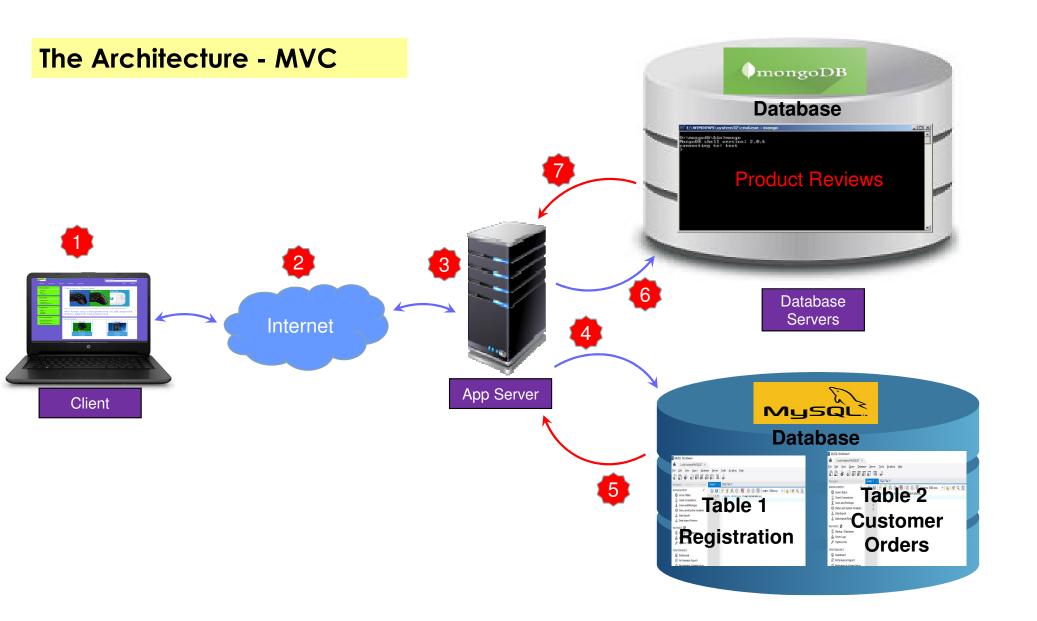
Tutorial #2

MySQL

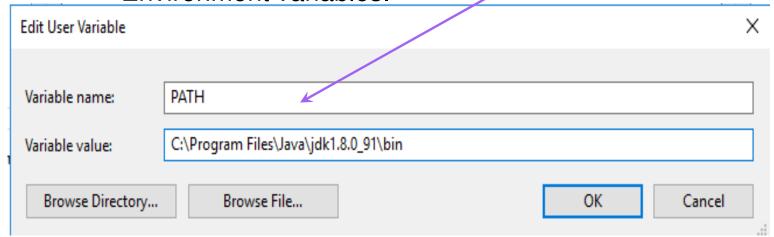
Datastore



Pre-Requisites:

- Install Java latest version into your system.
- Set the PATH system variable in your local system under Control Panel -> system -> Advanced system settings ->

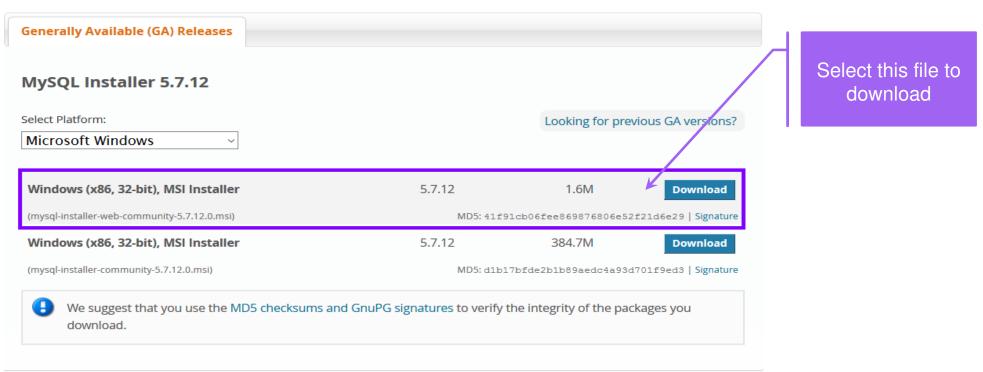
Environment variables.



Example PATH variable

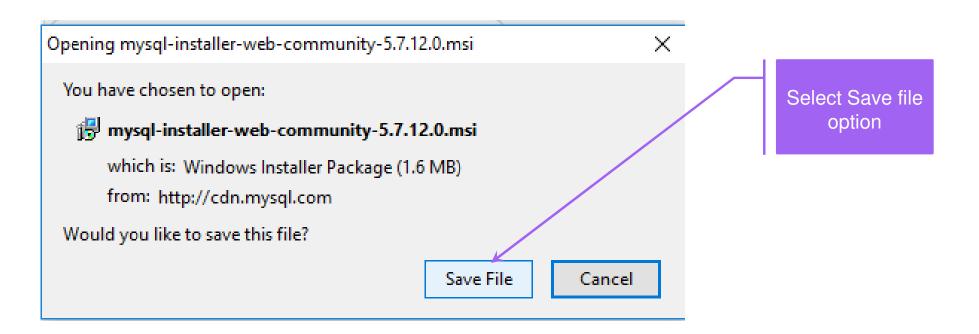
Download and Install MySQL Server

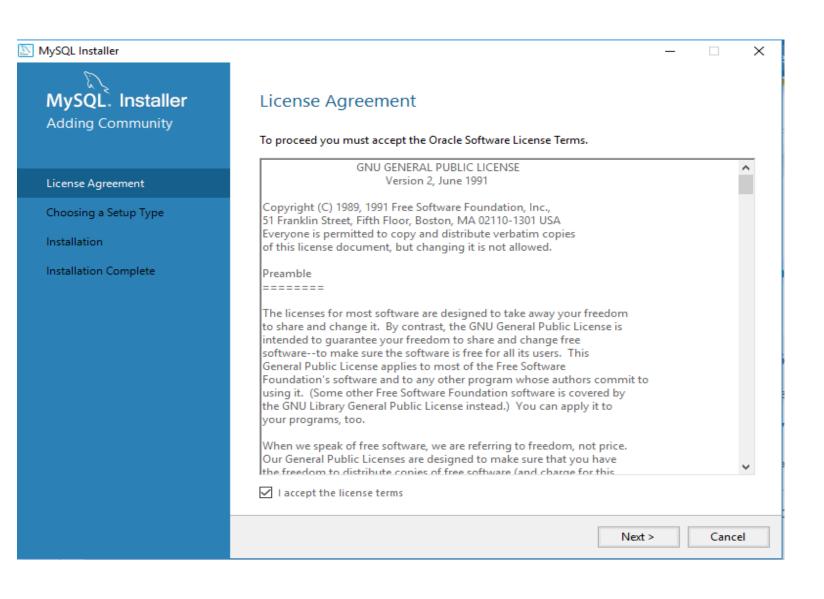
 Download the MySQL installer from <u>http://dev.mysql.com/downloads/installer/</u> (Choose the my-installer-web-community file)

