NMK20303 Database Management System LAB
MODULE 1

Introduction To Database

FACULTY OF ELECTRONIC ENGINEERING TECHNOLOGY

Universiti Malaysia Perlis

Objectives

1. To Setup database management system DBMS
2. Access DBMS with Command and GUI
3. Create your first database

Equipment/software

1. XAMPP Apache + MariaDB + PHP
2. Netbeans

Introduction

What a Database? A brief definition might be to store information, held over a period time and in computer readable form. A Store of Information classified into some practical purpose: (a) Static: Information collected for the sake of making a statistical analysis, e.g. the national census, or a survey of cracks in a stretch of motorway; (b) Growing: Textual material required for information retrieval e.g. technical abstracts, statutory or other regulations; (c) Dynamic: Operational and administrative information required for running an organization. In a commercial concern this will take the form of stock records, personnel records, customer records, among others.

Held period of time define census information is collected on a particular date and stored as a snapshot of the state of affairs when the survey was taken. Information from later observations will be kept quite separately, but appropriate comparisons may be made provided that the framework remains consistent. Bibliographic or other textual databases are accumulated over time - new material is added periodically but probably very little will be removed. When designing such a database it will be important to estimate and allow for the expected rate of growth, and perhaps to ensure that the more recent information is given some priority. An organizational database may not change very drastically in size, but it will be subject to frequent updating (deletions, amendments, insertions) following relevant actions within the organization itself.

In Computer Readable Form, computer storage and processing implies the use of software: in the current context a Database Management System (DBMS). The function of the DBMS is to store and retrieve information as required by applications programs or users sitting at terminals, using the facilities provided by the computer operating system. It is one of a number of software layers making computer facilities available to users with perhaps comparatively little technical expertise.

Summary of DBMS Functions

Data Definition is including the files, record structures, (field names, types and sizes), relationships between records of different types and extra information to make searching.

Data Entry and Validation may include type checking, range checking and consistency checking. **Updating** involves record of insertion, modification and deletion. **Data retrieval on the basis of selection criteria** by provide “Query” with which the characteristics of the required records may be specified and these allowed the selection of records on the basis of particular field values, selection of particular fields from records to be displayed and linking together records from two different files on the basis of matching field values. **Report Definition** provide facilities for describing how summary reports from the database are to be created and laid out on paper and may include (counts, totals, averages, maximum and minimum values). **Security** has several aspects which ensuring that only those authorized to do so can see and

modify the data, generally by some extension of the password principle. Secondly, security ensured the consistency of the database where many users are accessing and up-dating it simultaneously. Third, security ensured the existence and INTEGRITY of the database after hardware or software failure. At the very least this involves making provision for back-up and re-loading.

Software Installation and Configuration

XAMPP

XAMPP is the title used for a compilation of free software. The name is an acronym, with each letter representing one of the five key components. The software packet contains the web server Apache, the relational database management system MySQL (or MariaDB), and the scripting languages Perl and PHP. The initial X stands for the operating systems that it works with: Linux, Windows, and Mac OS X.

Apache: ihe open source web server Apache is the most widely used server worldwide for delivery of web content. The server application is made available as a free software by the Apache Software Foundation.

MySQL/MariaDB: in MySQL, XAMPP contains one of the most popular relational database management systems in the world. In combination with the web server Apache and the scripting language PHP, MySQL offers data storage for web services. Current XAMPP versions have replaced MySQL with MariaDB (a community-developed fork of the MySQL project, made by the original developers).

PHP: the server-side programming language PHP enables users to create dynamic websites or applications. PHP can be installed on all platforms and supports a number of diverse database systems.

Perl: the scripting language Perl is used in system administration, web development, and network programming. Like PHP, Perl also enables users to program dynamic web applications.

Alongside these core components, this free-to-use Apache distribution contains some other useful tools, which vary depending on your operating system. These tools include the mail server Mercury, the database administration tool phpMyAdmin, the web analytics software solutions Webalizer, OpenSSL, and Apache Tomcat, and the FTP servers FileZilla or ProFTPd.AMPP

Installing XAMPP

If you're using Linux or Mac OS X, then the steps listed below for the installation process may differ.

Step 1: Download

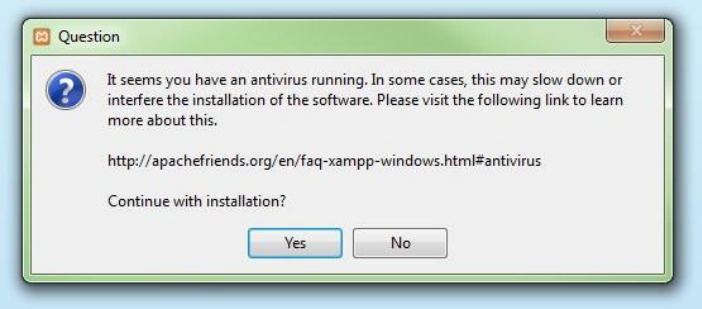
XAMPP is a release made available by the non-profit project Apache Friends. Versions with PHP 5.5, 5.6, or 7 are available for download on the Apache Friends website.

Step 2: Run .exe file

Once the software bundle has been downloaded, you can start the installation by double clicking on the file with the ending .exe.

