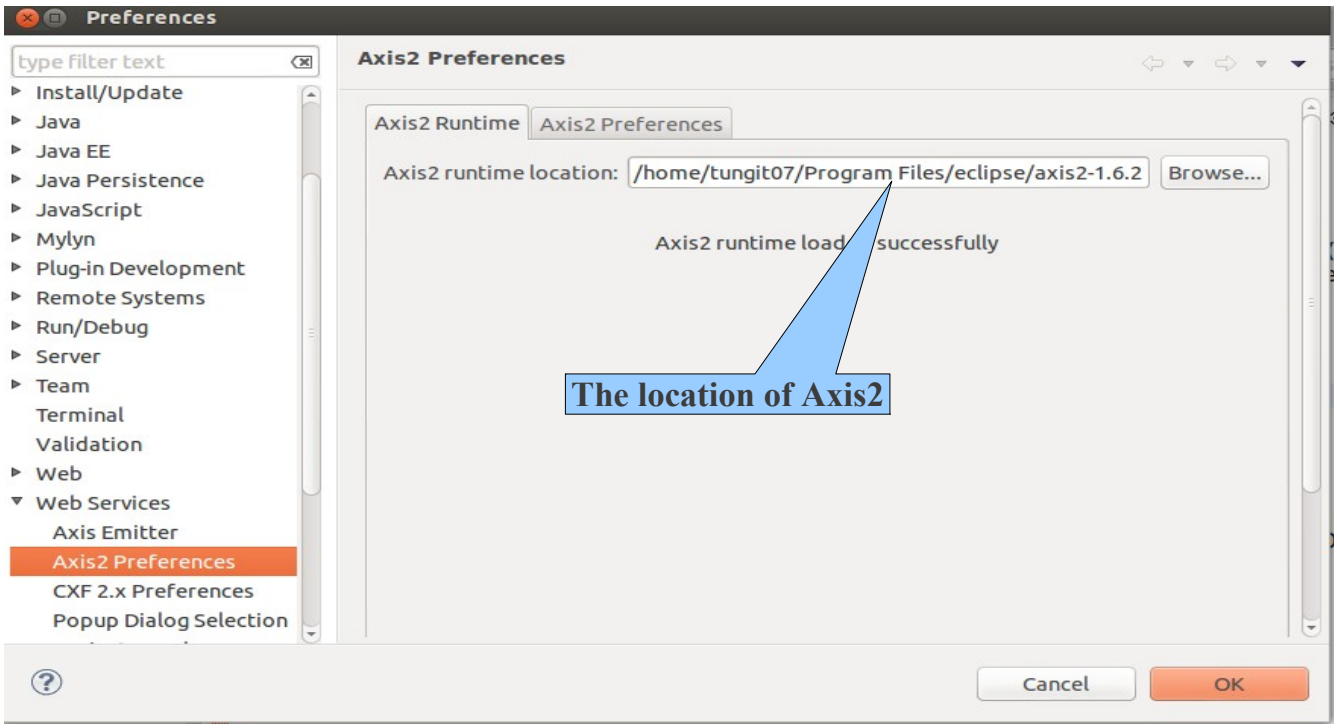
- JDK - **Java development kit** - http://www.oracle.com/technetwork/java/javase/downloads/index.html
- IDE: **Eclipse support J2EE** - http://www.eclipse.org/downloads/
- Web-server: **Apache Tomcar v6.0 or v7.0** - http://tomcat.apache.org/
- Web-services: **Apache Axis2** - http://axis.apache.org/axis2/java/core/
- DBMS: www.mysql.com/
  + MySQL 5.0
  + Mysql-connector (Mysql JDBC Driver)

2.1. Add the location of APACHE AXIS2 to eclipse:

Step 1: Choose menu "**Window**" on Eclipse => **Preferences**



Step 2: Choose **Web Services** => **Axis2 Preferences** => Fill **the location of Axis 2** => Click "**OK**" button.



2.2 Create database

- Create a database (You must remember username, password and database name for connect from web application to DBMS)

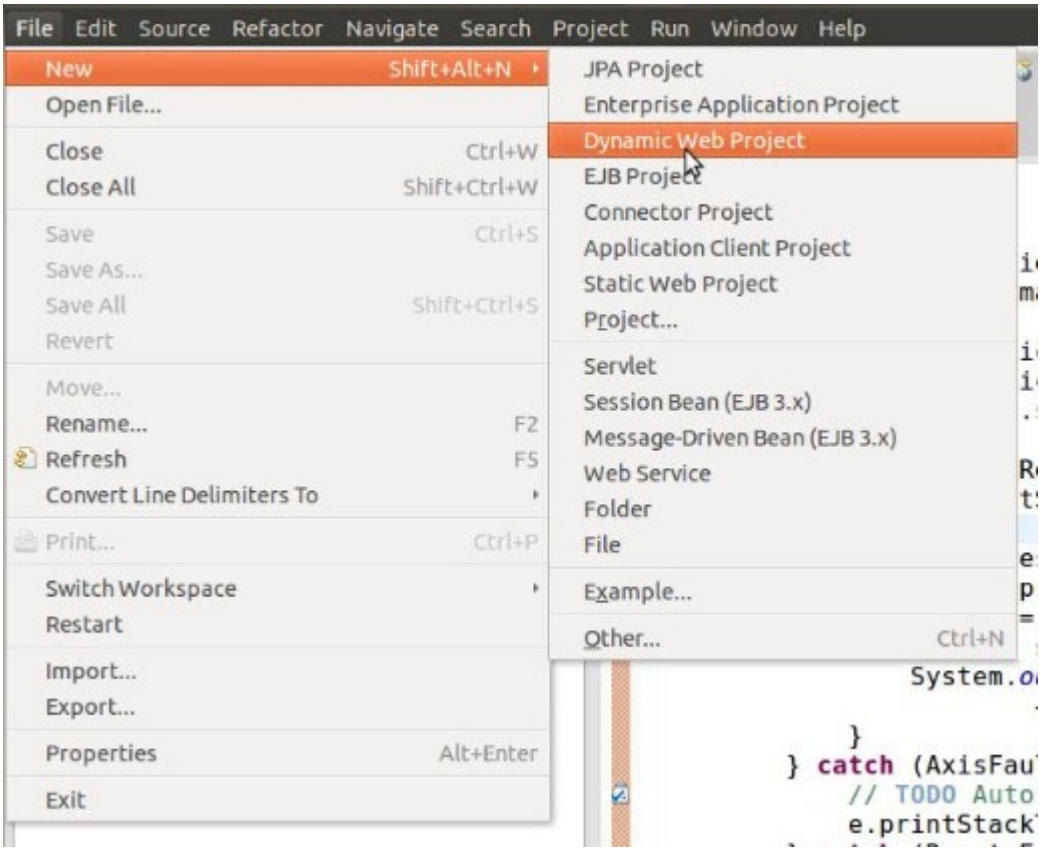
- Create table ***Student***:

```
CREATE TABLE `Student` (
  `STUDENT_ID` varchar(45) NOT NULL,
  `CLASS_ID` varchar(45) DEFAULT NULL,
  `STUDENT_NAME` varchar(45) DEFAULT NULL,
  `STUDENT_ADDRESS` varchar(45) DEFAULT NULL,
  `STUDENT_PHONE` varchar(45) DEFAULT NULL,
  PRIMARY KEY (`STUDENT_ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1$$
```