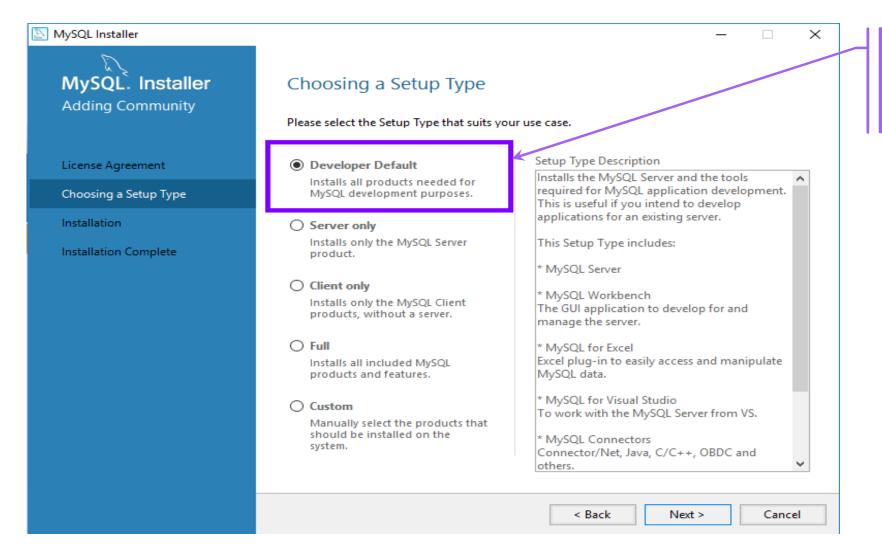


Open file and follow the steps:

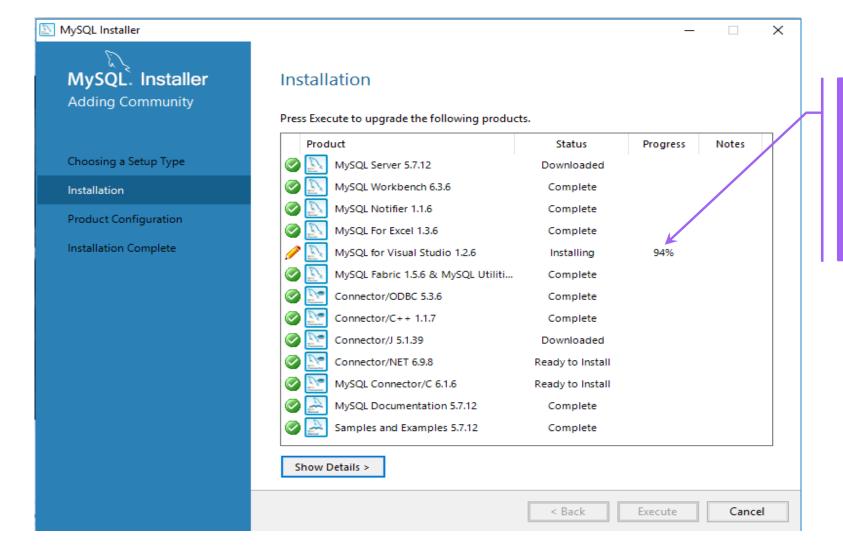
Step 1: Save file to download the installer.



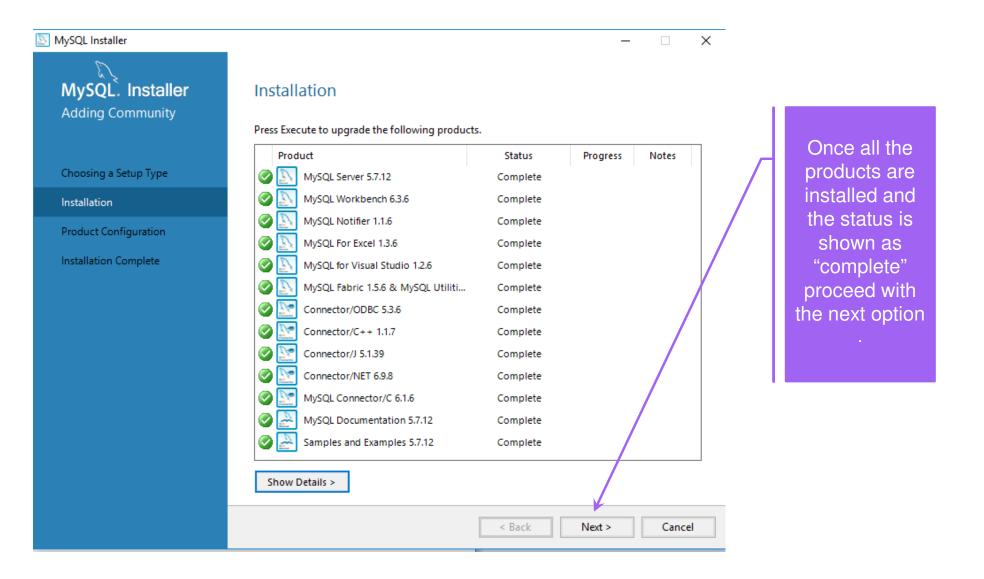


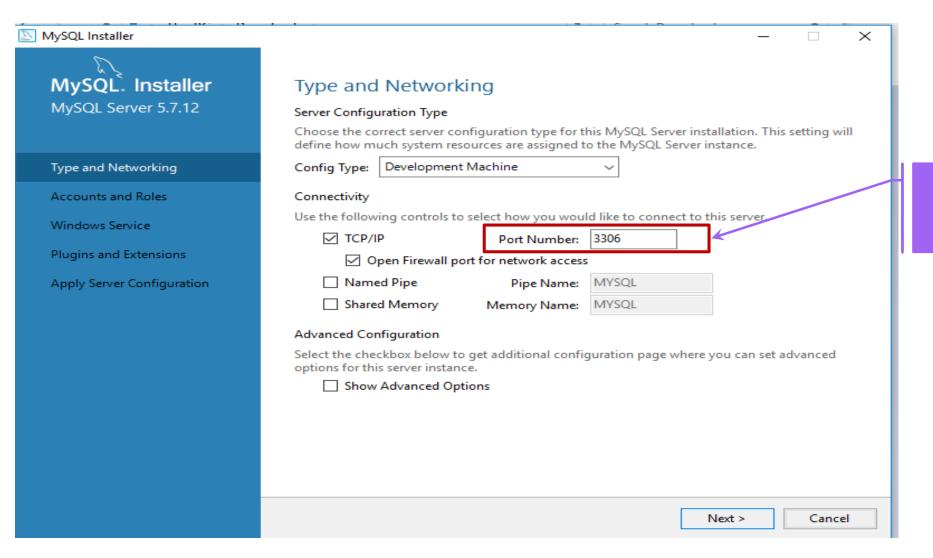


Select the setup type as "Developer Default"

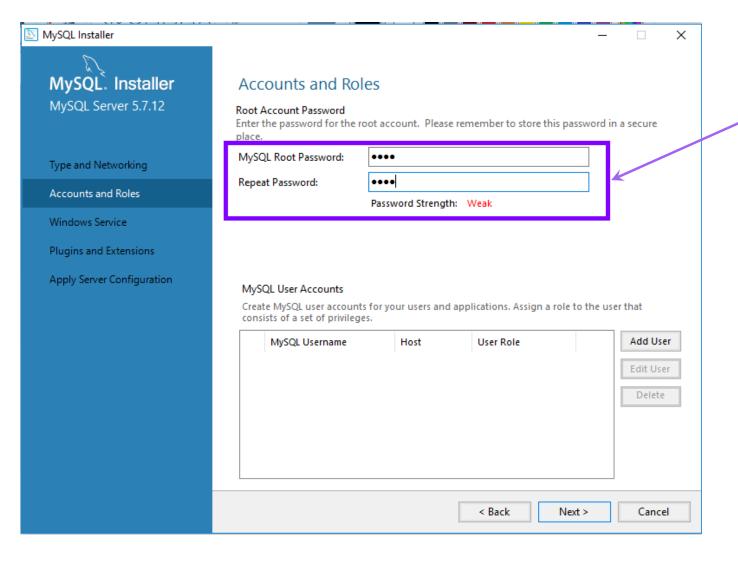


If you get a "Try
Again " option here
instead, then click
on the try again
option to download
the products.

