

# MPLAB Manual

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In this manual we will see:

- \* Installation of mplab and mplabx
- \* Installation of C18 compiler
- \* Path setup for C18 compiler in case of mplab
- \* Creation of first project.

# MPLAB Installation

Open MPLAB setup folder and click on setup.

This PC > IITB (Y:) > RA Duty > pic > mplab > Mplab Setup

Name	Date modified	Type	Size
 Data1	10-05-2012 10:50	WinRAR archive	1,07,540 KB
 ISSetup.dll	10-05-2012 10:18	Application extens...	2,056 KB
 MPLAB Tools v8.85	10-05-2012 10:50	Windows Installer ...	3,018 KB
 mplabcert	17-07-2009 20:36	BMP File	193 KB
 setup	10-05-2012 10:50	Application	3,783 KB

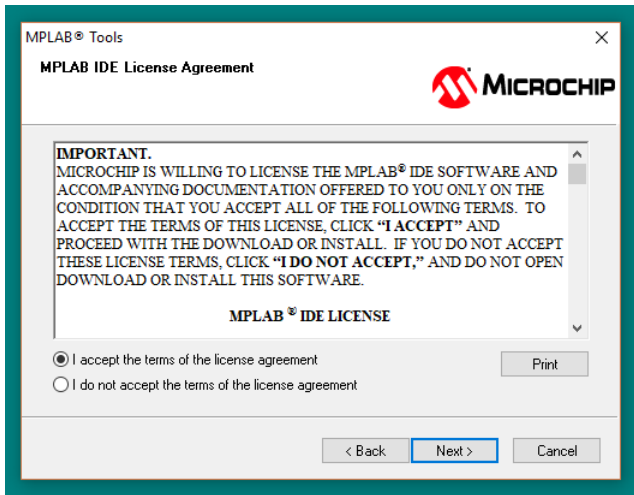
# MPLAB Installation

Follow the directions recommended in the window and click next.



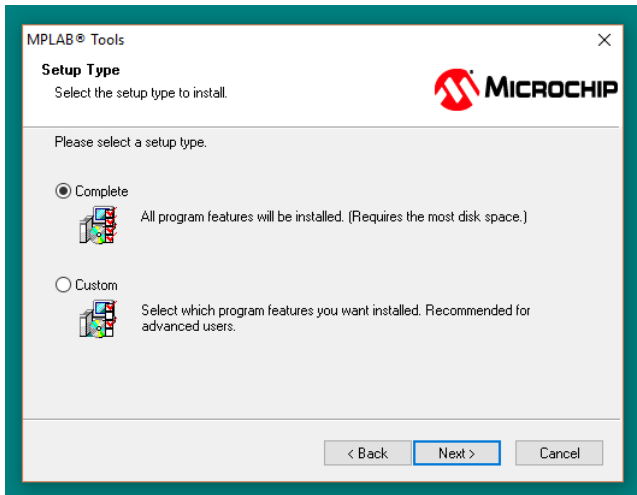
# MPLAB Installation

Read the terms of license agreement and select "I accept the terms of license agreement". Then click next.



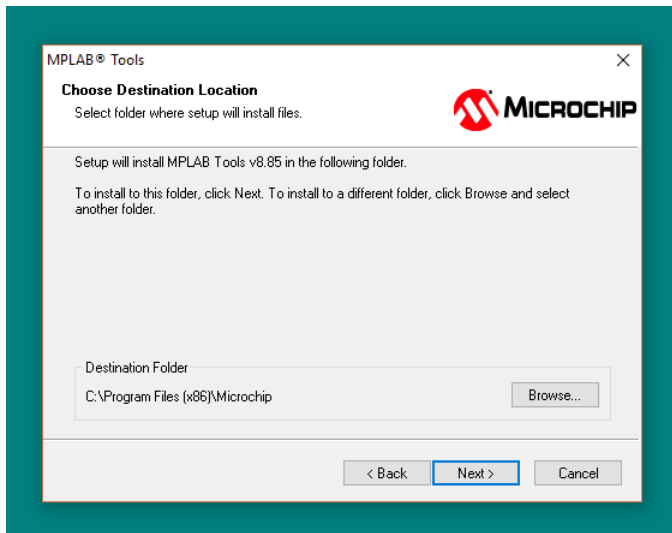
# MPLAB Installation

Now, select 'Complete' installation type. Then click next.



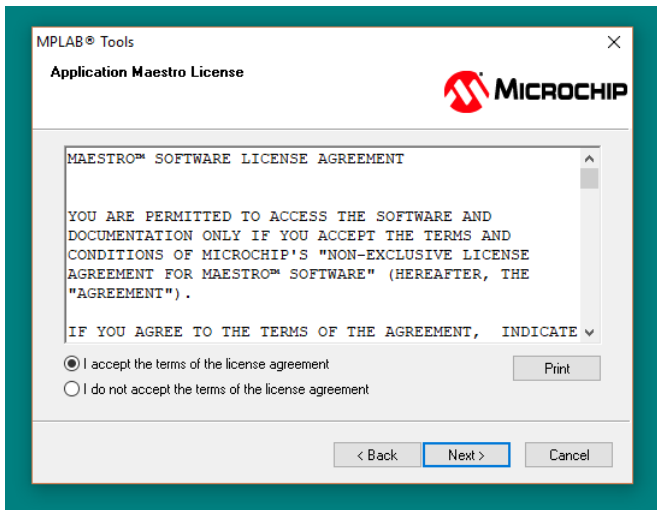
# MPLAB Installation

Choose the folder path or Default path for the installation and click next.