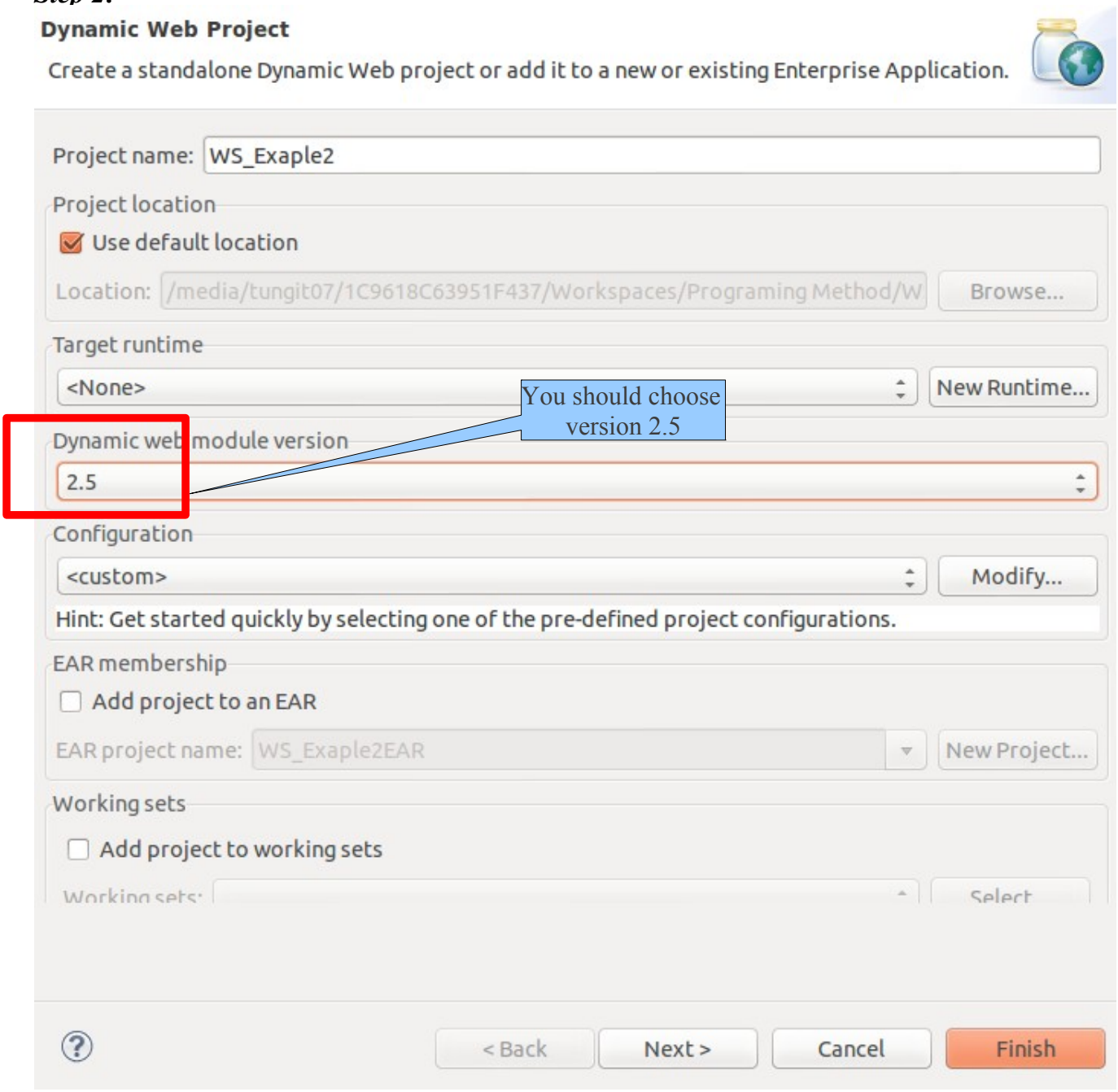
#	STUDENT_ID	CLASS_ID	STUDENT_NAME	STUDENT_ADDRESS	STUDENT_PHONE
1	MITM03019	MITM03	Nguyen Van A	33, Hai Ba Trung	0934130035
2	MITM04015	MITM04	Le Nhat Tung	11, Le Van Viet, Q.9	01267508930
3	MITM04017	MITM04	Tran Van Thanh	22, Truong Chinh	01674568701
*	NULL	NULL	NULL	NULL	NULL

3. CREATE A WEB APPLICATION

Step 1:

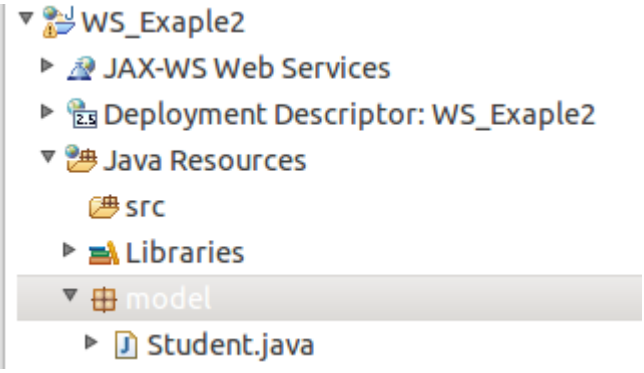


Step 2:



Step 3:

- Create "**model**" pakage and create clas **Student**:



```java
package model;

public class Student {

private String STUDENT_ID, CLASS_ID, STUDENT_NAME, STUDENT_ADDRESS,
                        STUDENT_PHONE;

        public Student() {
        }

        public Student(String sTUDENT_ID, String cLASS_ID, String sTUDENT_NAME,
                        String sTUDENT_ADDRESS, String sTUDENT_PHONE) {
                STUDENT_ID = sTUDENT_ID;
                CLASS_ID = cLASS_ID;
                STUDENT_NAME = sTUDENT_NAME;
                STUDENT_ADDRESS = sTUDENT_ADDRESS;
                STUDENT_PHONE = sTUDENT_PHONE;
        }

        public String getSTUDENT_ID() {
                return STUDENT_ID;
        }

        public void setSTUDENT_ID(String sTUDENT_ID) {
                STUDENT_ID = sTUDENT_ID;
        }

        public String getCLASS_ID() {
                return CLASS_ID;
        }

        public void setCLASS_ID(String cLASS_ID) {
                CLASS_ID = cLASS_ID;
        }

        public String getSTUDENT_NAME() {
                return STUDENT_NAME;
        }

        public void setSTUDENT_NAME(String sTUDENT_NAME) {
                STUDENT_NAME = sTUDENT_NAME;
        }

        public String getSTUDENT_ADDRESS() {
                return STUDENT_ADDRESS;
        }

        public void setSTUDENT_ADDRESS(String sTUDENT_ADDRESS) {
                STUDENT_ADDRESS = sTUDENT_ADDRESS;
        }

        public String getSTUDENT_PHONE() {
                return STUDENT_PHONE;
        }

        public void setSTUDENT_PHONE(String sTUDENT_PHONE) {
                STUDENT_PHONE = sTUDENT_PHONE;
        }

        @Override
        public String toString() {
                return "Student [STUDENT_ID=" + STUDENT_ID + ", CLASS_ID=" + CLASS_ID
                                + ", STUDENT_NAME=" + STUDENT_NAME + ", STUDENT_ADDRESS="
                                + STUDENT_ADDRESS + ", STUDENT_PHONE=" + STUDENT_PHONE + "]";
        }

}
```

This method support to print all information of Student

Step 4: Connect to database

- Create class ***DBConnection*** to connect from Web application to DBMS (remember you must add ***JDBC driver*** into project.

```
package model;

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

public class DBConnection {
	public static Connection getConnection() {
		Connection connection = null;
		try {
			Class.forName("com.mysql.jdbc.Driver").newInstance();
			String url = "jdbc:mysql://localhost/School";
			String user = "root";
			String pass = "khongcopass";
			connection = DriverManager.getConnection(url, user, pass);
		} catch (ClassNotFoundException e) {
			// No driver err
			e.printStackTrace();
		} catch (SQLException e) {
			// Can not connect
			e.printStackTrace();
		} catch (Exception e) {
			// Orther err
			e.printStackTrace();
		}

		return connection;
	}

	public static void main(String[] args) {
		System.out.println(getConnection());
	}

}
```

4. CREATE SERVICE'S IMPLEMENTATION

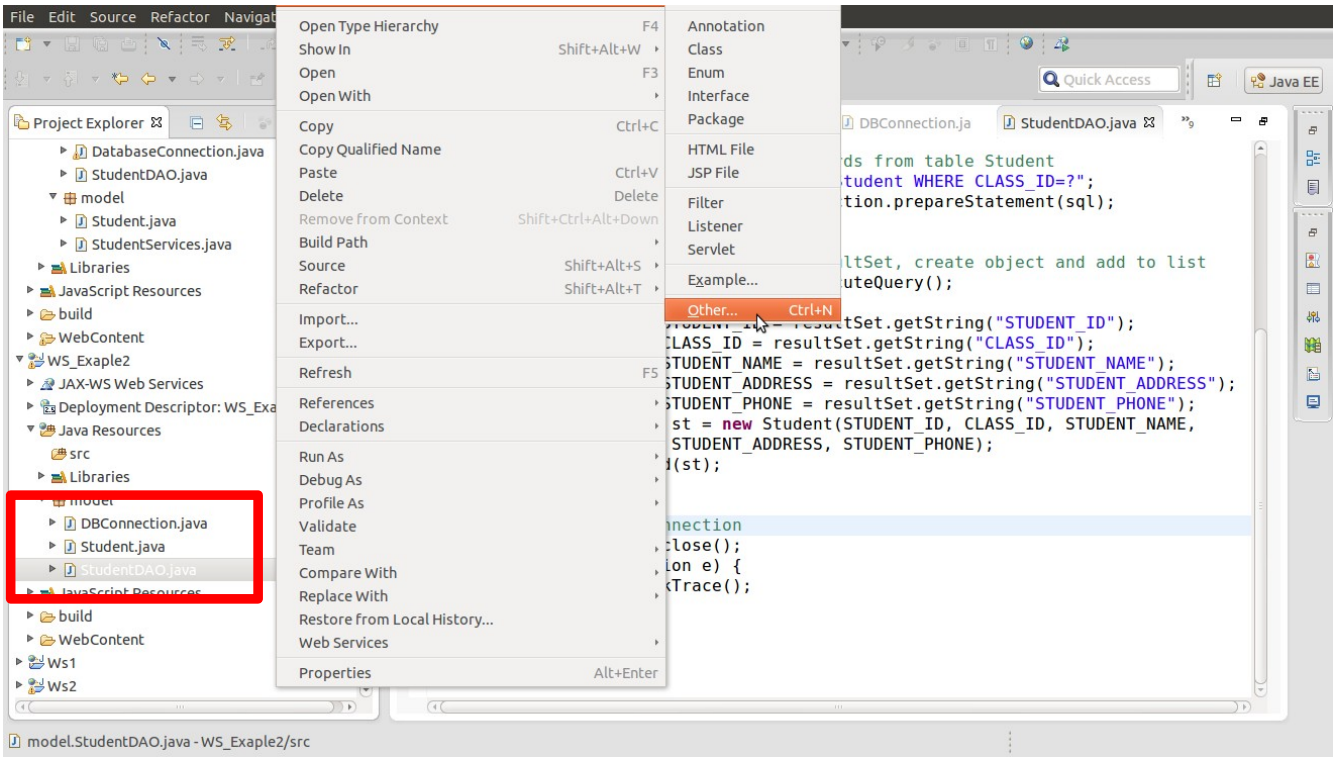
- Create class ***StudentDAO***, it is a *data access object* class. In this class we create method ***getStudents(String class_id)*** to get ***list of student*** from DBMS based on ***class -id***.

```
package model;

import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.util.ArrayList;

public class StudentDAO {
	public ArrayList<Student> getStudents(String class_id) {
		ArrayList<Student> list = new ArrayList<Student>();
		try {
			// Get Connection
			Connection connection = DBConnection.getConnection();

			// Execute query to get records from table Student
			String sql = "SELECT * FROM Student WHERE CLASS_ID=?";
			PreparedStatement pr = connection.prepareStatement(sql);
			pr.setString(1, class_id);

			// Read all records from ResultSet, create object and add into list
```