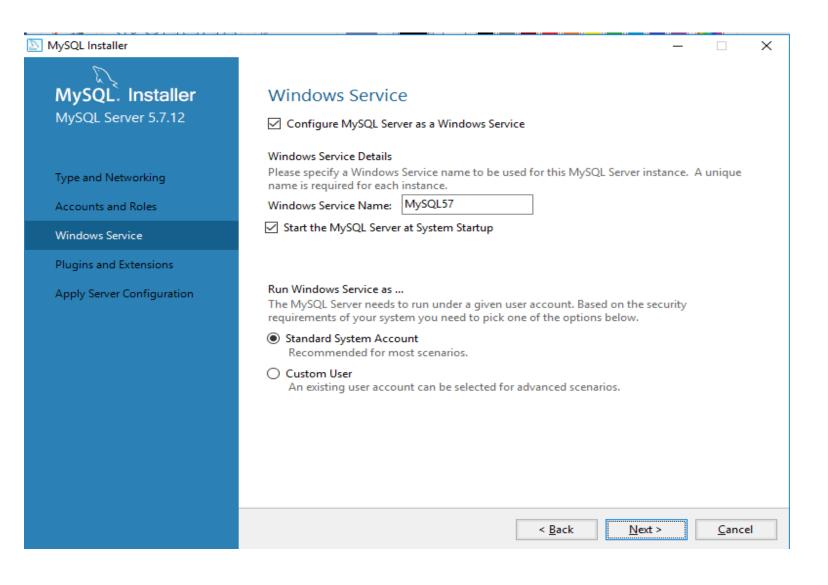


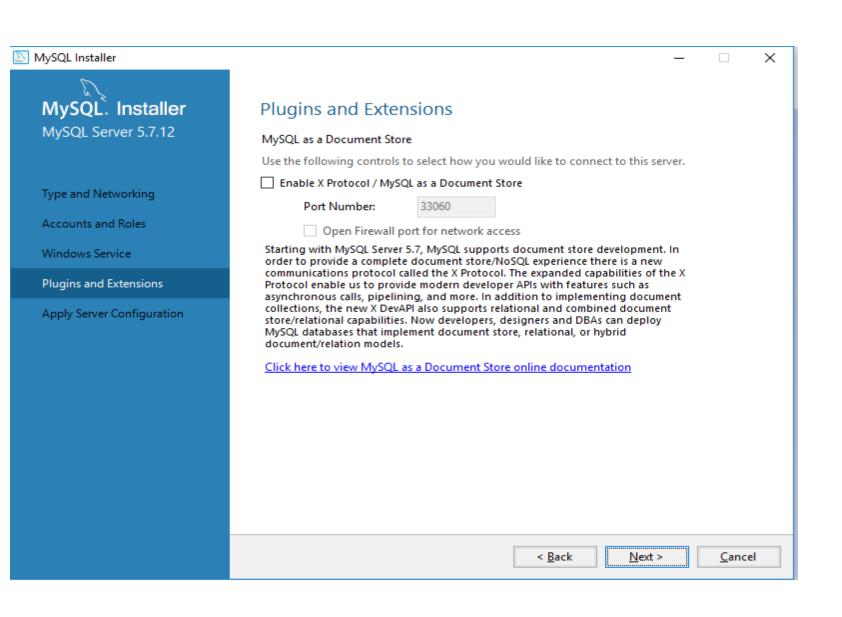


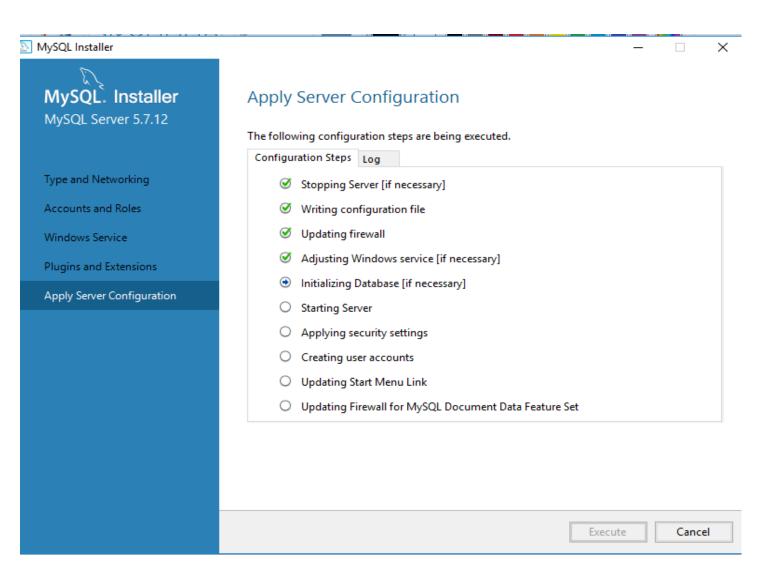
Port to connect to MYSQL

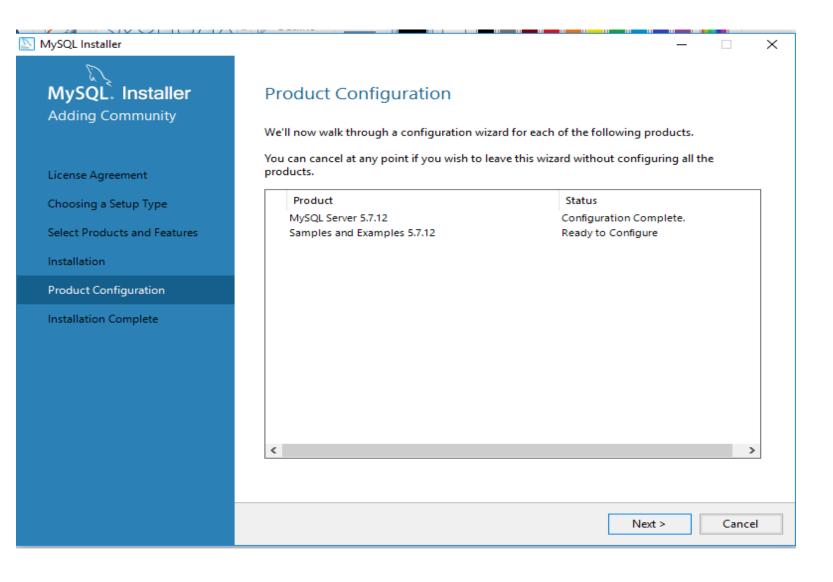


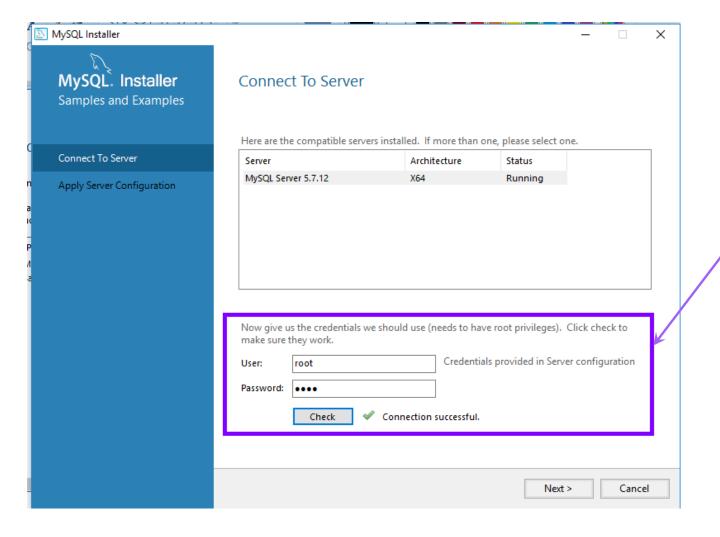
Enter the password. You will need to store these credentials as you need them to access MySQL.