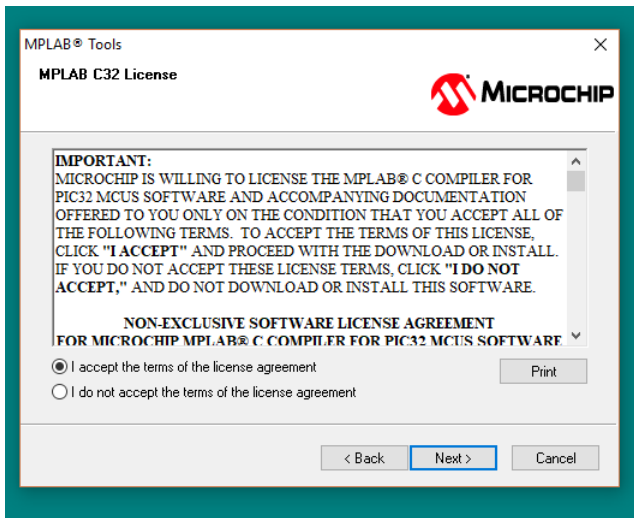
# MPLAB Installation

Read the terms of Application Maestro license agreement and select "I accept the terms of license agreement". Once done, click next.



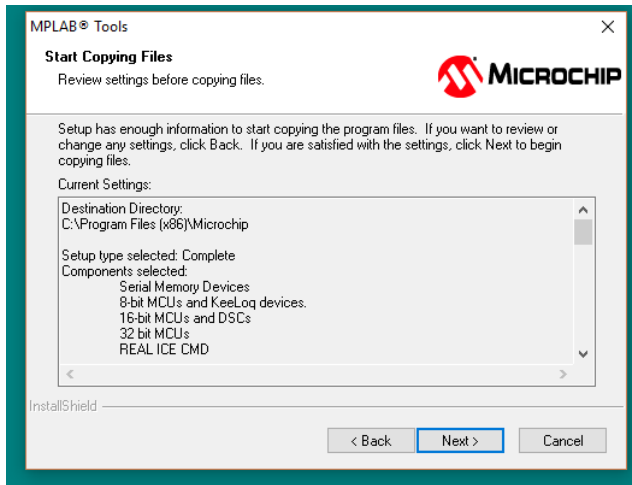
# MPLAB Installation

Read the terms of MPLAB C32 license agreement and select "I accept the terms of license agreement". Once done, click next.



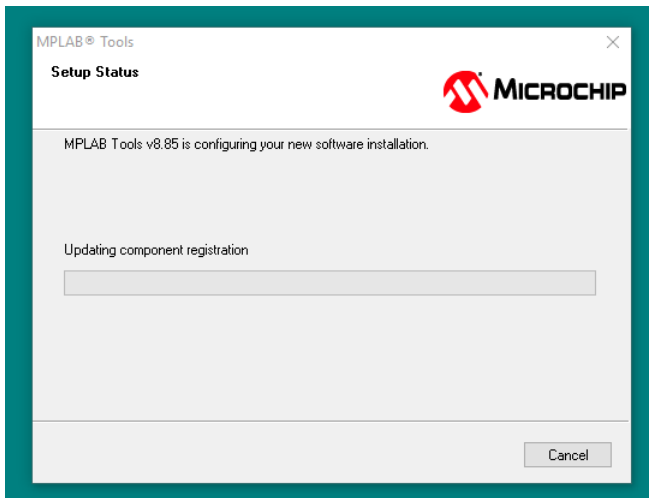
# MPLAB Installation

Review the files to be copied and the directory before installation starts. Then click next to start the installation.



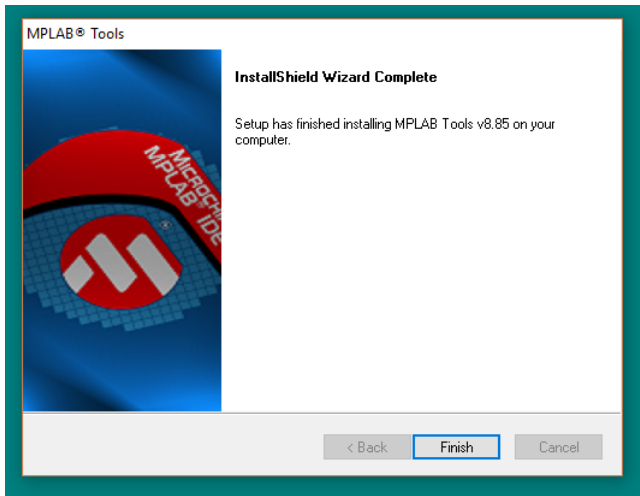
# MPLAB Installation

Please be patient till installation completes.



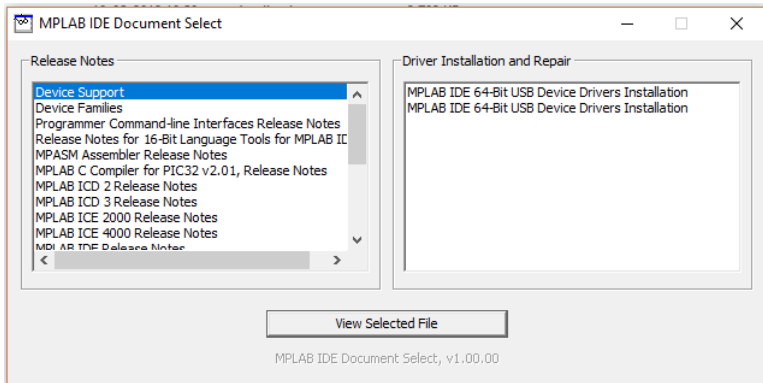
# MPLAB Installation

Following window pops up after installation completes. Click finish.