Step 3: Deactivate any antivirus software

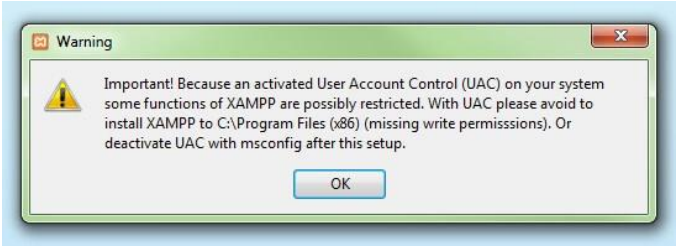
Since an active antivirus program can negatively affect the installation process, it's recommended to temporarily pause any antivirus software until all XAMPP components have successfully been installed.



Before installing XAMPP, it is advisable to disable the anti-virus program temporarily

Step 4: Deactivate UAC

User Account Control (UAC) can interfere with the XAMPP installation because it limits writing access to the C: drive, so we recommend you deactivate this too for the duration of the installation process. To find out how to turn off your UAC, head to the Microsoft Windows support pages.



User account control can affect the installation of XAMPP

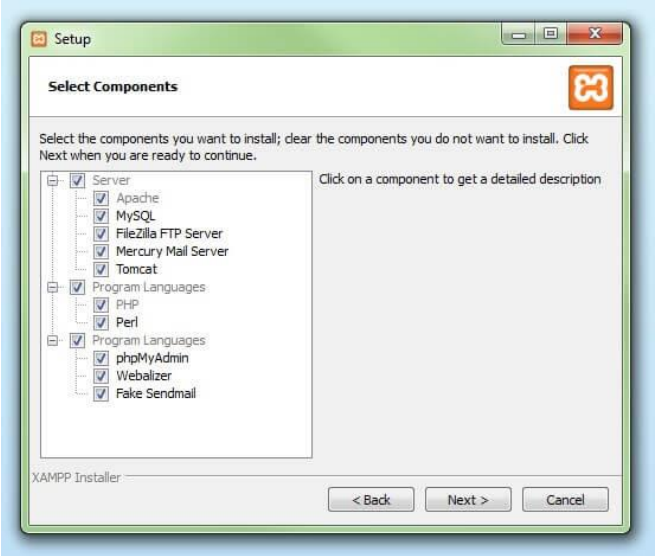
Step 5: Start the setup wizard

After you've opened the .exe file (after deactivating your antivirus program(s) and taken note of the User Account Control, the start screen of the XAMPP setup wizard should appear automatically. Click on 'Next' to configure the installation settings.

You can start the setup on the startup screen

Step 6: Choose software components

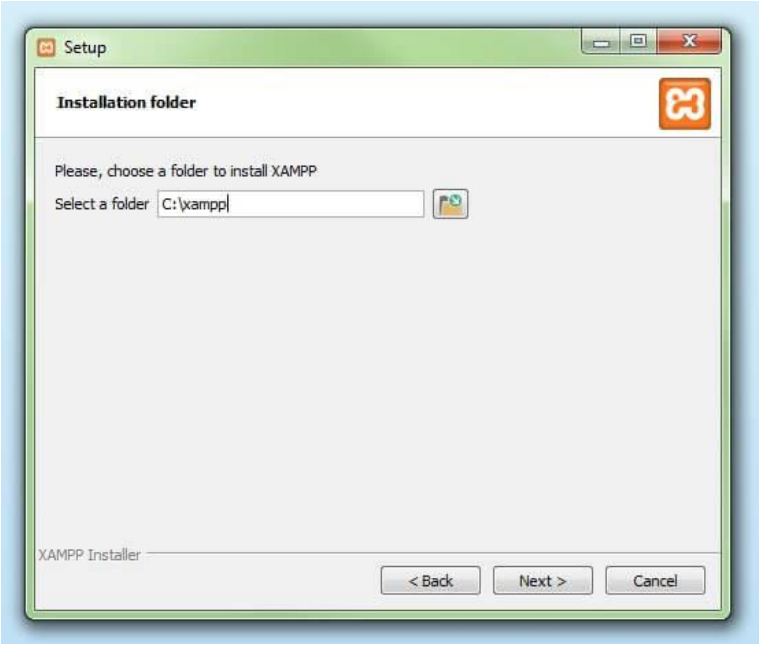
Under ‘Select Components’, you have the option to exclude individual components of the XAMPP software bundle from the installation. But for a full local test server, we recommend you install using the standard setup and all available components. After making your choice, click ‘Next’.



In the dialog window entitled 'select components', you can choose the software components before installation

Step 7: Choose the installation directory

In this next step, you have the chance to choose where you’d like the XAMPP software packet to be installed. If you opt for the standard setup, then a folder with the name XAMPP will be created under C:\ for you. After you’ve chosen a location, click ‘Next’.



For the next step, you need to select the directory where XAMPP should be installed

Step 8: Start the installation process

Once all the aforementioned preferences have been decided, click to start the installation. The setup wizard will unpack and install the selected components and save them to the designated directory. This process can take several minutes in total. You can follow the progress of this installation by keeping an eye on the green loading bar in the middle of the screen.