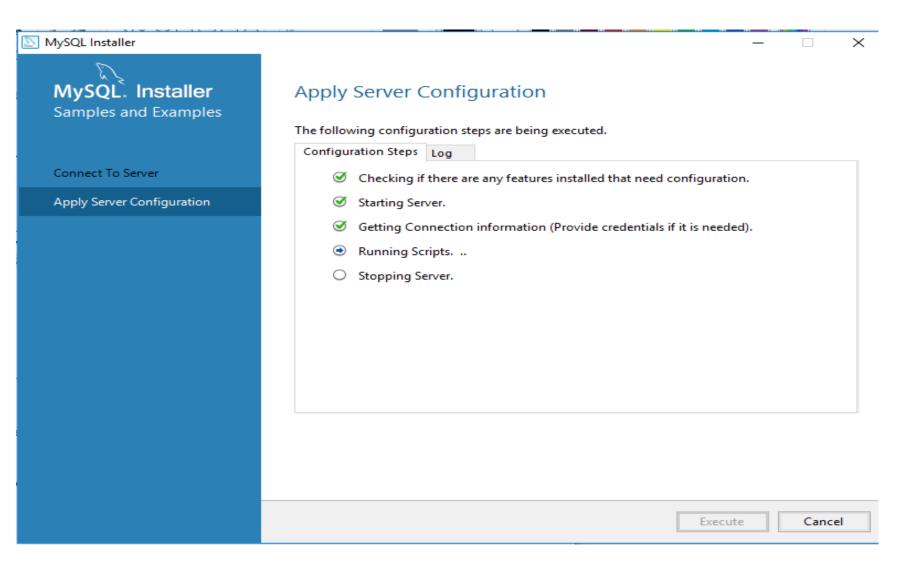


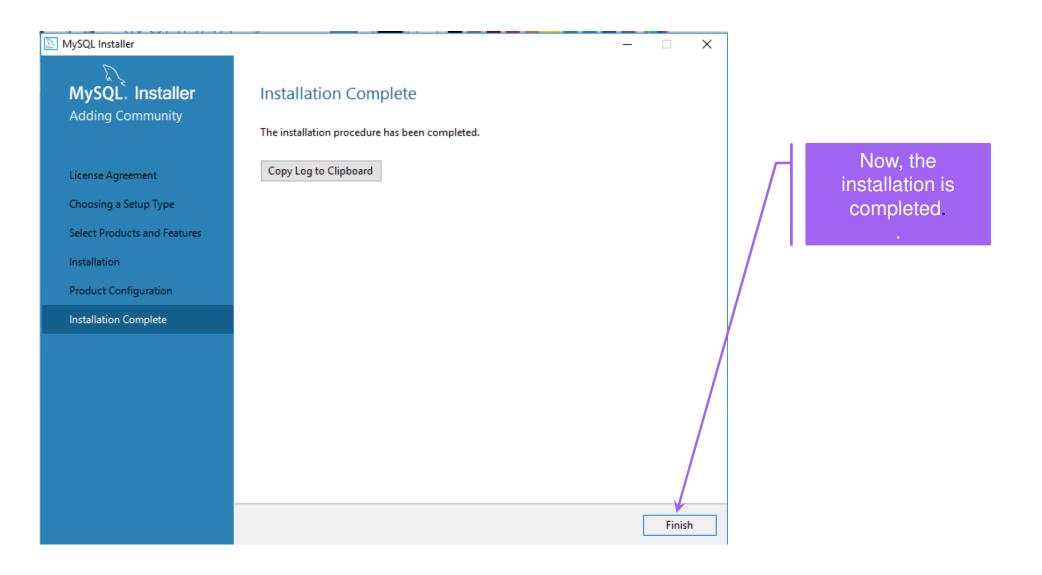






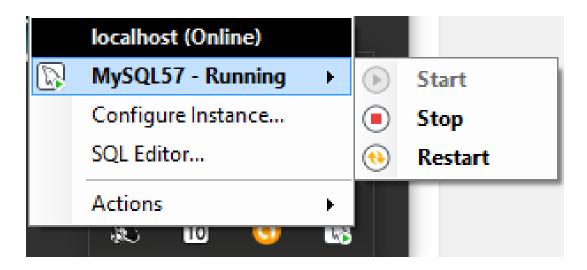
Before proceeding, make sure you check the connection by providing required credentials.





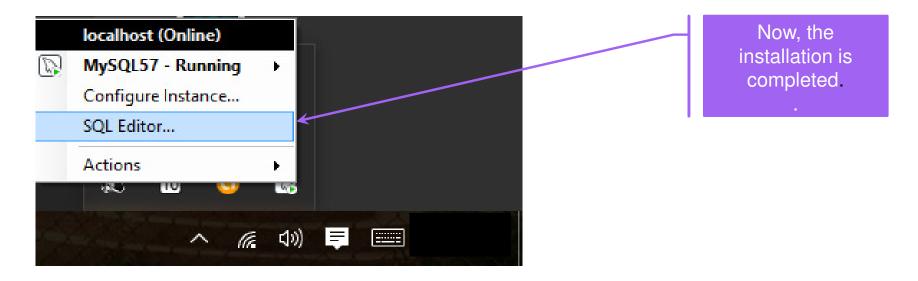
Post Installation...

After the installation, we can monitor MySQL server by accessing MySQL notifier from the task bar.

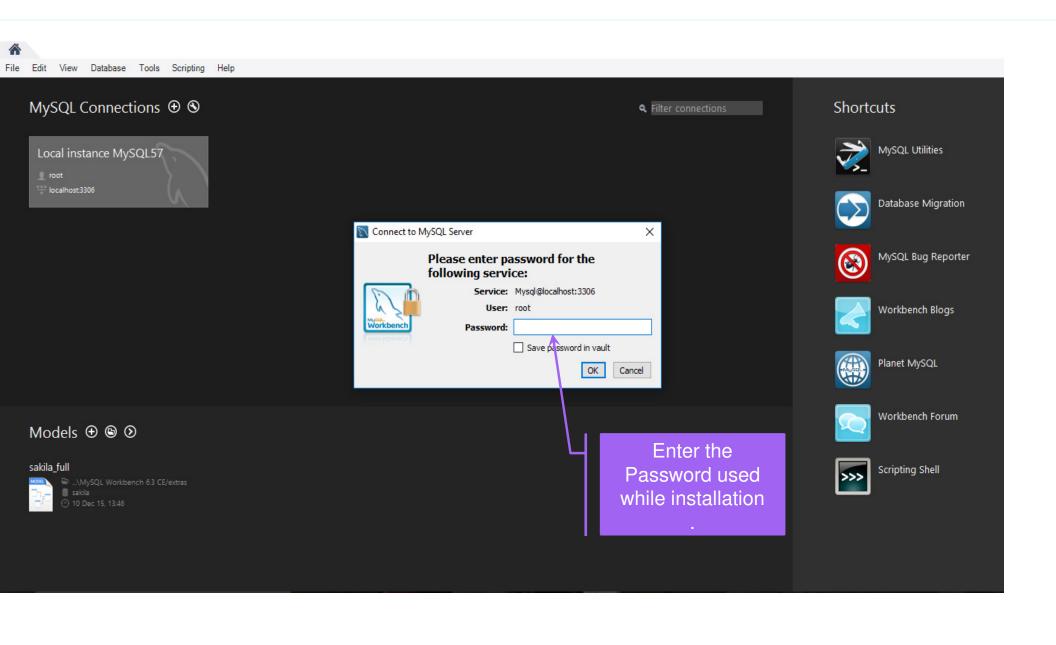


Through the MySQL notifier, we could start, stop or restart MySQL components.