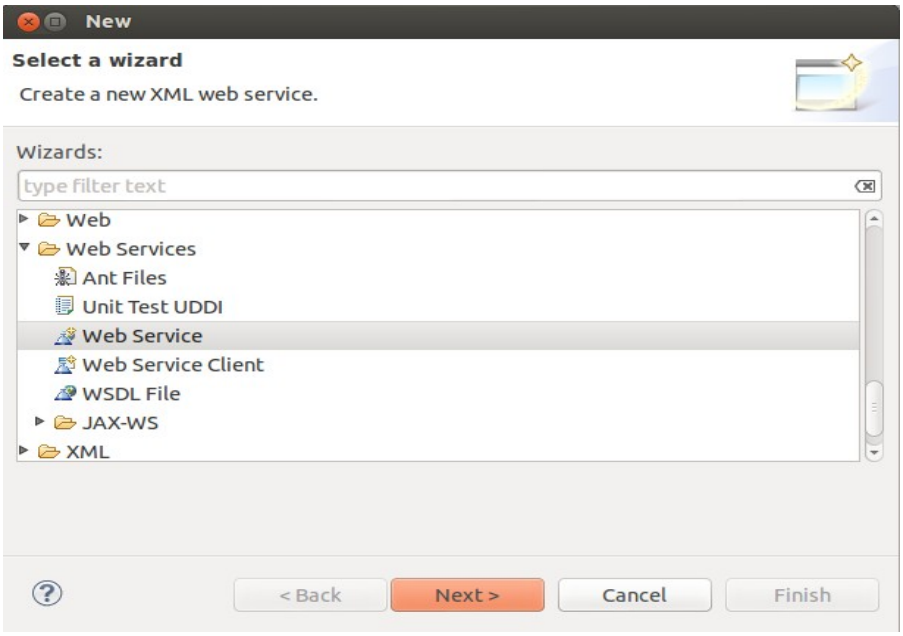
```
                        ResultSet resultSet = pr.executeQuery();
                        while (resultSet.next()) {
                                String STUDENT_ID = resultSet.getString("STUDENT_ID");
                                String CLASS_ID = resultSet.getString("CLASS_ID");
                                String STUDENT_NAME = resultSet.getString("STUDENT_NAME");
                                String STUDENT_ADDRESS = resultSet.getString("STUDENT_ADDRESS");
                                String STUDENT_PHONE = resultSet.getString("STUDENT_PHONE");
                                Student st = new Student(STUDENT_ID, CLASS_ID, STUDENT_NAME,
                                                STUDENT_ADDRESS, STUDENT_PHONE);
                                list.add(st);
                        }

                        // Close Connection
                        connection.close();
                } catch (Exception e) {
                        e.printStackTrace();
                }
                return list;
        }
}
```

5. GENERATE WEB SERVICE

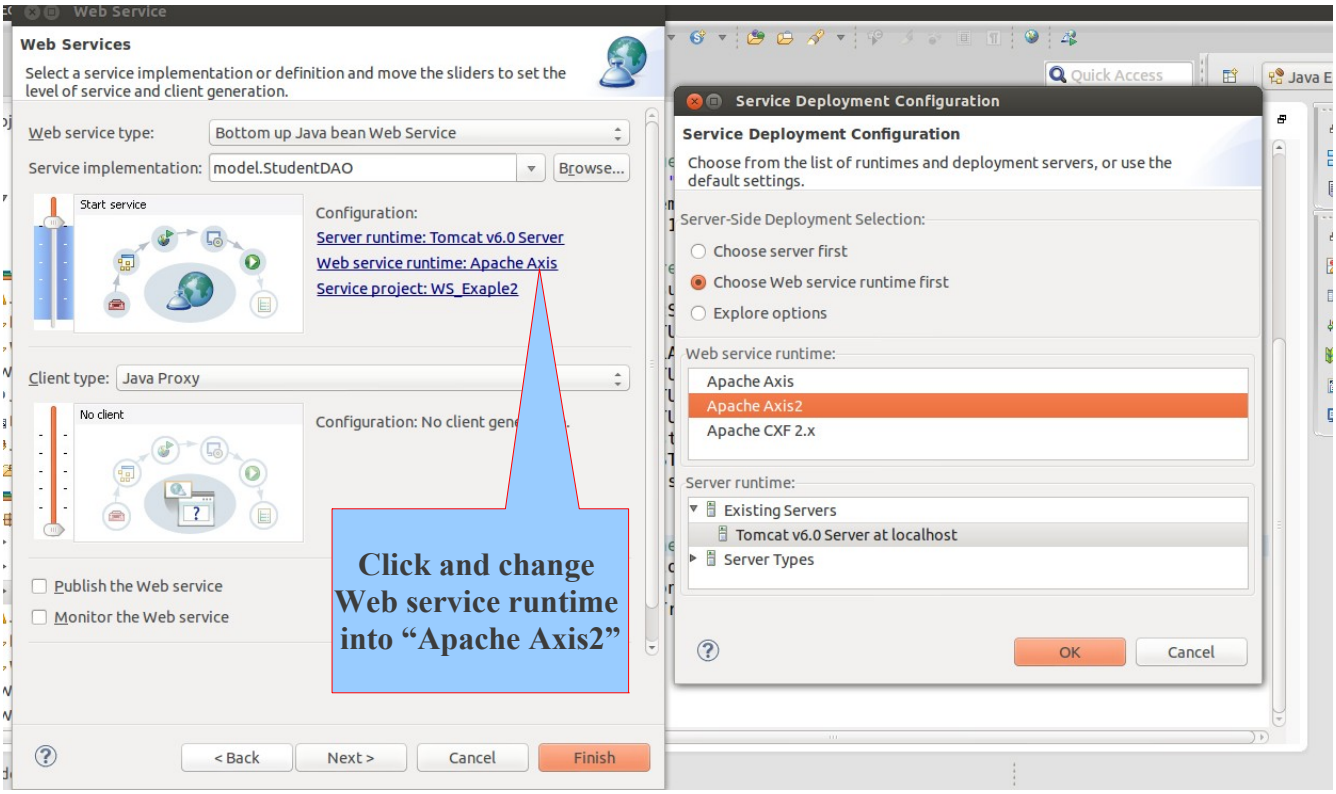
Step 1: Right click on **StudentDAO** class => Choose "**New**" => Choose "**Other**"