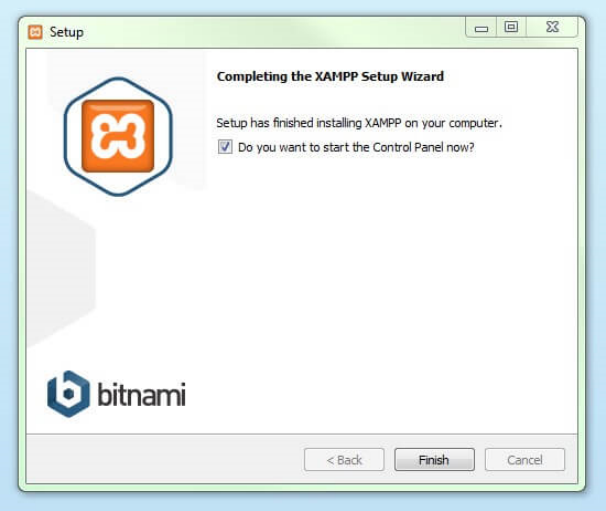
According to the default settings, the selected software components are unpacked and installed in the target folder

Step 9: Windows Firewall blocking

Your Firewall may interrupt the installation process to block the some components of the XAMPP. Use the corresponding check box to enable communication between the Apache server and your private network or work network. Remember that making your XAMPP server available for public networks isn't recommended.

Step 10: Complete installation

Once all the components are unpacked and installed, you can close the setup wizard by clicking on 'Finish'. Click to tick the corresponding check box and open the XAMPP Control Panel once the installation process is finished.

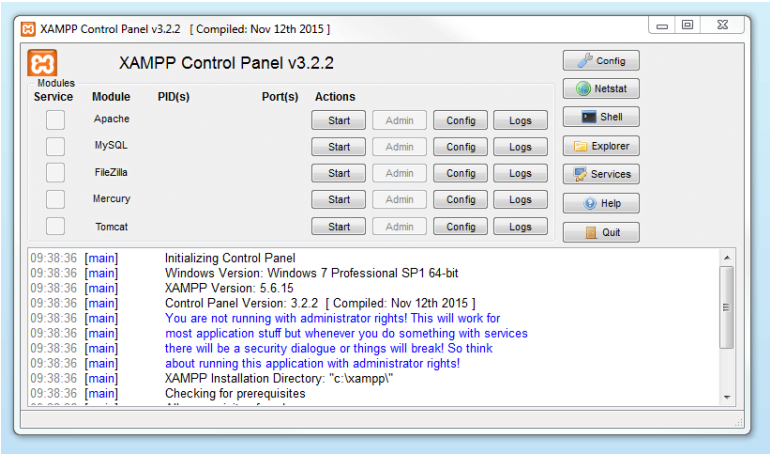


By clicking on 'finish', the XAMPP Setup Wizard is completed

The XAMPP Control Panel

Controls for the individual components of your test server can be reached through the XAMPP Control Panel. **The clear user interface** logs all actions and allows you to start or stop individual modules with a single. The XAMPP Control Panel also offers you various other buttons, including:

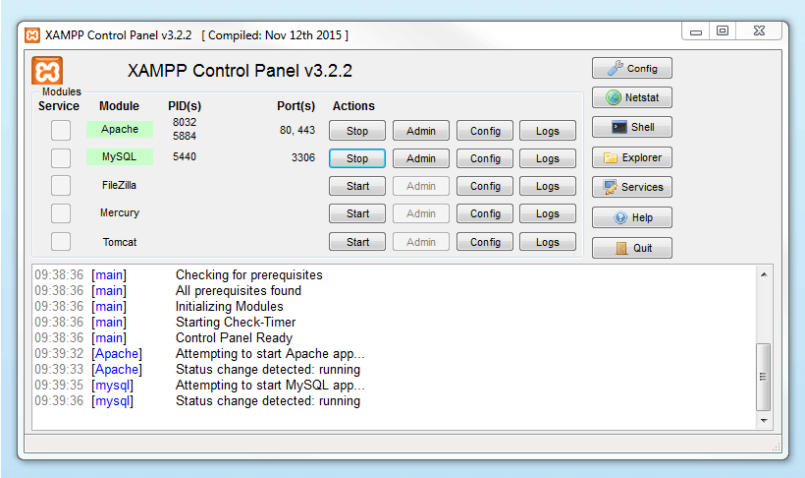
- **Config:** allows you to configure the XAMPP as well as the individual components
- Netstat**:** shows all running processes on the local computer
- **Shell:** opens a UNIX shell
- **Explorer:** opens the XAMPP folder in Windows Explorer
- **Services:** shows all services currently running in the background
- **Help:** offers links to user forums
- **Quit:** closes the XAMPP Control Panel



In the Control Panel, you can start and stop individual modules

Starting modules

Individual modules can be started or stopped on the XAMPP Control Panel through the corresponding buttons under ‘Actions’. You can see which modules have been started because their names are highlighted green under the ‘Module’ title.



An active module is marked in green in the Control Panel

If a module can’t be started as a result of an error, you’ll be informed of this straight away in red font. A **detailed error report** can help you identify the cause of the issue.

Netbeans

NetBeans is an open-source integrated development environment (IDE) for developing with Java, PHP, C++, and other programming languages. NetBeans is also referred to as a platform of modular components used for developing Java desktop applications.

These instructions describe how to download and install NetBeans, a commonly used IDE for Java programming. Using an IDE means that you have all of the tools you need in one place (your "development environment") instead of having to organize things manually.

Step 0: Install JDK

To use NetBeans for Java programming, you need to first install Java Development Kit (JDK). See "JDK - How to Install ".

Step 1: Download

Download "NetBeans IDE" installer from http://netbeans.org/downloads/index.html . There are many "bundles" available. For beginners, choose the 1st entry "Java SE" (e.g., "`netbeans-8.2-javase-windows.exe` " 95MB).