To open the Workbench, where we write and execute several queries, we should click on "SQL Editor".

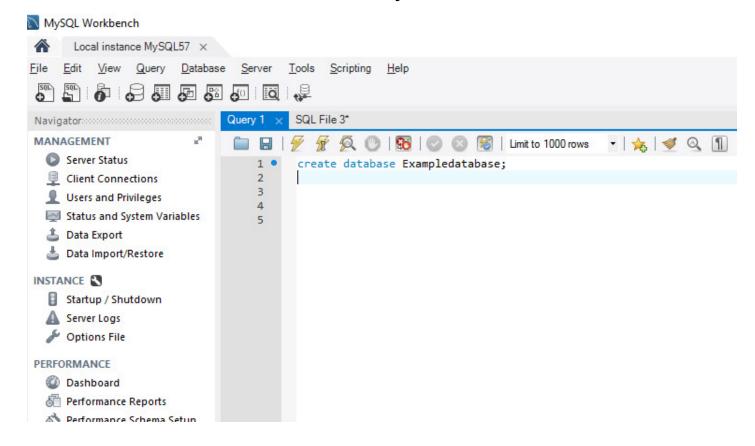


Once the workbench is opened, we need to enter the credentials (used during installation) to access workbench. Following screenshot exhibits the same.



Executing queries in MySQL Workbench

Goto File and select "New Query Tab" to write and execute the queries.

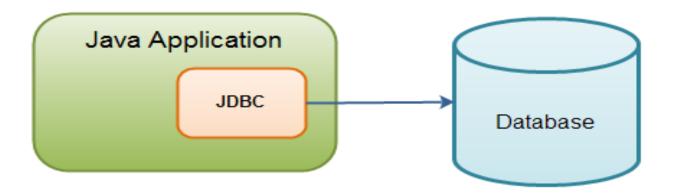


Executing queries using a Java Application

Now let us write and execute the SQL queries using a Java Application.

How do we do it?

-> By using a JDBC Driver. JDBC stands for Java Database Connectivity.



JDBC Driver Types

Type 1: JDBC-ODBC Bridge driver (Bridge)

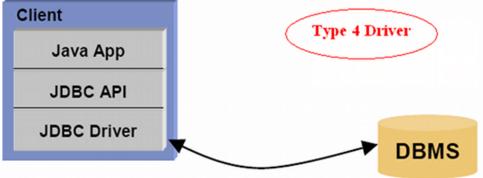
Type 2: Native-API/partly Java driver (Native)

Type 3: All Java/Net-protocol driver (Middleware)

Type 4: All Java/Native-protocol driver (Pure)

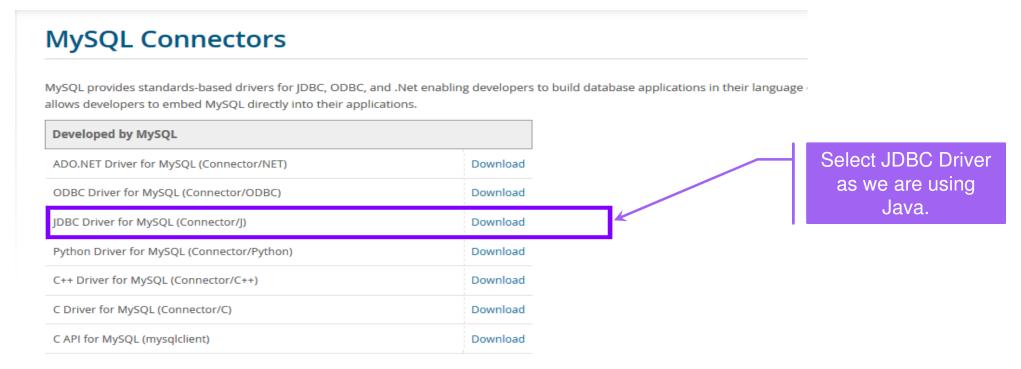
We will be using the Type 4 driver, as we use libraries to

communicate directly with the database server.



Download the Jar file:

We need a jar file mysql-connector-java-5.1.39-bin.jar to compile and execute a application. If you want to compile the examples from the command line, go to the site http://www.mysql.com/products/connector/ and download the MySQL connector for the Java language.



Steps to Execute the application

Option 1: Executing the Program by adding the jar file path in a bat file.

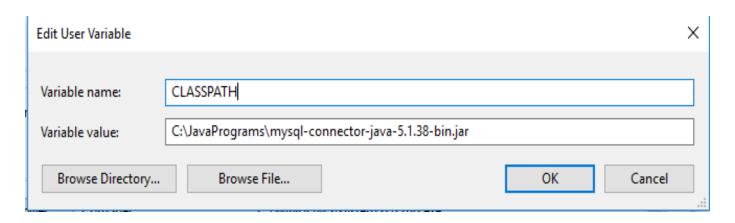
Add the whole path for jar file in CLASSPATH inside your env-setup.bat file

The location of the JAR files highlighted will differ based on where they are present on your computer Please make sure you do the changes accordingly

Option 2: By setting a classpath variable.

Steps:

- Goto Control Panel -> system -> Advanced system settings -> Environment Variables.
- Under User variables, choose new, and create a new variable called
 Classpath = "The full pathname where jar file is present in the system"
- Click on save.
- Then OK.



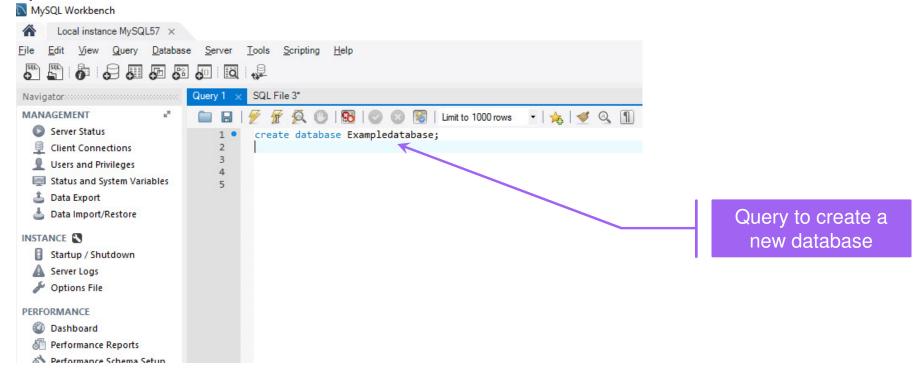
A walkthrough example

In this example,

- First, we will create a database called "exampledatabase" using MySQL workbench.
- Secondly, we will create a table "Registration" within the exampledatabase and store customer login details
- Third, we will create a table "CustomerOrders" within the exampledatabase and store order details for game speed application.