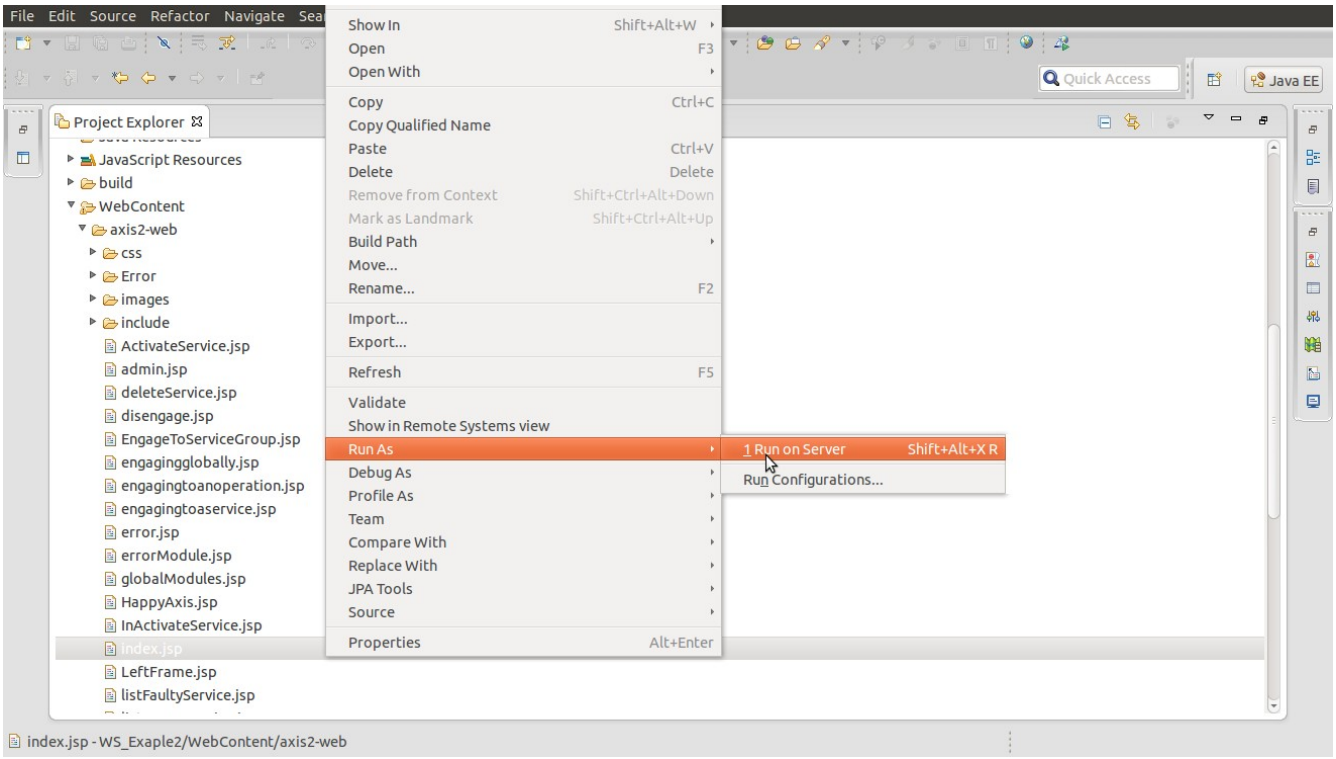
***Step 2*:** Choose "**Web service**" and click "**Next**" button

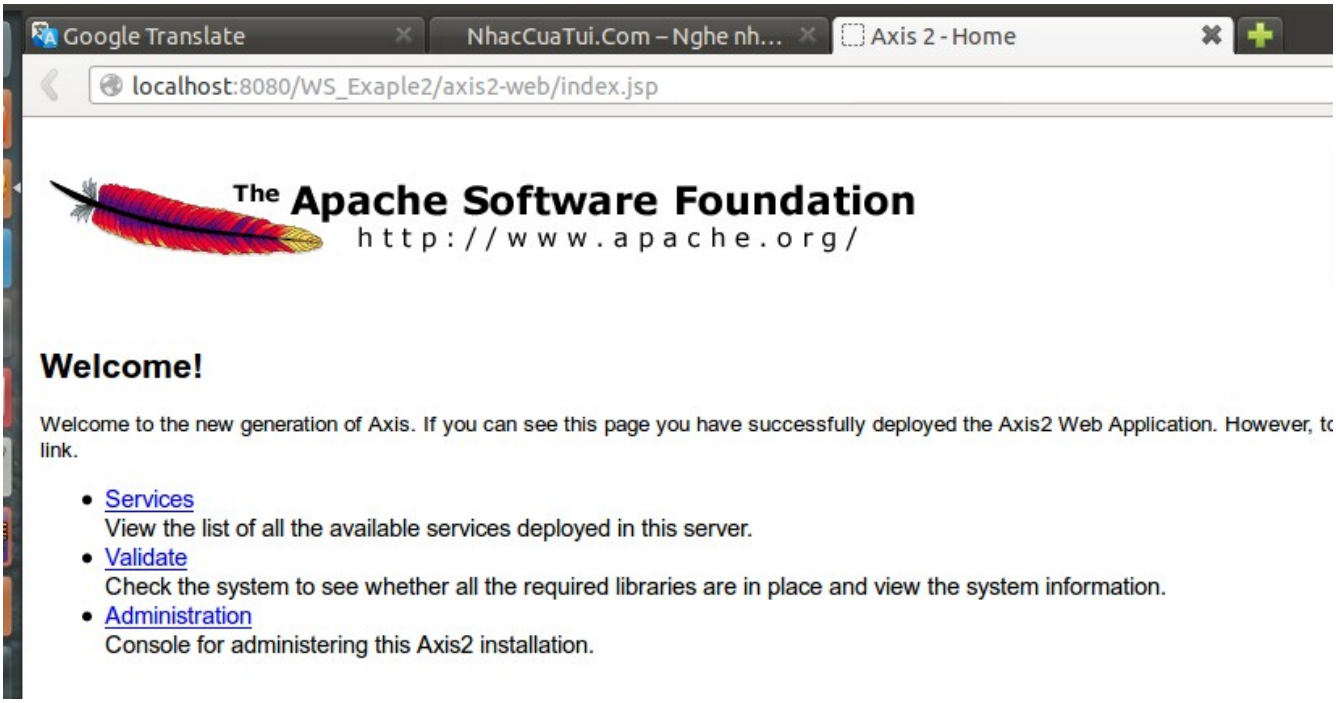


***Step 3*:**



***Step 4*:** Run Apache Axis2





Available services

Version

Service Description : Version

Service EPR : http://localhost:8080/WS_Exaple2/services/Version

Service Status : Active

Available Operations

- getVersion

Click StudentDao to get file “wsdl”