Step 2: Run the Installer

Run the downloaded installer.

Example

To start PHP development in the NetBeans IDE for PHP, you first need to create a project. A project contains the information on the location of the project files and the way you want to run and debug your application (run configuration).

Start the IDE, switch to the Projects window, and choose File > New Project. The Choose Project panel opens.

In the Categories list, choose PHP.

In the Projects area, choose PHP Application and click Next. The New PHP Project > Name and Location panel opens.

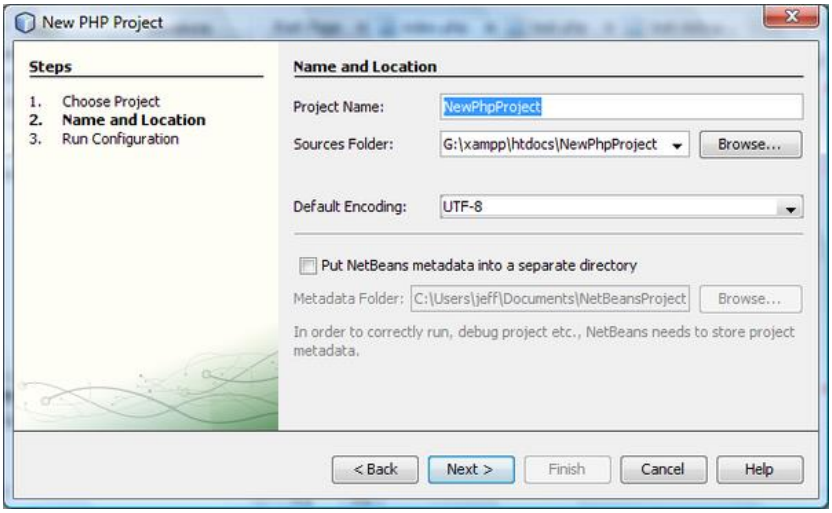
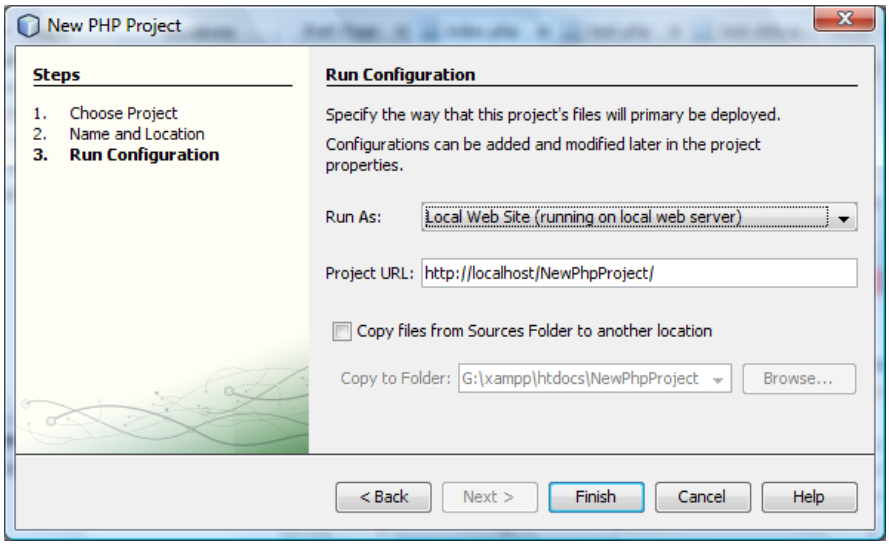


Figure 1. Name and Location panel of New PHP Project wizard, with Source Folder location as XAmpp document root.

1. In the Project Name text field, enter `NewPHPProject` .
2. In the Sources Folder field, browse for your PHP document root and create a subfolder there called `NewPHPProject` . The document root is the folder where the web server looks for files to open in the browser. The document root is specified in the web server configuration file. For example, on Xampp, the document root is XAMPP_HOME/htdocs.
3. Leave all other fields with their default values. Click Next. The Run Configuration window opens.



1. In the Run As drop-down list, select Local Web Site. The project will run on your local Apache server. Your other options are to run the project remotely via FTP and to run it from the command line.
2. Leave the Project URL at default.
3. Click Finish. The IDE creates the project.

Running Your First PHP Project

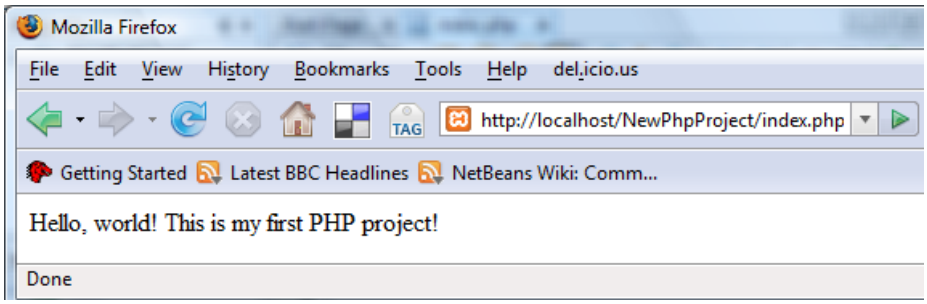
1. Start the IDE, choose File > Open Project. The Open Project dialog box opens.
2. Select `NewPHPProject` and click Open Project. The NewPHPProject tree appears in the Projects window and the project's `index.php` file opens in the editor and in the Navigator window.

```
echo "Hello, world! This is my first PHP project!";
```