A walkthrough example

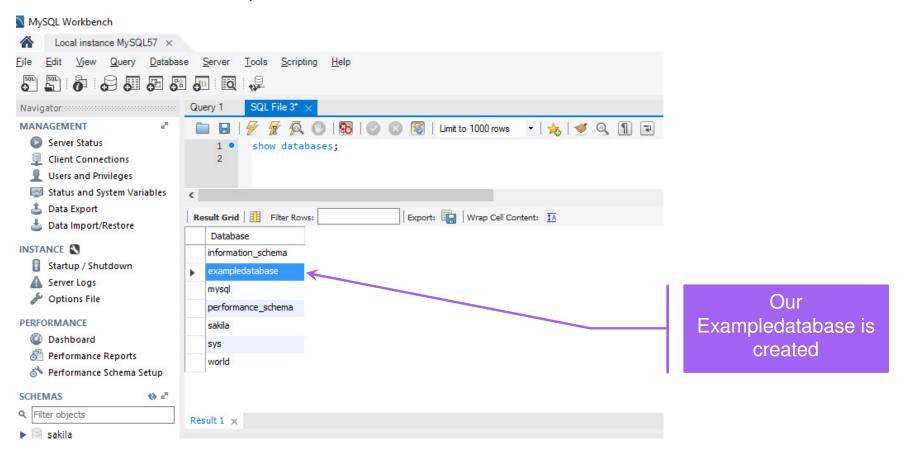
 Step 1: Create a database called "exampledatabase" in the workbench space, and execute the SQL command.



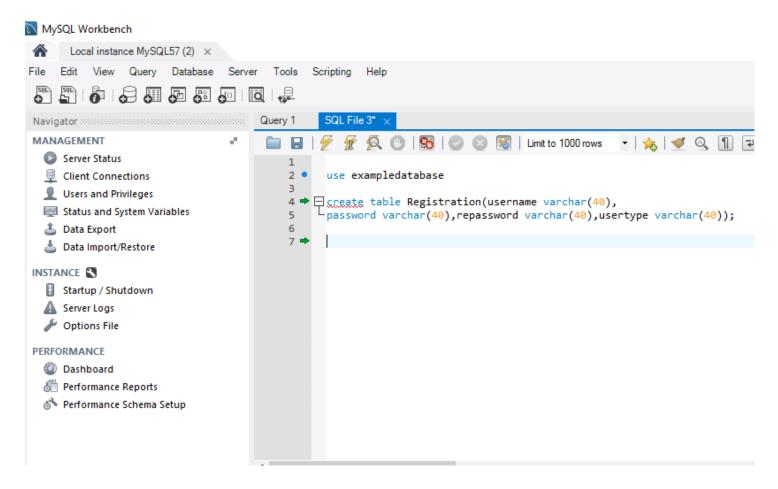
A walkthrough example

Write and execute the following commands to check if the database is created.

-> show databases;

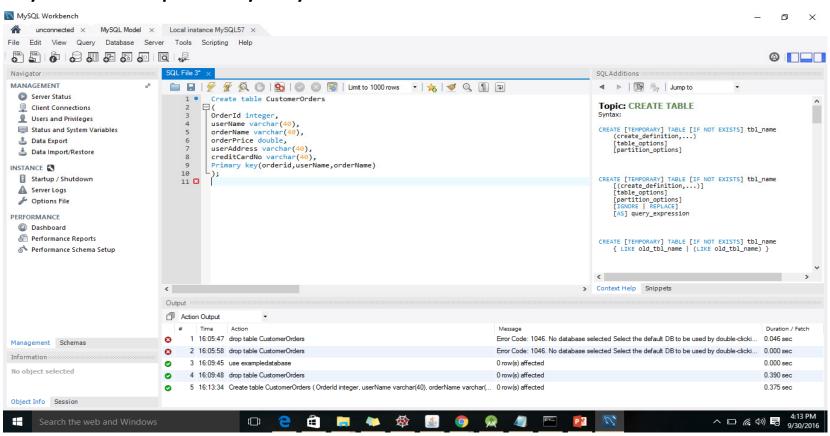


Step 2: Create a table "Registration" in the workbench space, and execute the SQL command.



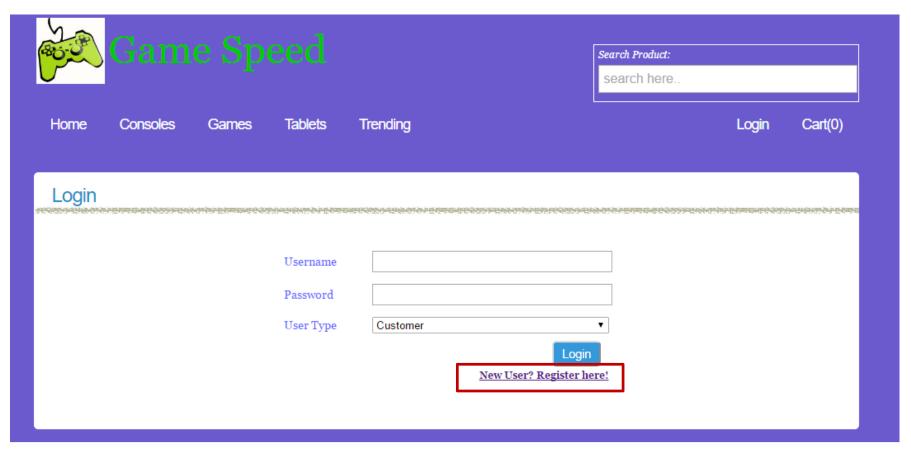
Step 3: Create a table called "CustomerOrder" in the workbench space, and execute the SQL command.

Specify the id as primary key for table

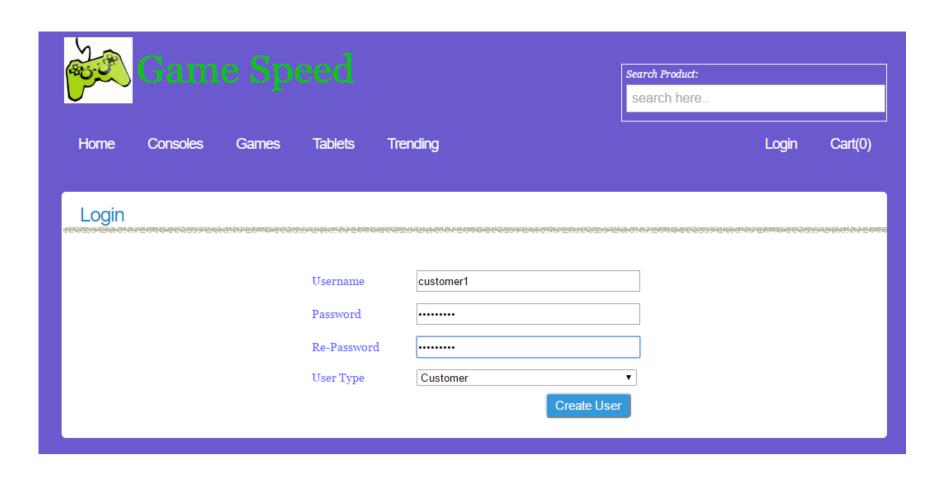


Example – Registration

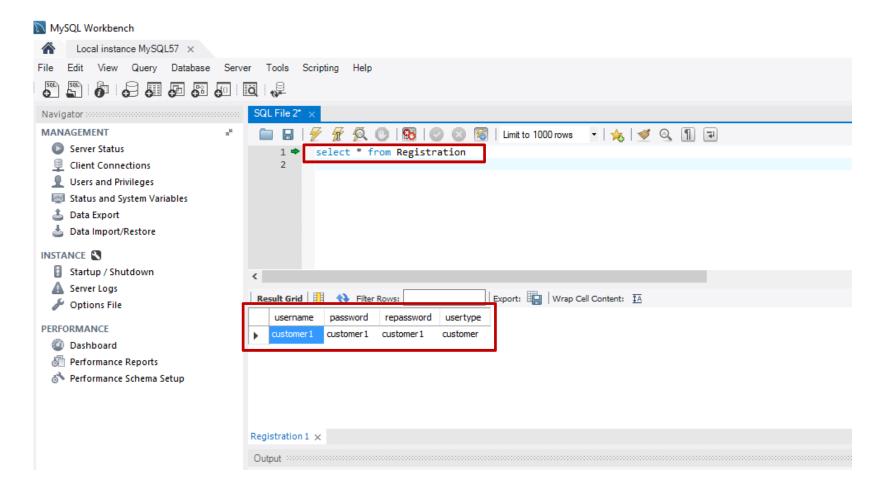
New User can Register into Website by Clicking on the Register here link On clicking the button user is directed to Registration page