StudentDAO

Service Description : Please Type your service description here

Service EPR : http://localhost:8080/WS_Exaple2/services/StudentDAO

Service Status : Active

Available Operations

- getStudents

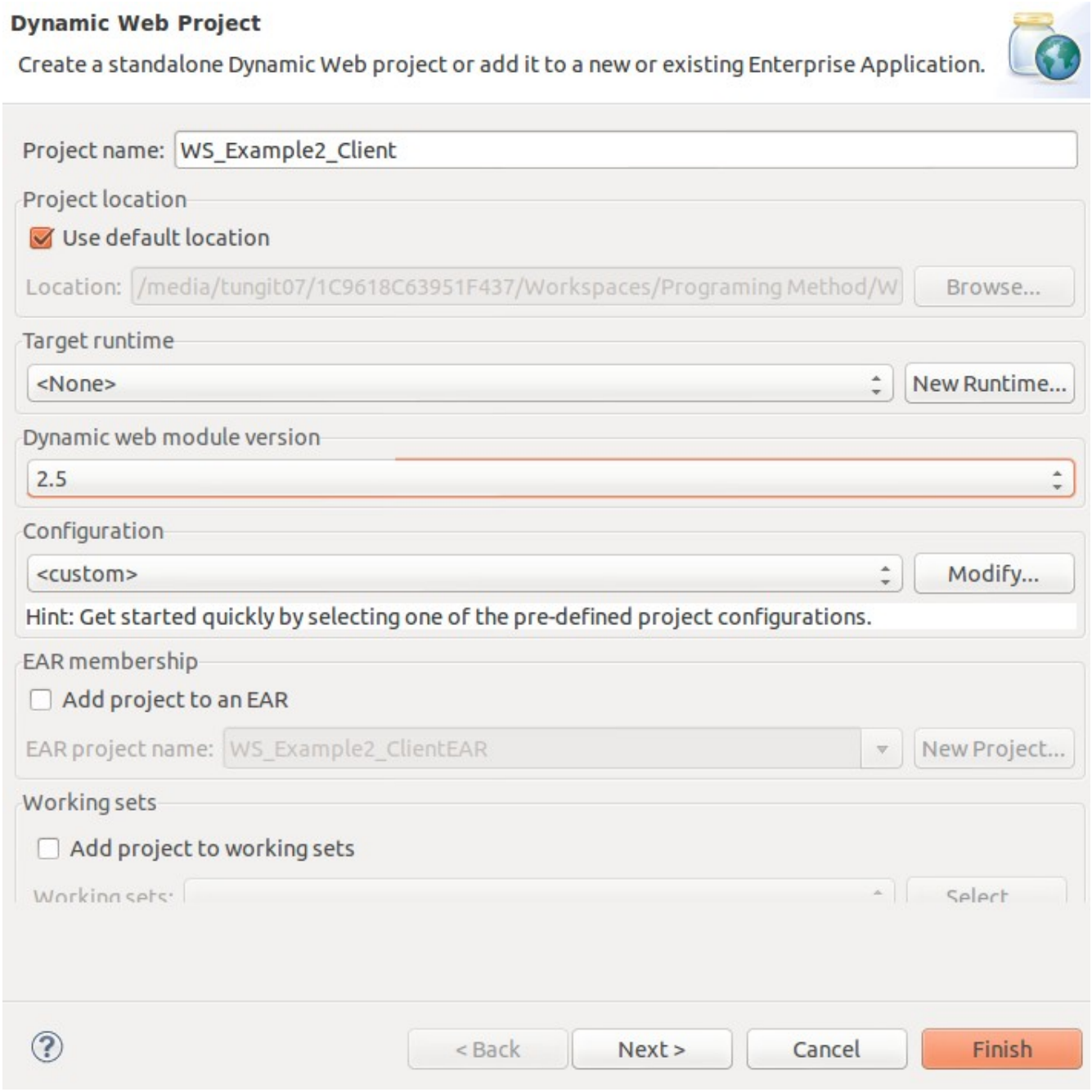
Link of dilw “wsdl”

This XML file does not appear to have any style information associated with it. The document tree is shown below.

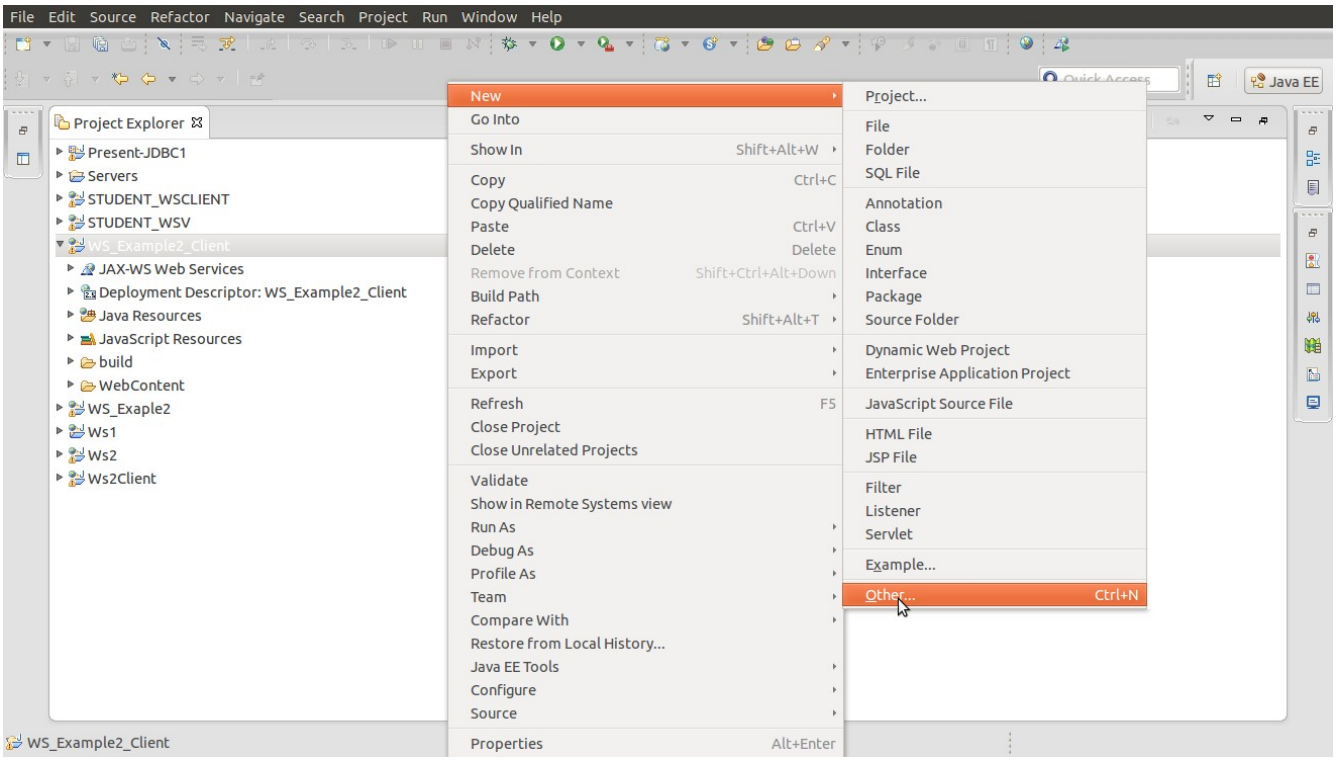

```
−<wsdl:definitions targetNamespace="http://model">
   <wsdl:documentation> Please Type your service description here </wsdl:documentation>
  −<wsdl:types>
    −<xs:schema attributeFormDefault="qualified" elementFormDefault="qualified" targetNamespace="http://model/xsd'
      −<xs:complexType name="Student">
        −<xs:sequence>
            <xs:element minOccurs="0" name="CLASS_ID" nillable="true" type="xs:string"/>
            <xs:element minOccurs="0" name="STUDENT_ADDRESS" nillable="true" type="xs:string"/>
            <xs:element minOccurs="0" name="STUDENT_ID" nillable="true" type="xs:string"/>
            <xs:element minOccurs="0" name="STUDENT_NAME" nillable="true" type="xs:string"/>
            <xs:element minOccurs="0" name="STUDENT_PHONE" nillable="true" type="xs:string"/>
          </xs:sequence>
        </xs:complexType>
      </xs:schema>
    −<xs:schema attributeFormDefault="qualified" elementFormDefault="qualified" targetNamespace="http://model">
        <xs:import namespace="http://model/xsd"/>
      −<xs:element name="getStudents">
        −<xs:complexType>
          −<xs:sequence>
              <xs:element minOccurs="0" name="class_id" nillable="true" type="xs:string"/>
```