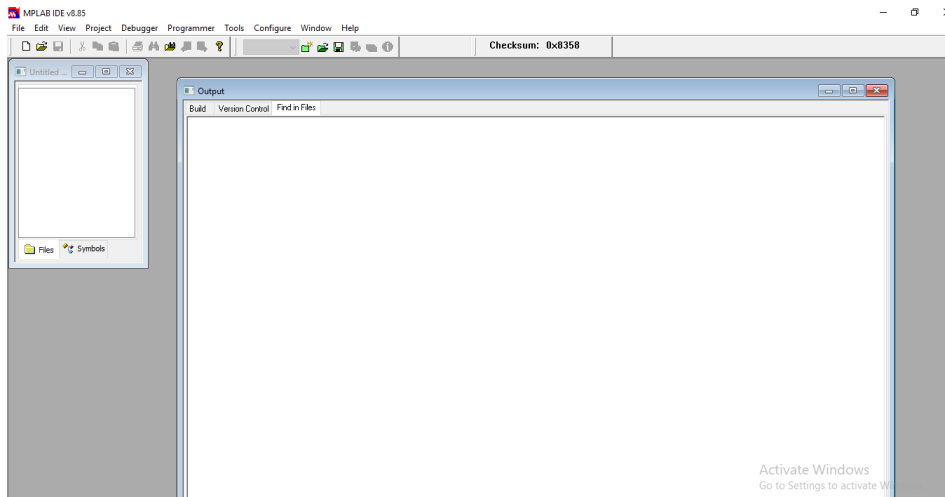
# MPLAB Installation

Installation is completed. Read me document Pops up. Read it and close the window.



# MPLAB Installation

Open MPLAB. You should be able to see two windows, project window and output window as shown in the figure.






# MPLABX Installation (Required, if advanced features to be used. Otherwise, Leave it)

Now, After successful installation of MPLAB, lets go for installation of MPLABX (Not mandatory).

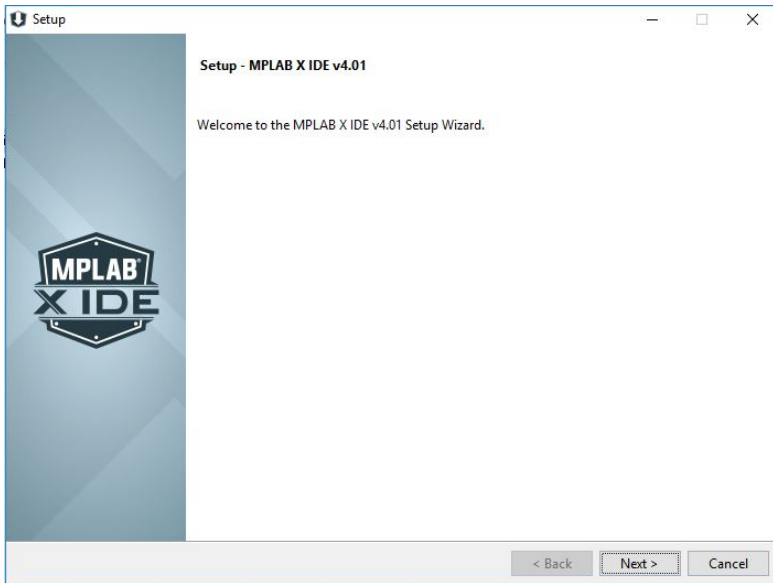
Open mplabx folder you will see 3 application files viz. mplabx ide installation file, mplabx ipe installation file, C18 compiler installation file. Click on mplabx ide file.

## MPLABX

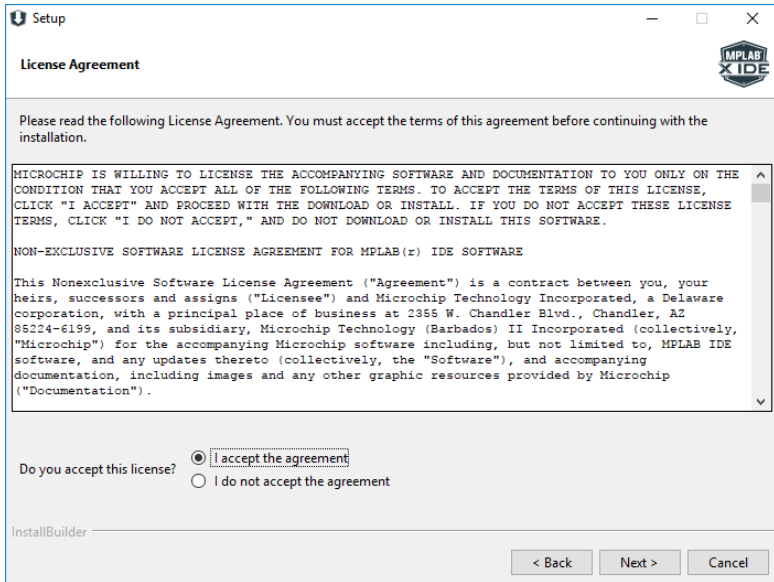
Name	Date modified	Type	Size
 mplabc18-v3.47-windows-eval-installer	03-11-2017 09:58	Application	85,222 KB
 MPLABX-v4.01-windows-installer	16-10-2017 21:09	Application	6,67,625 KB
 xc8-v1.44-full-install-windows-installer	16-10-2017 21:38	Application	99,601 KB

# MPLABX Installation

Upon clicking, a welcome window will open. Click next.



Read the license agreement and accept it in order to proceed ahead. Click next.



**Setup**

**License Agreement**

Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.