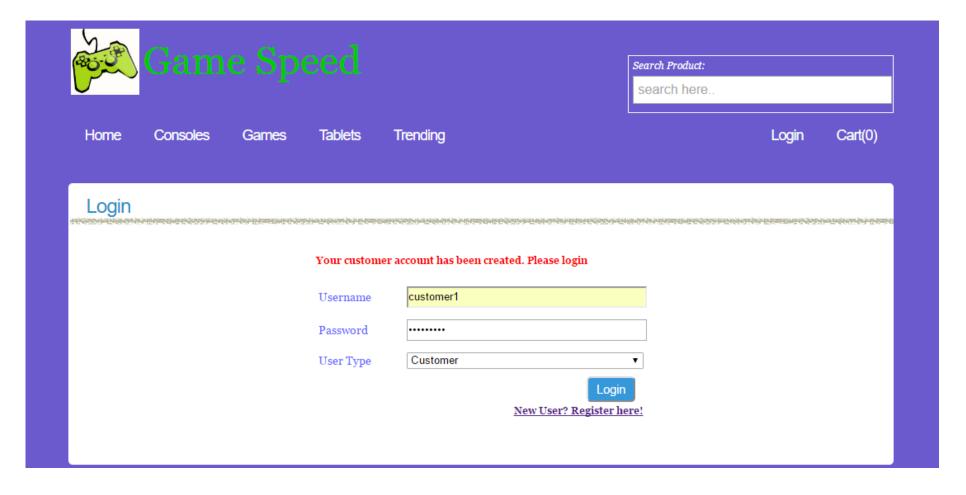
User provides the login information On clicking create user button data is stored in Registration Table of My sql



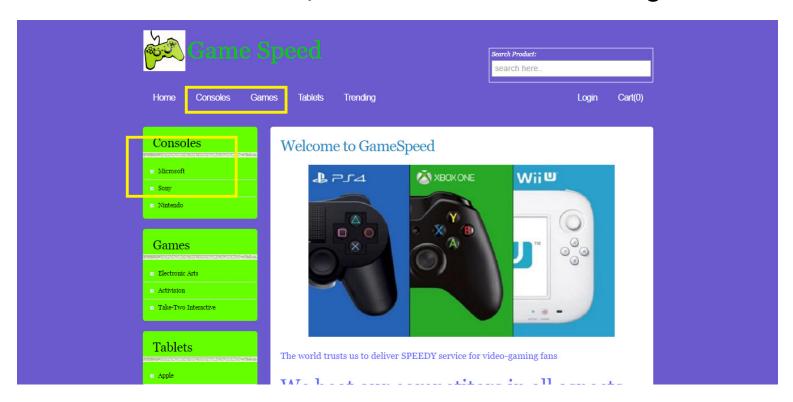
User data is stored in Registration table you can check using the select query in workbench to check if all the column values are stored properly



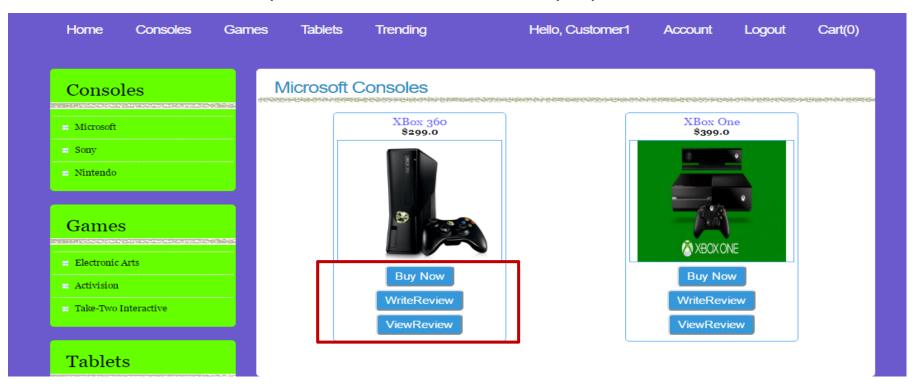
After an Account is created for user in Registration table user can login into website with the credentials



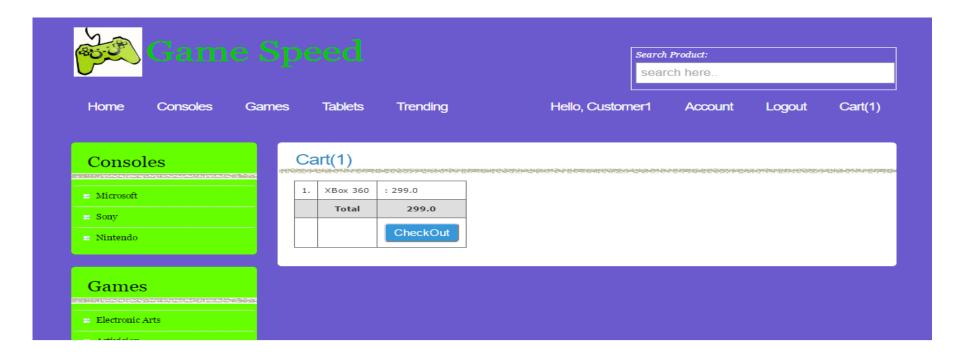
- Click on the products available in the navigation bar
- You can also select the products from the left navigation bar



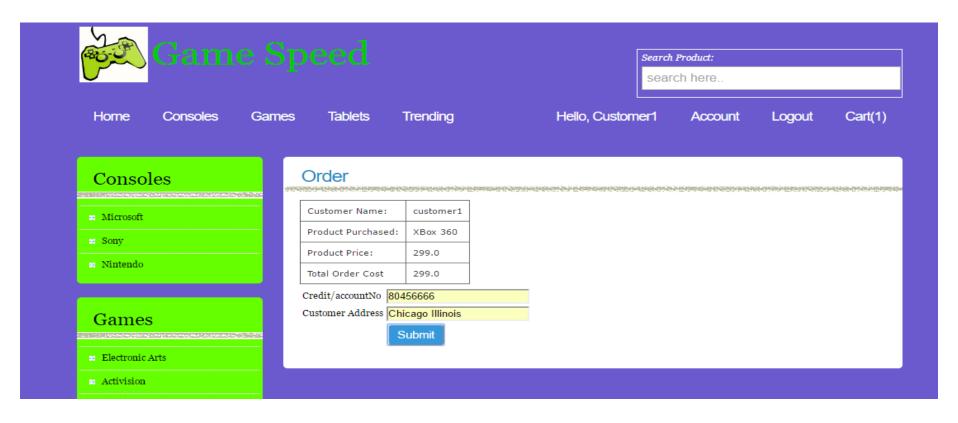
- Clicking on a product type will take you to the product page
- You have different options available such as buy a product, write reviews.



- Click on 'Buy' button on the products page to purchase the product
- This should take you to a new page (Cart Servlet) where you can purchase the product
- Click on 'Check Out' to place the order for the selected product.



 Clicking on CheckOut Button will take you to the CheckOut webpage where you have to provide your credit card no and address information.