1. Enter the following code inside the `<?php ?>` block:

```
echo "Hello, world! This is my first PHP project!";
```

1. To run the project, position the cursor on the NewPHPProject node and choose Run from the context menu. The figure below shows what you should see in the browser window:



Create PHP Project

Start the IDE in case it's not running. Now click the File Options on Main Menu -> New Project. It will show the New Project Wizard as shown in Fig 1.1

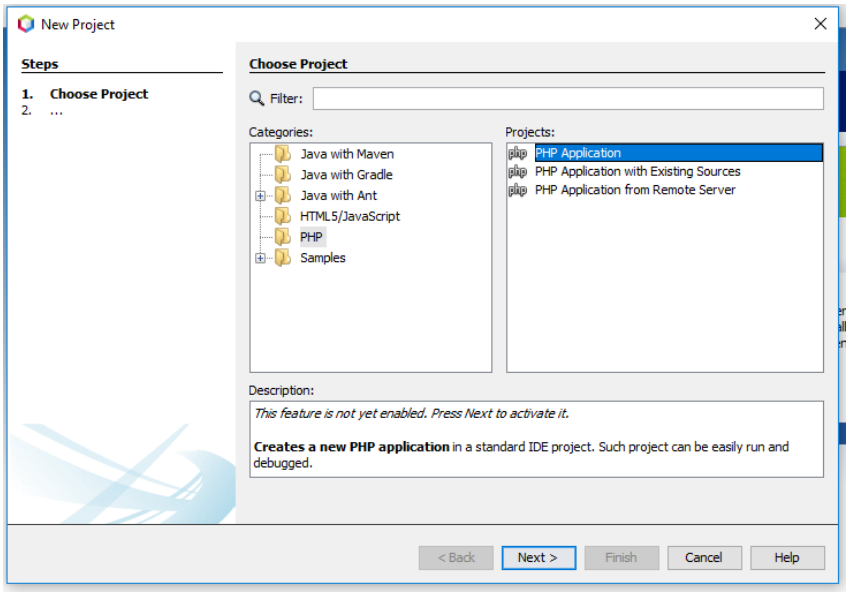


Fig 1.1

Select **PHP** from the **Categories option** and also select **PHP Application** from **Projects option** as highlighted in Fig 1.1. The NetBeans 11 will show a message in the description section to enable appropriate plugins required for PHP development, in case it's the first project. Now click the **Next Button**. On the next wizard, NetBeans will find the corresponding plugins required for PHP development as shown in Fig 1.2 and shows the project configuration options as shown in Fig 1.3.

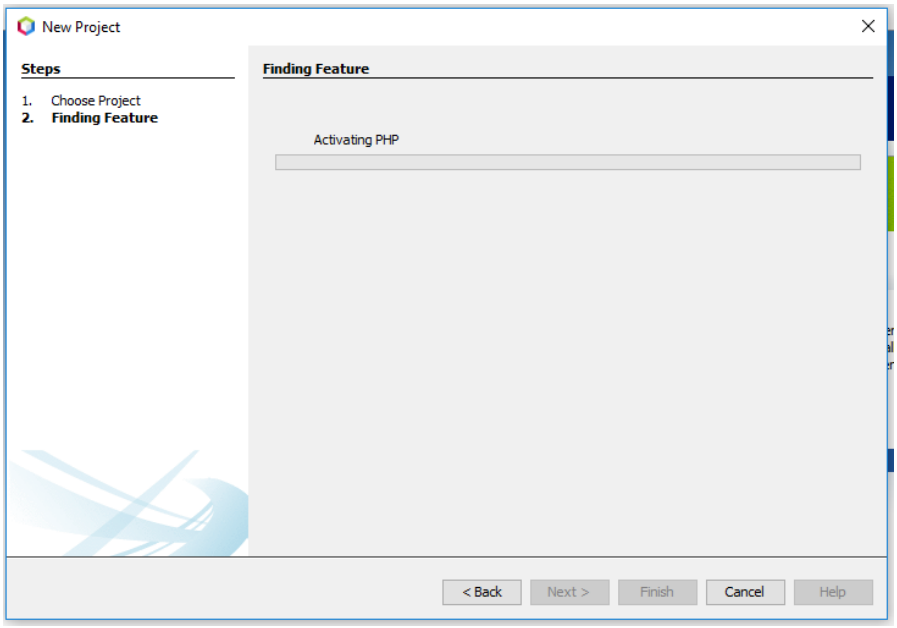


Fig 1.2

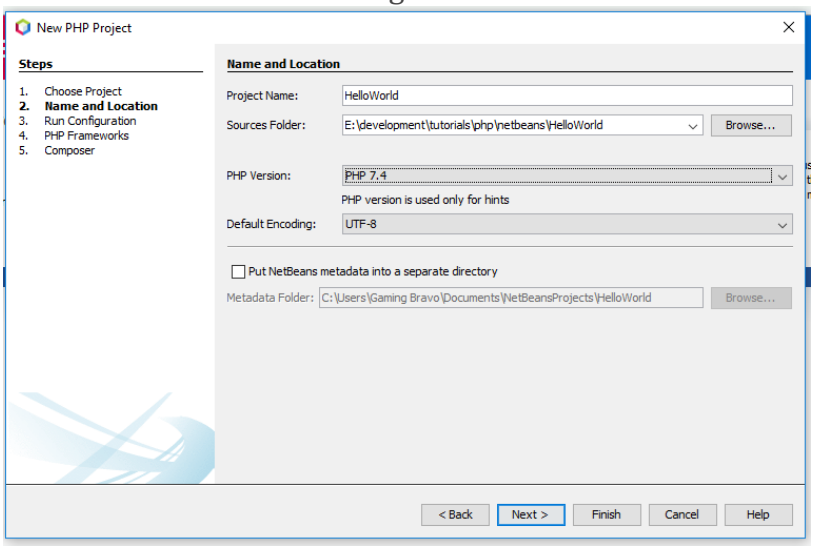


Fig 1.3

You can choose the appropriate location of the project and PHP version depending on your project needs.