MICROCHIP IS WILLING TO LICENSE THE ACCOMPANYING SOFTWARE AND DOCUMENTATION TO YOU ONLY ON THE CONDITION THAT YOU ACCEPT ALL OF THE FOLLOWING TERMS. TO ACCEPT THE TERMS OF THIS LICENSE, CLICK "I ACCEPT" AND PROCEED WITH THE DOWNLOAD OR INSTALL. IF YOU DO NOT ACCEPT THESE LICENSE TERMS, CLICK "I DO NOT ACCEPT," AND DO NOT DOWNLOAD OR INSTALL THIS SOFTWARE.

NON-EXCLUSIVE SOFTWARE LICENSE AGREEMENT FOR MPLAB(x) IDE SOFTWARE

This Nonexclusive Software License Agreement ("Agreement") is a contract between you, your heirs, successors and assigns ("Licensee") and Microchip Technology Incorporated, a Delaware corporation, with a principal place of business at 2355 W. Chandler Blvd., Chandler, AZ 85224-6199, and its subsidiary, Microchip Technology (Barbados) II Incorporated (collectively, "Microchip") for the accompanying Microchip software including, but not limited to, MPLAB IDE software, and any updates thereto (collectively, the "Software"), and accompanying documentation, including images and any other graphic resources provided by Microchip ("Documentation").

Do you accept this license?

I accept the agreement

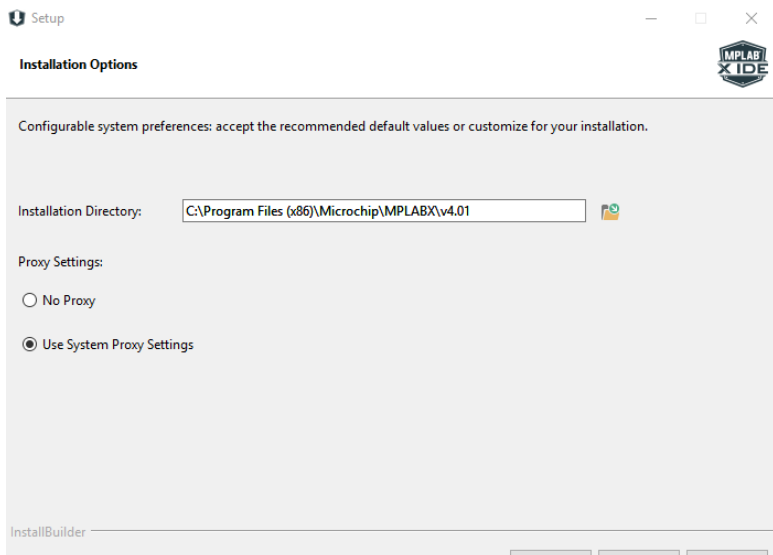
I do not accept the agreement

InstallBuilder

< Back    Next >    Cancel

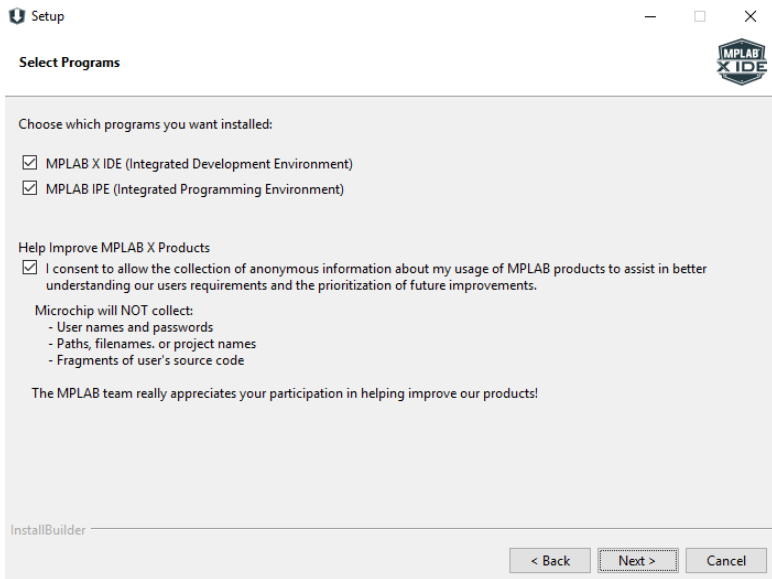
# MPLABX Installation

Select the installation directory to store the installed files of mplabx. Using proxy settings is optional. Click next.



# MPLABX Installation

Now, select the programs to be installed. You can check all boxes and click next.



The screenshot shows a Windows-style dialog box titled "Setup" with a shield icon on the left and standard window controls (minimize, maximize, close) on the right. The main heading is "Select Programs". Below this, there is a section "Choose which programs you want installed:" with two checked checkboxes: "MPLAB X IDE (Integrated Development Environment)" and "MPLAB IPE (Integrated Programming Environment)". A logo for "MPLAB X IDE" is in the top right corner. Below the checkboxes is a section "Help Improve MPLAB X Products" with a checked checkbox: "I consent to allow the collection of anonymous information about my usage of MPLAB products to assist in better understanding our users requirements and the prioritization of future improvements." Underneath, it states "Microchip will NOT collect:" followed by a list: "- User names and passwords", "- Paths, filenames, or project names", and "- Fragments of user's source code". A thank-you message follows: "The MPLAB team really appreciates your participation in helping improve our products!". At the bottom left, it says "InstallBuilder". At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a dashed border), and "Cancel".

Setup

### Select Programs

Choose which programs you want installed:

- MPLAB X IDE (Integrated Development Environment)
- MPLAB IPE (Integrated Programming Environment)

Help Improve MPLAB X Products

- I consent to allow the collection of anonymous information about my usage of MPLAB products to assist in better understanding our users requirements and the prioritization of future improvements.