6. CREATE SERVICE'S CLIENT

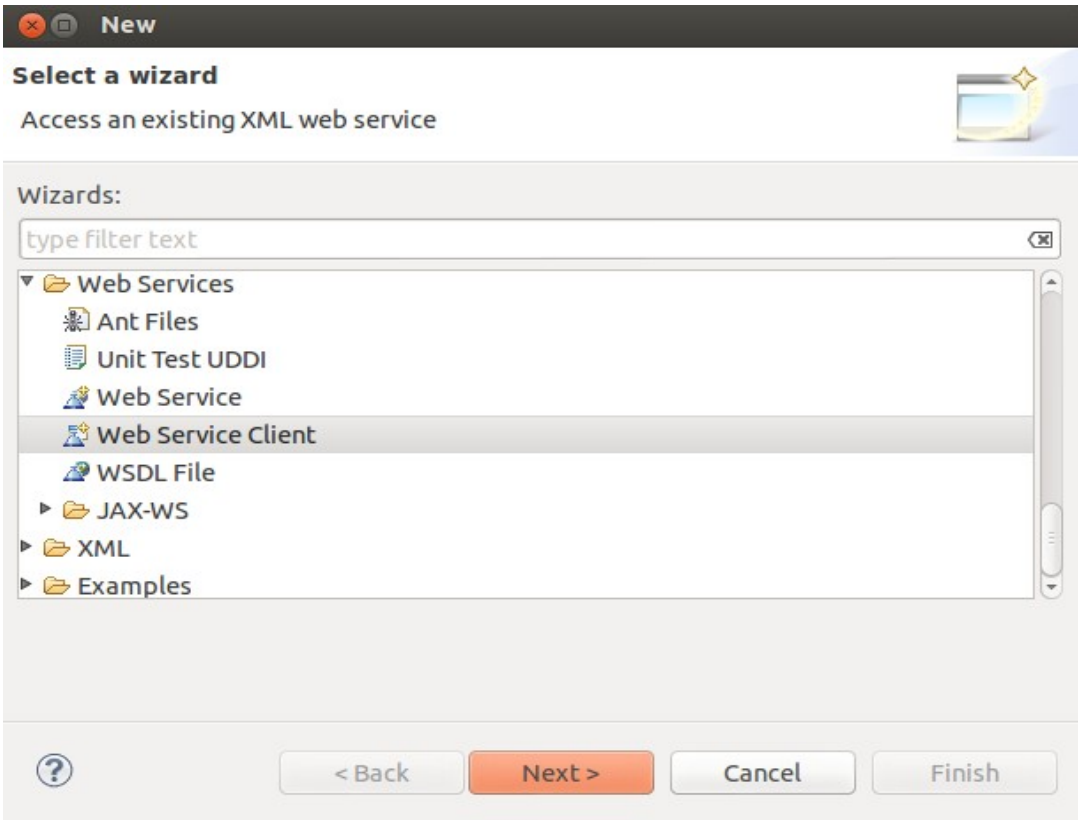
Step 1: Create a new web application



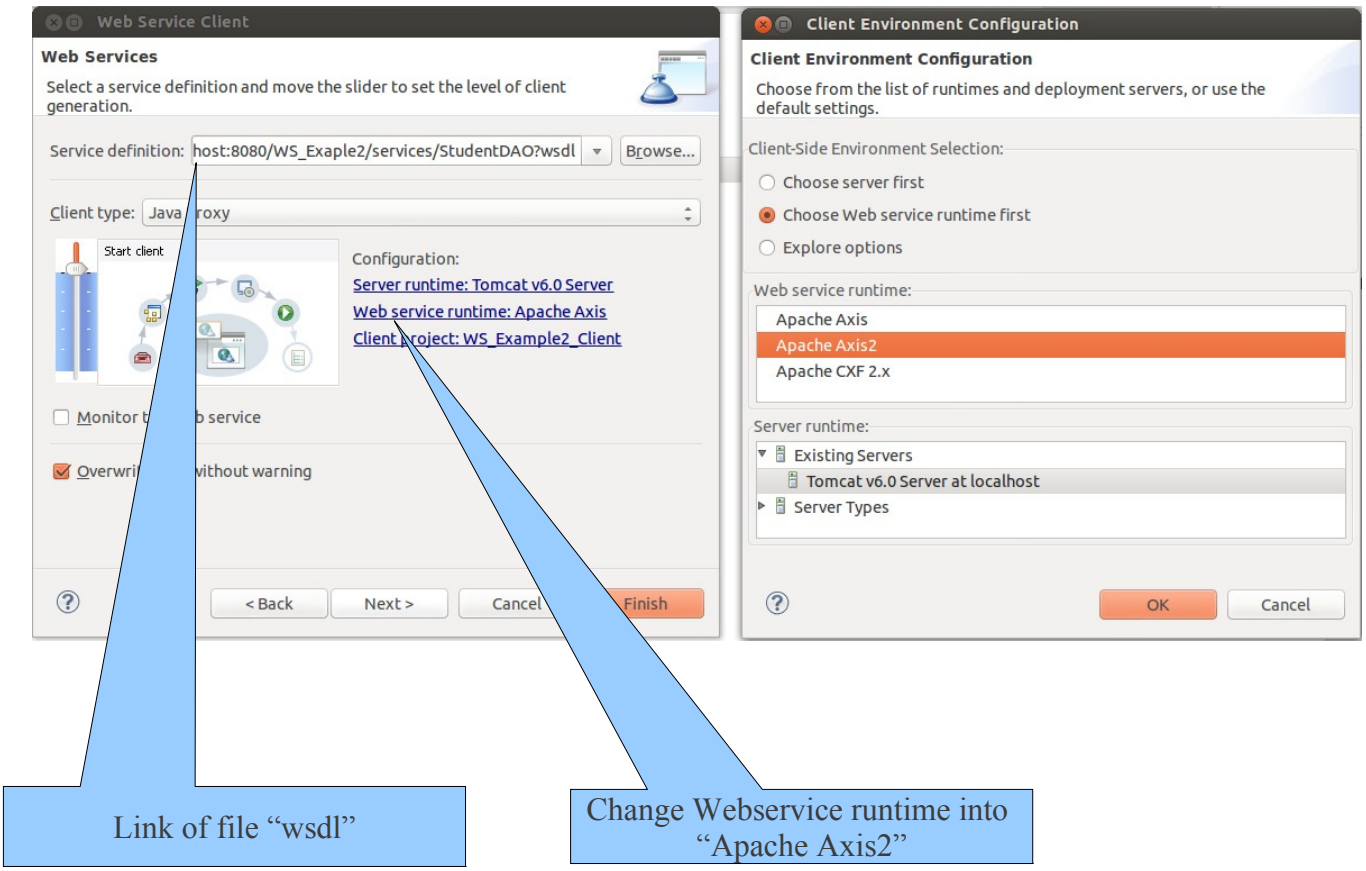
Step 2: Right click on **WS_Example2_Client** => choose "**New**" => Choose "**Other**"