Provide the project name and location based on your requirements and also select the PHP version. I have selected PHP 7.4 since it's already installed on my system. You can follow How To Install PHP 7 On Windows to install the most recent version of PHP. You can also install PHP bundled with **XAMPP** or **WAMP** by following How To Install XAMPP On Windows or How To Install WampServer on Windows. Now click on the **Next Button**. The next wizard provides options to choose the project's runtime configurations. I have selected Script for this tutorial as shown in Fig 1.4.

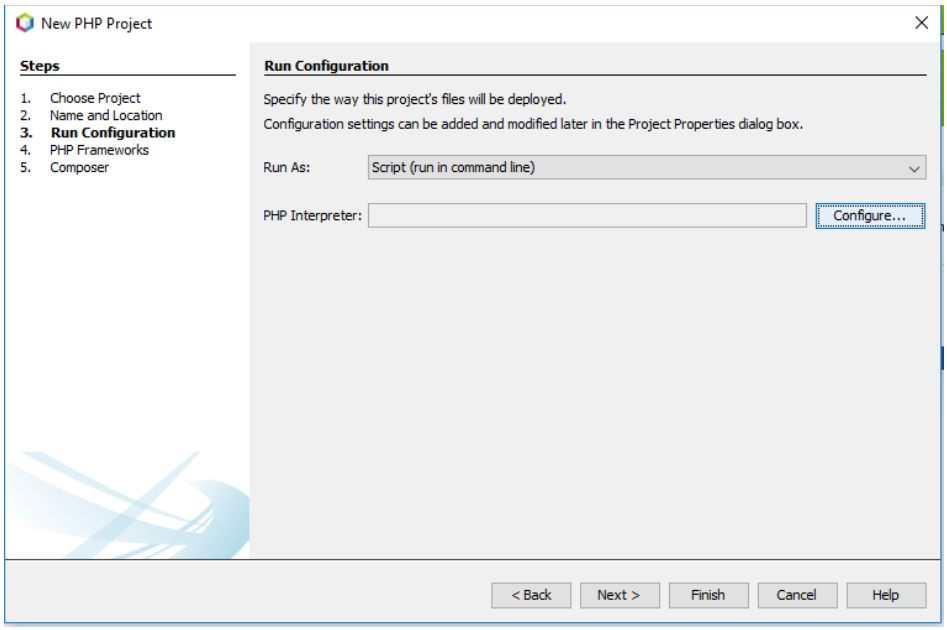


Fig 1.4

It also asks for the corresponding PHP Interpreter to execute the program for the Script Option. The configuration should be similar to the one as shown in Fig 1.5 and Fig 1.6.

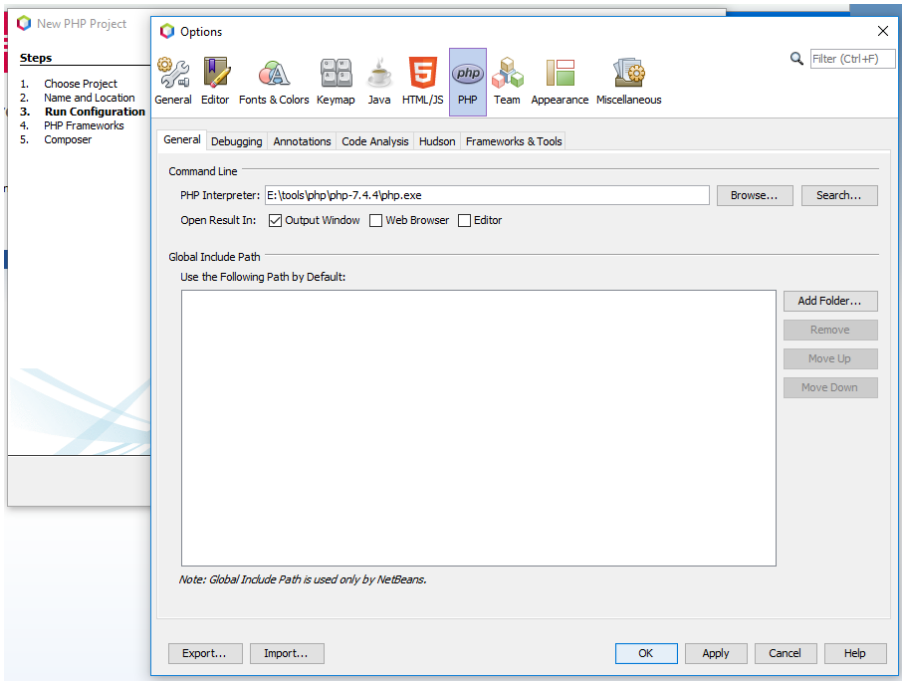


Fig 1.5

Click the **Apply Button** to apply the PHP Interpreter configurations.