Microchip will NOT collect:

- User names and passwords
- Paths, filenames, or project names
- Fragments of user's source code

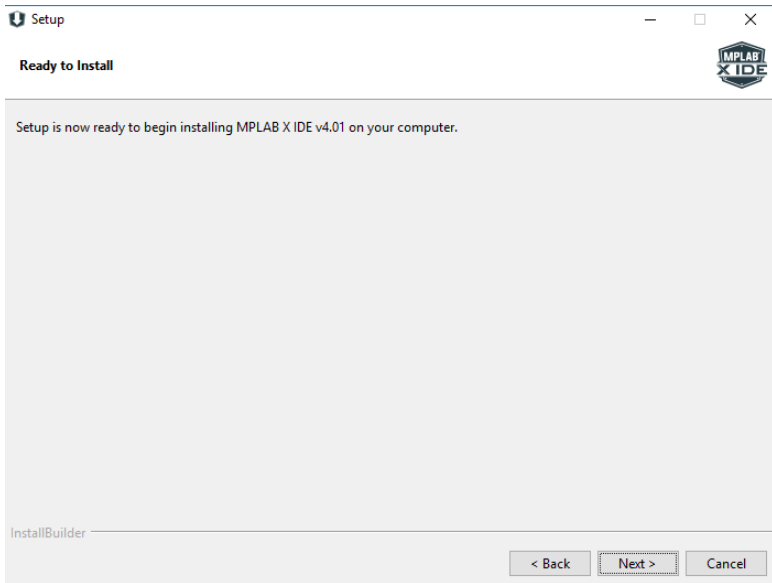
The MPLAB team really appreciates your participation in helping improve our products!

InstallBuilder

< Back    Next >    Cancel

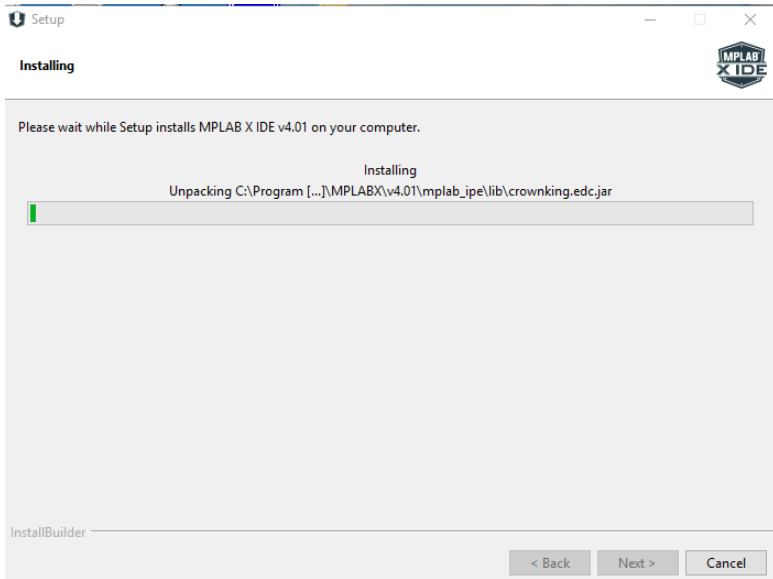
# MPLABX Installation

Click next again to start the installation.



# MPLABX Installation

While installation completes, you can take a tea break;-)






# C18 compiler Installation

Now we have the IDE for code development, but to compile the written code/s compiler is needed. Let's install it.

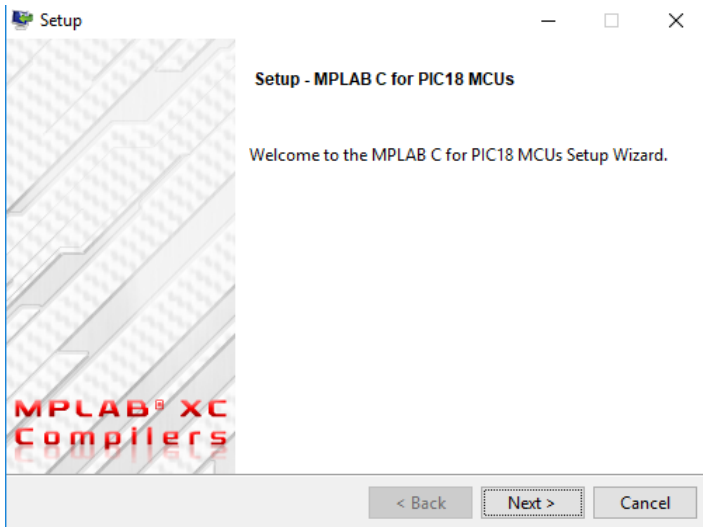
Open mplabx folder and click on C18 setup application.

## MPLABX

Name	Date modified	Type	Size
 mplabc18-v3.47-windows-eval-installer	03-11-2017 09:58	Application	85,222 KB
 MPLABX-v4.01-windows-installer	16-10-2017 21:09	Application	6,67,625 KB
 xc8-v1.44-full-install-windows-installer	16-10-2017 21:38	Application	99,601 KB

# C18 compiler Installation

A welcome window will open. Click next.