Step 3: Choose "**Web Service client**" and click "**Next**"

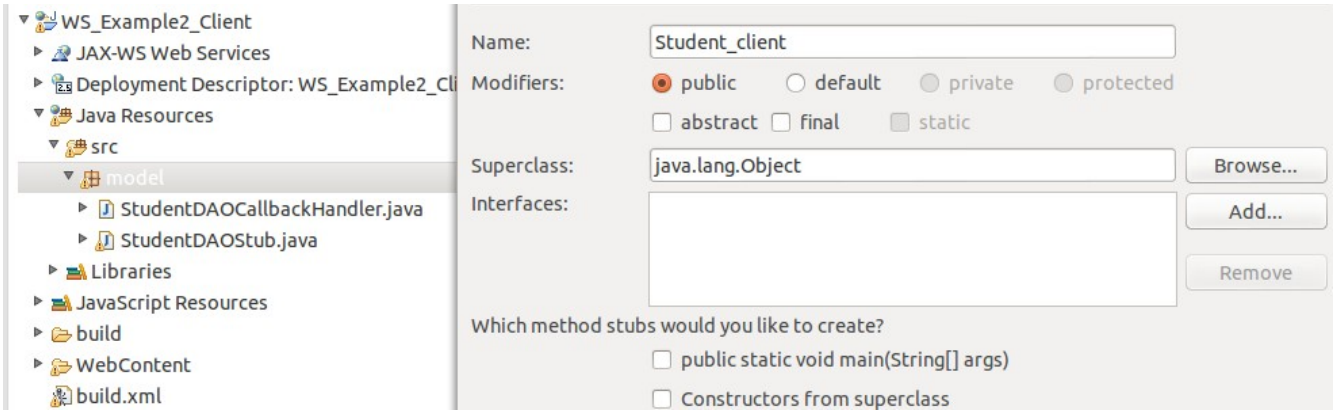


Step 4: Fill the link of file "wsdl" and change web service runtime.



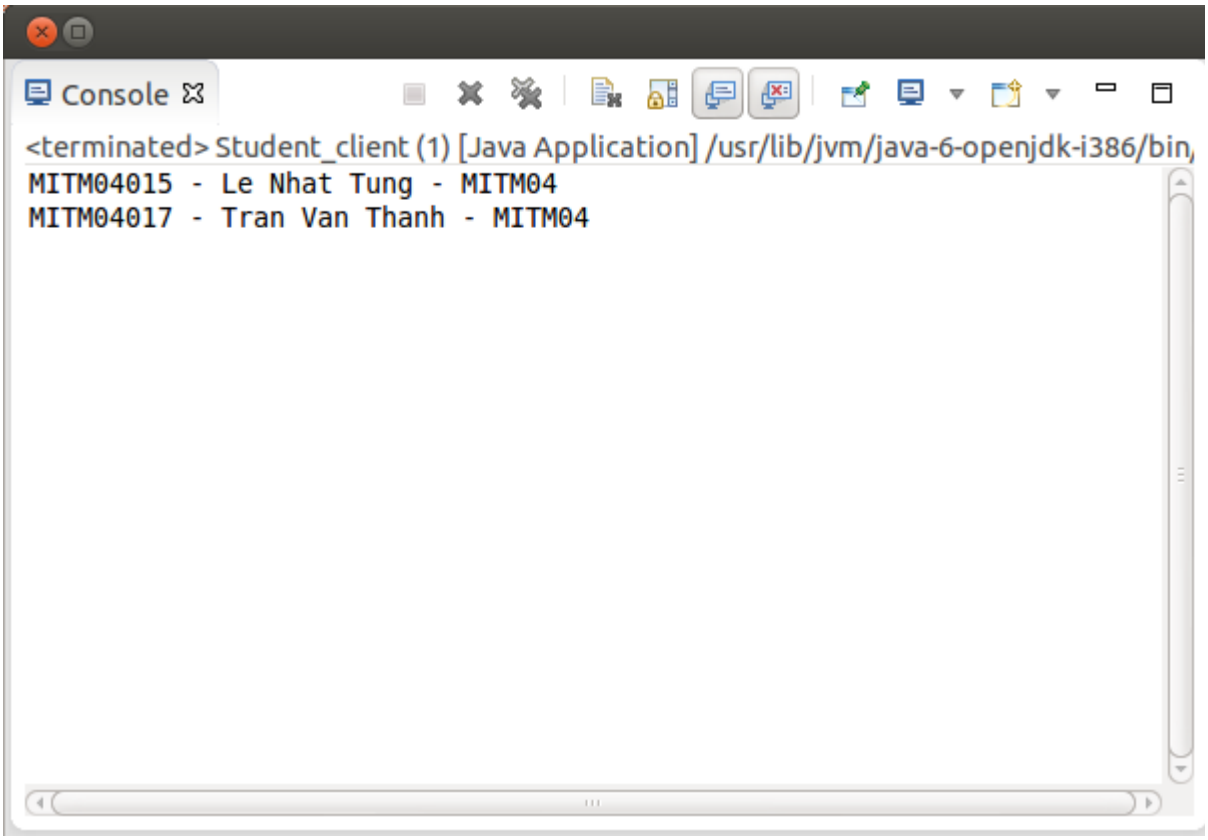
Step 5:

- Create a class Student_client to call method




```
package model;

import java.rmi.RemoteException;

import model.StudentDAOStub.Student;

import org.apache.axis2.AxisFault;
```

```
public class Student_client {
	public static void main(String[] args) {
		try {
			StudentDAOStub servicesStub = new StudentDAOStub();
			StudentDAOStub.GetStudents getStudents = new StudentDAOStub.GetStudents();
			getStudents.setClass_id("MITM04");

			StudentDAOStub.GetStudentsResponse getStudentsResponse = servicesStub
					.getStudents(getStudents);

			Student[] result = getStudentsResponse.get_return();
			for (int i = 0; i < result.length; i++) {
				Student st = result[i];
				System.out.println(st.getSTUDENT_ID() + " - "
						+ st.getSTUDENT_NAME() + " - " + st.getCLASS_ID());
			}
		} catch (AxisFault e) {
			// TODO Auto-generated catch block
			e.printStackTrace();
		} catch (RemoteException e) {
			// TODO Auto-generated catch block
			e.printStackTrace();
		}

	}
}
```



- The end of example 2-
Thank for your reading