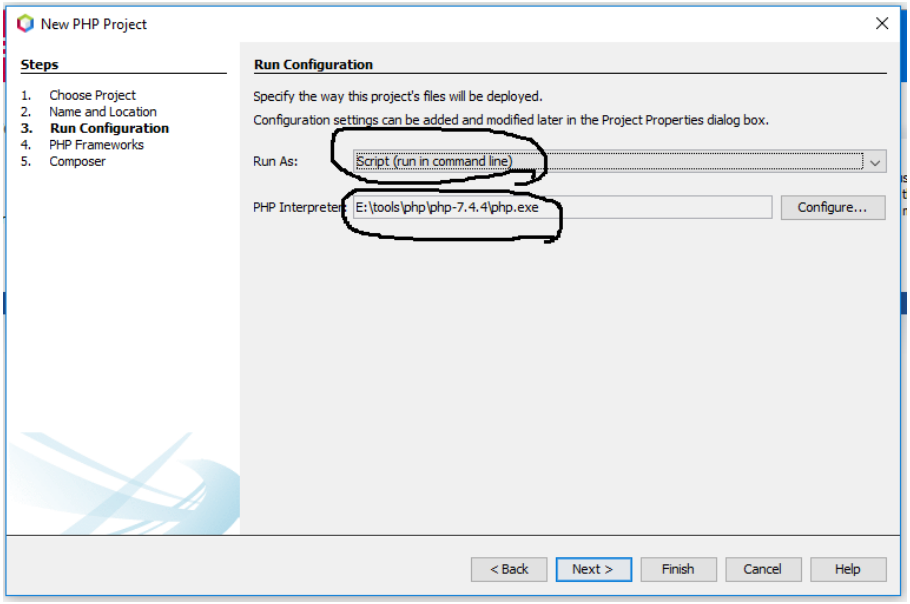


Fig 1.6

Apart from Script Option to run PHP program on the console, there are few more options specific to Runtime including Local Web Site, Remote Web Site, and PHP Built-in Web Server. This tutorial does not discuss the additional Runtime configuration. After selecting the Script as a Runtime option, we can also select the location where PHP is installed.

Now click the **Next Button**. The next screen provides options to configure the PHP Frameworks as shown in Fig 1.7.

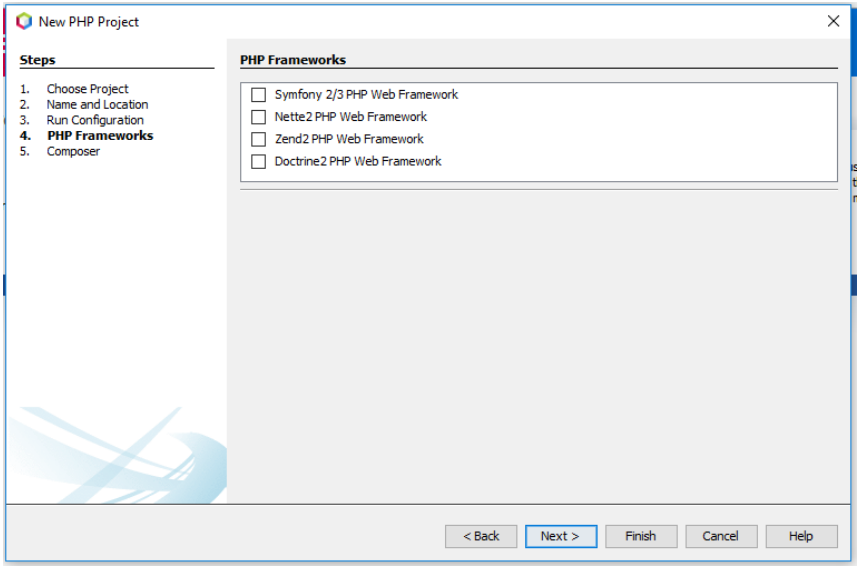


Fig 1.7

Now click the **Next Button**. The next wizard provide options to configure Composer as shown in Fig 1.8. We will simply skip this step since we will be writing a simple Hello World program in this tutorial.

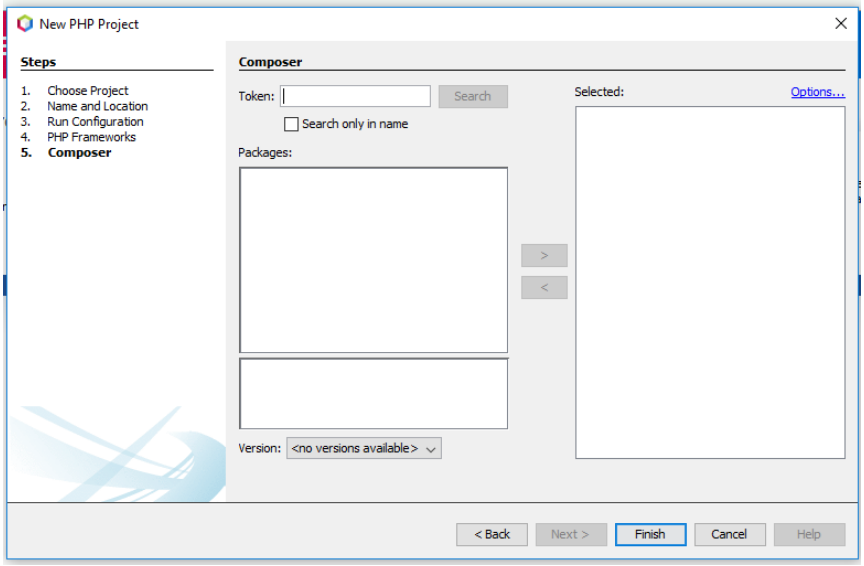


Fig 1.8

Now click the **Finish Button** to complete the project set up. The project with default **index.php** file created by NetBeans looks like the one shown in Fig 1.9.