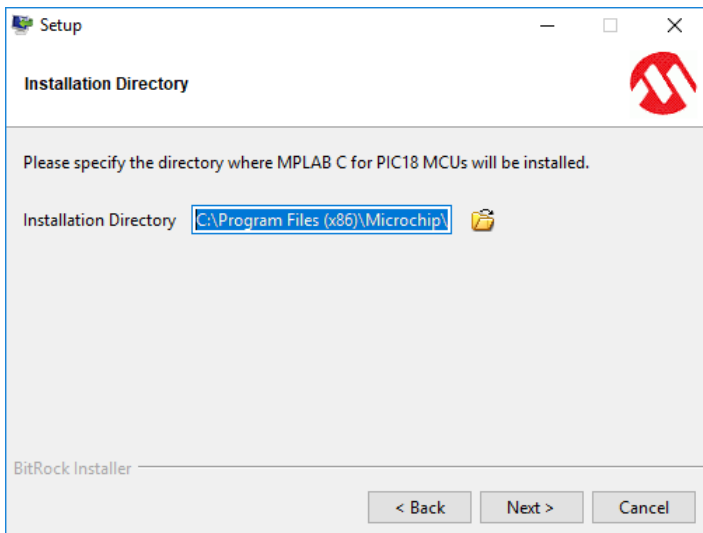
# C18 compiler Installation

Read the license agreement and accept it in order to proceed ahead. Click next.



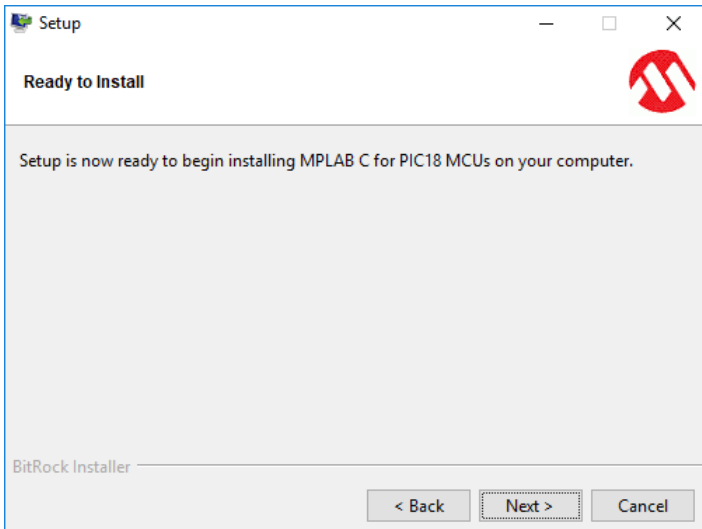
# C18 compiler Installation

Select the installation directory to store the installed files of C18 compiler. Click next.



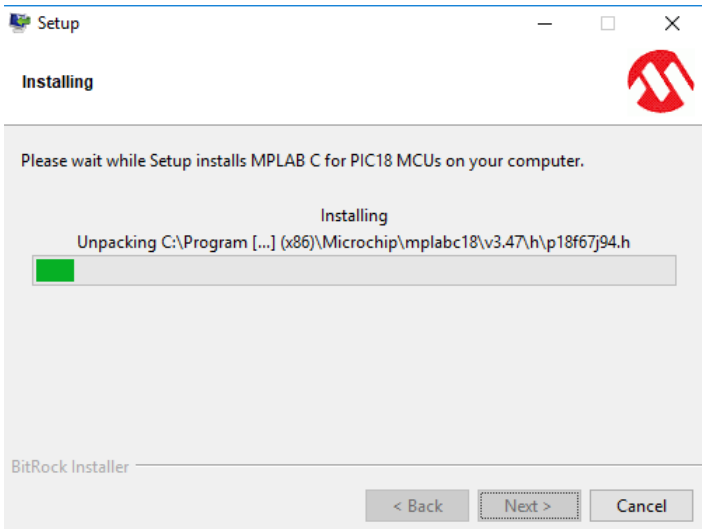
# C18 compiler Installation

Finally, C18 is ready to install. Click next to start the installation.



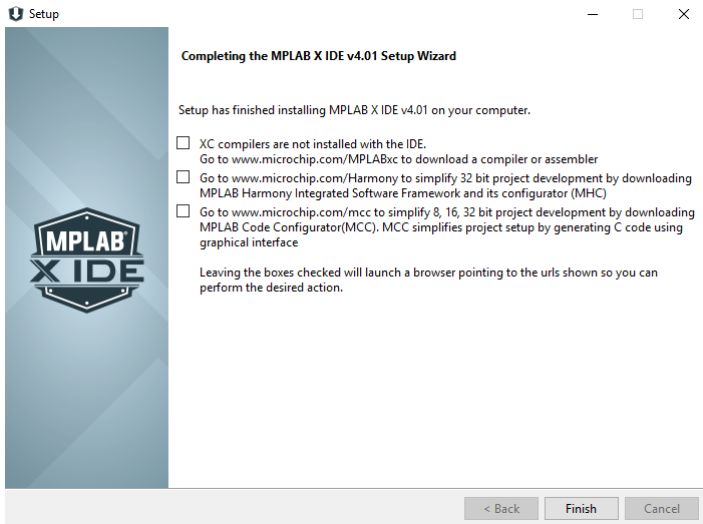
# C18 compiler Installation

Now have some patience and let C18 get installed.



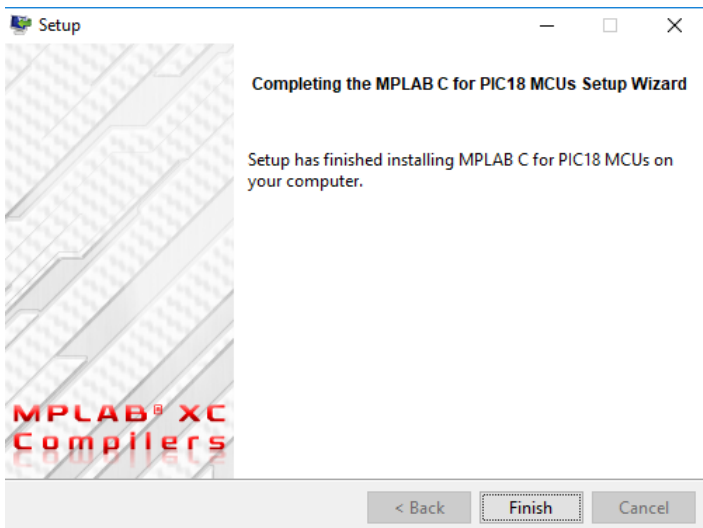
# C18 compiler Installation

Once installation completes, it will open a setup window and will show some additional things to install. You don't need to install any of those softwares so just uncheck all boxes and click next.