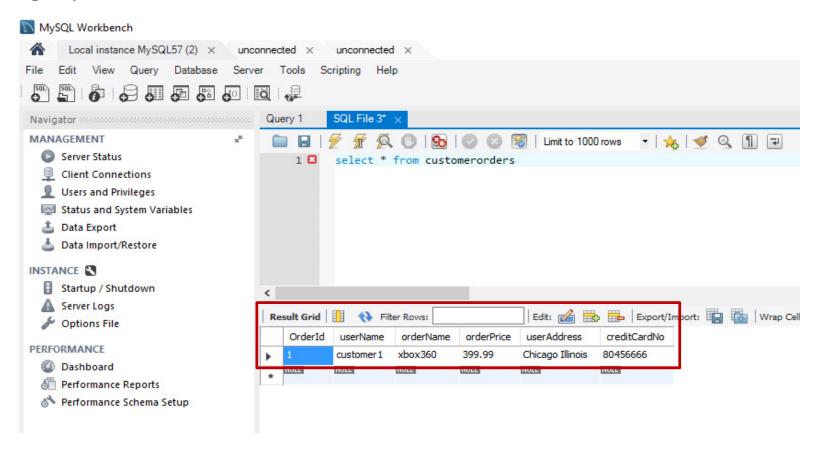
Games

Electronic Arts
 Activision

 On clicking the submit button from check out page from the cart order will be stored in My Sql database and order no will be generated Search Product: search here. Home Consoles Games **Tablets Trending** Hello, Customer1 Account Logout Cart(0) Consoles Order Your Order is stored ⇒ Microsoft Your Order No is 1 ⇒ Sony → Nintendo

Order is Deleted

You can Check if the order Stored by executing select Query in database using sql workbench



Servlets MySql Connection

We will be using com.mysql.jdbc.Driver for connecting mysql from servlets

Syntax:

Connection conn=

Class.forName("com.mysql.jdbc.Driver").newInstance();

DriverManager.getConnection() method is used to connect to my sql database

Specify the database url, user name and password as parameter to the getConnection() method

conn=DriverManager.getConnection("jdbc:mysql://localhost:3306/exampleda
tabase", "root", "root");

Prepared Statement Execution

- Prepared Statement are used to generate Sql statement for a Query String in java
- Syntax:
 - Prepared Statement ps=conn.prepareStatement("select * from Registration where username=? And usertype=?")
- Specify the Query String as parameter inside conn.prepareStatement() to perform insert or select into database from java
- ? Are place holder where we need to provide the value for a particular query
- In the next line? We will replace with actual parameter value As ps.setString(1,"customer1") -1 denotes the first? Place ps.setString(2,"customer") 2 denotes the second? Place

Walkthrough to get connect to Database from Servlet

MySqlDataStoreUtilities class to connect Database from Servlet

Walkthrough for User Registration Code Snippet

User Registration Sample Code

```
HashMap<String, User> hm=new HashMap<String, User>();
    try
    {
    hm=MySqlDataStoreUtilities.selectUser();
    }
    catch(Exception e){}
    if(hm.containsKey(username))
    error_msg = "Username already exist as " + usertype;
    else
    {
        User user = new User(username, password, usertype);
        hm.put(username, user);
        MySqlDataStoreUtilities.insertUser(...);
    }
}
```

Calling utility function to select data from database and storing orders in hashmap

Calling utility function to insert user details in database

Utility Function For Registration

ļ

```
public static void insertUser(String username, String password, String
usertype) {
try{
       Class.forName("com.mysql.jdbc.Driver").newInstance();
       conn =
       DriverManager.getConnection("jdbc:mysgl://localhost:3306/exampleda
       tabase","root","root")
                                                                              Connecting to
                                                                                example
       String insertIntoCustomerRegisterQuery = "INSERT INTO
                                                                               database
       Registration (username, password, usertype)
              + "VALUES (?,?,?);";
                                                                             Query to insert
       PreparedStatement pst =
                                                                              data to table
       conn.prepareStatement(insertIntoCustomerRegisterQuery);
              pst.setString(1, username);
                                                                    Setting Value for Each
                                                                        Parameter
              pst.setString(2,password);
              pst.setString(3, usertype);
                                                                     Execute method will
              pst.execute();
                                                                       insert data into
                                                                         database
   catch(Exception e) { }
```

Walkthrough for Inserting Order Code Snippet

Storing Order Payments

```
public void storePayment (int orderId, String orderName, double orderPrice, String
userAddress,String creditCardNo) {
HashMap<Integer, ArrayList<OrderPayment>> orderPayments= new HashMap<Integer,
ArrayList<OrderPayment>>(); try
{orderPayments= MySqlDataStoreUtilities.selectOrder();
                                                                       Calling utility function
catch(Exception e) { }
                                                                       to select data from
                                                                       database and storing
if(!orderPayments.containsKey(orderId)){
                                                                       orders in hashmap
ArrayList<OrderPayment> arr = new ArrayList<OrderPayment>();
orderPayments.put(orderId, arr);
ArrayList<OrderPayment> listOrderPayment = orderPayments.get(orderId)
OrderPayment orderpayment = new OrderPayment (...);
listOrderPayment.add(orderpayment);
try
                                                                       Calling utility function
{MySqlDataStoreUtilities.insertOrder (...);
                                                                       to inserting orders in
} }
                                                                            database
```

Utility Function for Select Order into hashmap

```
public static HashMap<Integer, ArrayList<OrderPayment>> selectOrder()
 HashMap<Integer, ArrayList<OrderPayment>> orderPayments=new
        HashMap<Integer, ArrayList<OrderPayment>>();
 try{ getConnection();
     String selectOrderQuery ="select * from customerorders";
     PreparedStatement pst = conn.prepareStatement(selectOrderQuery);
                                                                                ResultSet used to
     ResultSet rs = pst.executeQuery();
                                                                                 store table data
     ArrayList<OrderPayment> orderList=new ArrayList<OrderPayment>();
                                                                                 obtained from
                                                                               database in servlet
     while(rs.next())
     {if(!orderPayments.containsKey(rs.getInt("OrderId")))
        {ArrayList<OrderPayment> arr = new ArrayList<OrderPayment>();
     orderPayments.put(rs.getInt("orderId"), arr);}
     ArrayList<OrderPayment> listOrderPayment =orderPayments.get(rs.getInt("OrderId"));
     OrderPayment order= new
         OrderPayment (rs.getInt ("OrderId"), rs.getString ("userName"), rs.getString ("orderName"));
     listOrderPayment.add(order);
                                                                      Iterate through ResultSet
                                                                      and Store each order into
   }catch(...) { }
                                                                            class object
       return orderPayments;}
```

Utility Function for storing orders

```
public static void insertOrder(int orderId, String userName, String orderName)
       try
              Class.forName("com.mysgl.jdbc.Driver").newInstance();
       conn =
       DriverManager.getConnection("jdbc:mysql://localhost:3306/exampledatabase"
              ,"root","root");
                                                                                Connecting to
       String insertIntoCustomerOrderQuery = "INSERT INTO
                                                                                  example
       customerOrders(OrderId, UserName, OrderName) " + "VALUES (?,?,?);";
                                                                                  database
       PreparedStatement pst =
                                                                              Query to insert
       conn.prepareStatement(insertIntoCustomerOrderQuery);
                                                                               data to table
              pst.setInt(1,orderId);
              pst.setString(2,userName);
                                                                      Setting Value for Each
              pst.setString(3, orderName);
                                                                           Parameter
              pst.execute();
                                                                       Execute method will
                                                                         insert data into
              catch(Exception e) { }
                                                                           database
```