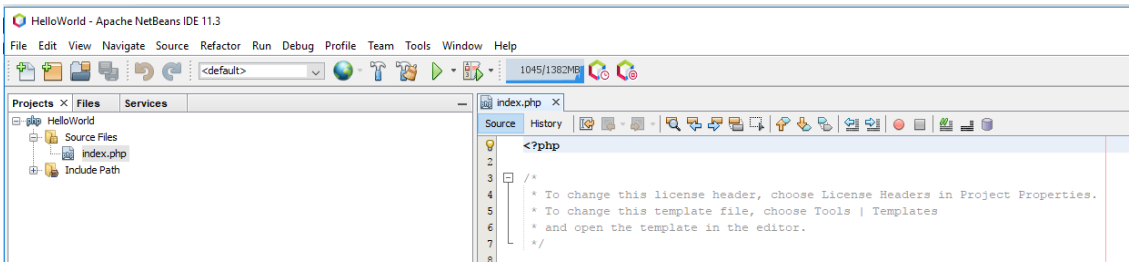


Fig 1.9

Hello PHP

In this step, we will update the index.php program and execute it on the console. Write Hello PHP as shown below.

```
<?php
echo "Hello PHP !!";
```

Now **right-click** on the **index.php** file in the **Projects Window** on the **left panel**. Also, **click on Run** to **execute the program** as shown in Fig 10. You can also select the File on Projects Window and press Shift + F6 to execute the program.

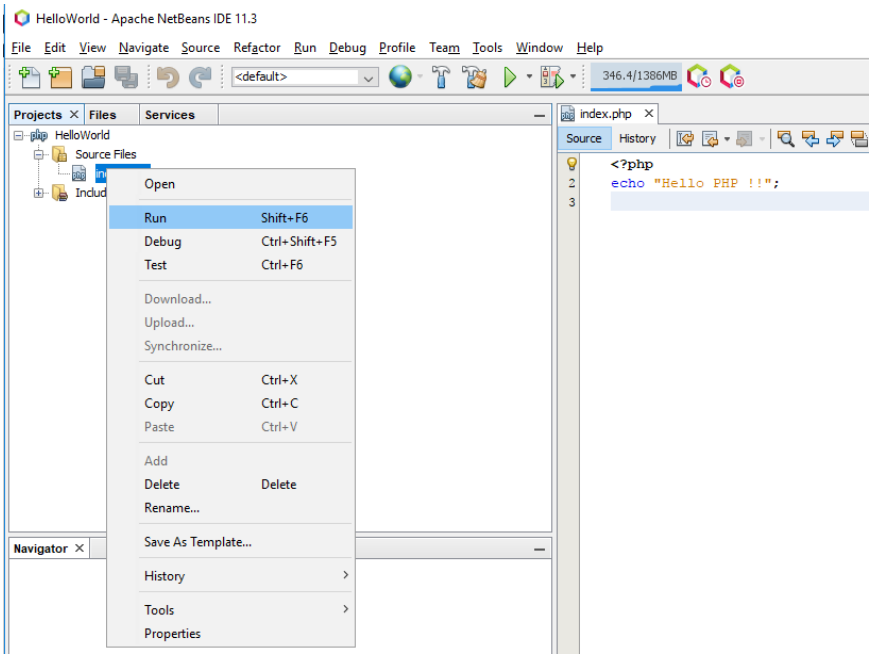


Fig 1.10

It will show the output as shown in Fig 1.11.

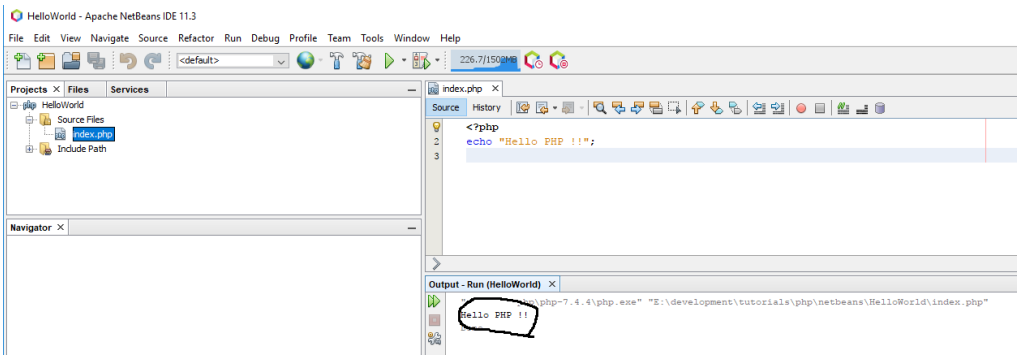


Fig 1.11

These are the basic steps required to write and execute PHP programs using NetBeans 11.

Summary

This example explained the steps required to create the first PHP project using NetBeans 11 and also explained to write and execute the PHP programs.