# C18 compiler Installation

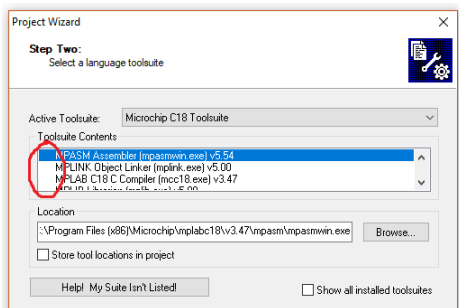
At last,click on finish.



# MPLAB Setup

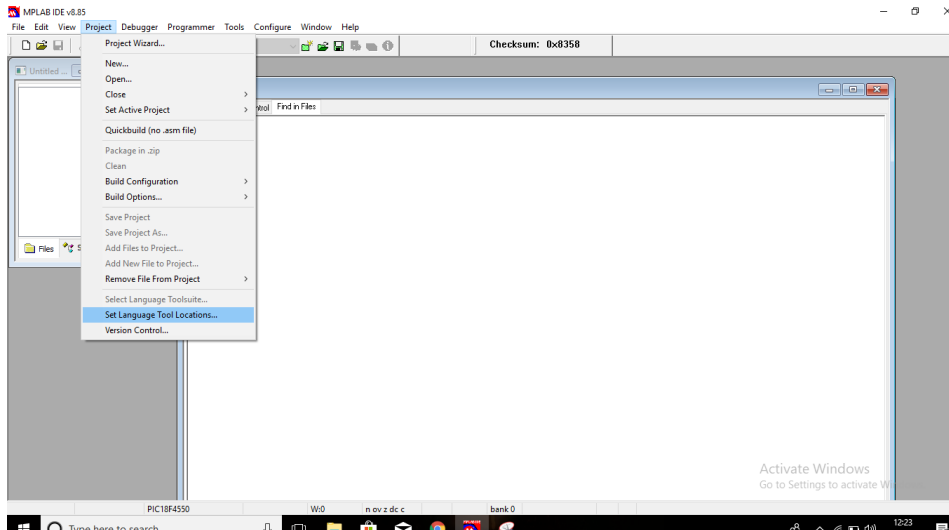
MPLAB is completely installed. Now, link it to the C18 compiler.

- \* While installing C18 compiler, system links it automatically to the mplab. But the linking has to be done manually in some systems.
- \* You can easily check whether the linking is already done or needs to be done manually while creating the project.
- \* If you see the red cross in front of 'exe' files while selection in the C18 toolsuit, the linking needs to be done. Else the linking is already done. Skip the setup.

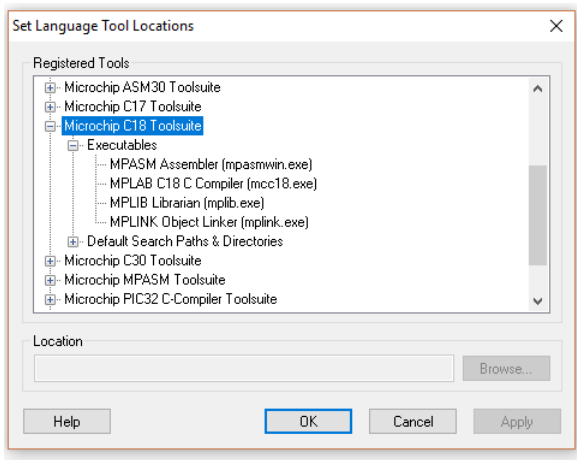


# MPLAB Setup

In order to setup the linking with MPLAB, go to project:-set language tool locations.

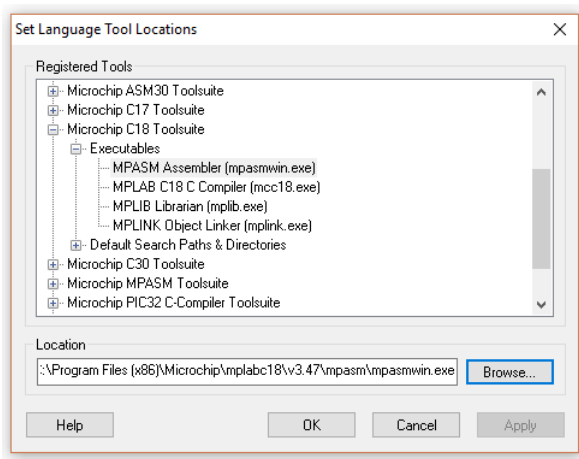


Expand microchip C18 toolsuite and further expand executables.



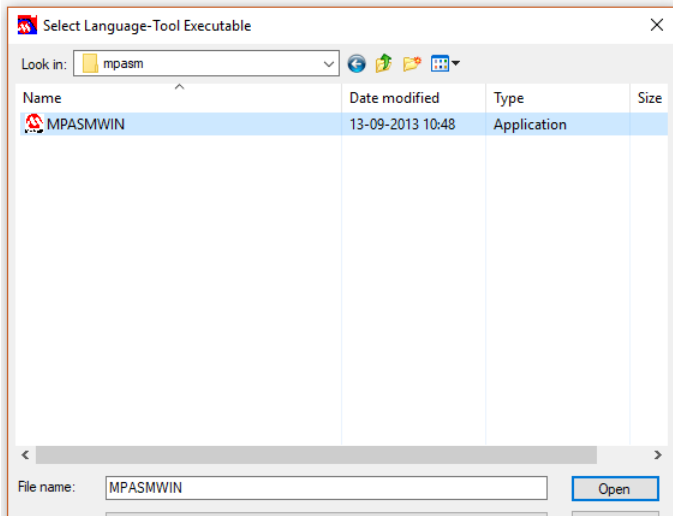
# MPLAB Setup

Click on first executable file i.e. MPASM assembler. Now provide the path of this exe files to the software. For that, select exe and click browse.



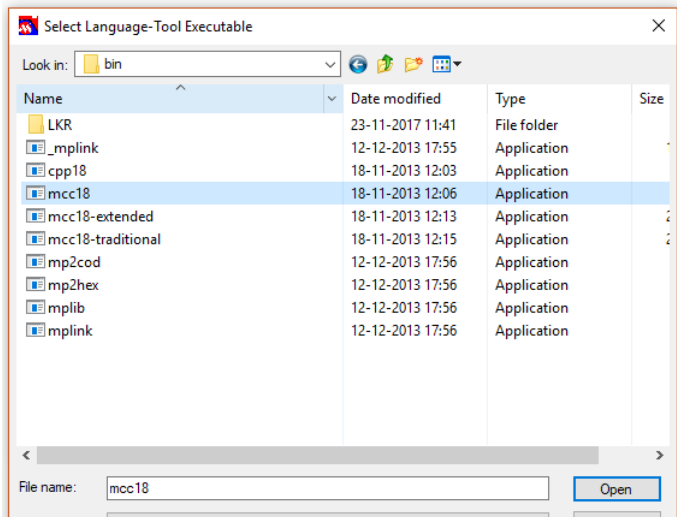
# MPLAB Setup

Now go to C drive you should be able to see a folder named mcc18. Open the folder and further go in folder named mpasm, you will see the mpasmwin.exe file select it and click open.



# MPLAB Setup

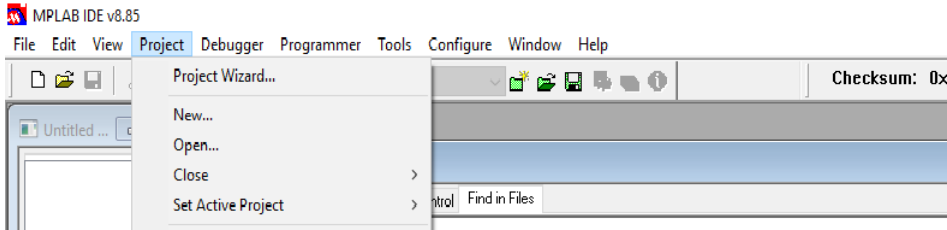
Similarly for other exe files, provide the correct path. All exe files will be available in bin directory of mcc18 folder. Select these exe one-by-one. Then the setup is complete.



# First project using MPLAB

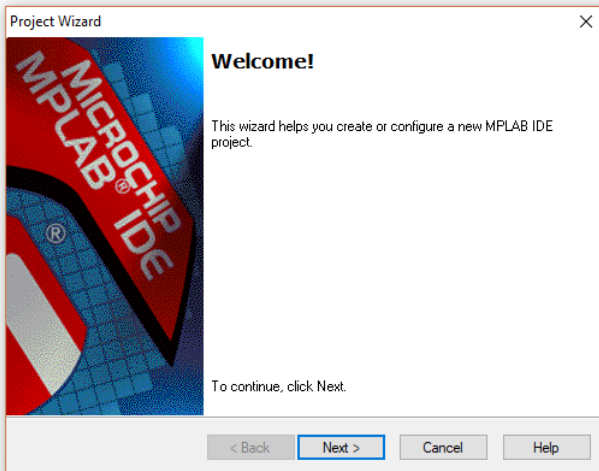
Now we are done with installation and the setup. So let's create our first project. We will see how to create project using mlab followed by mlabx.

Go to project:-project wizard.



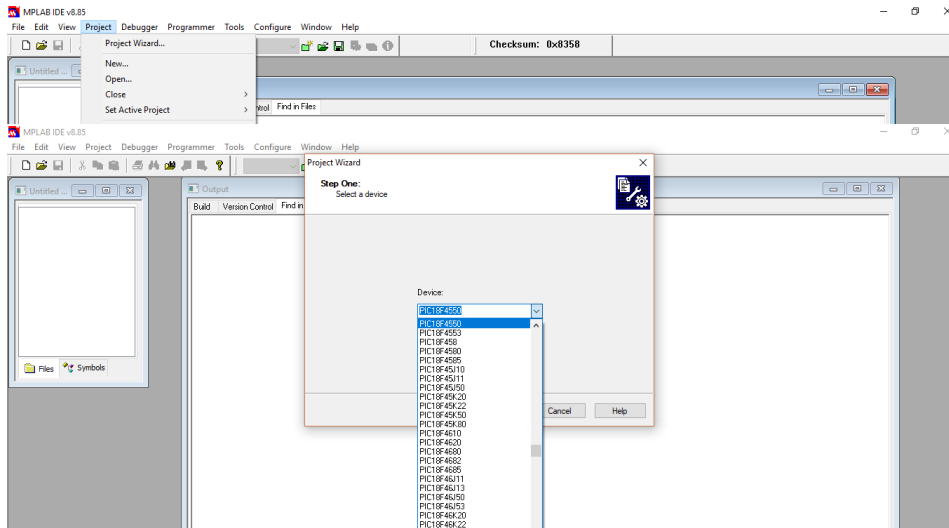
# First project using MPLAB

It's a welcome page. Click next.



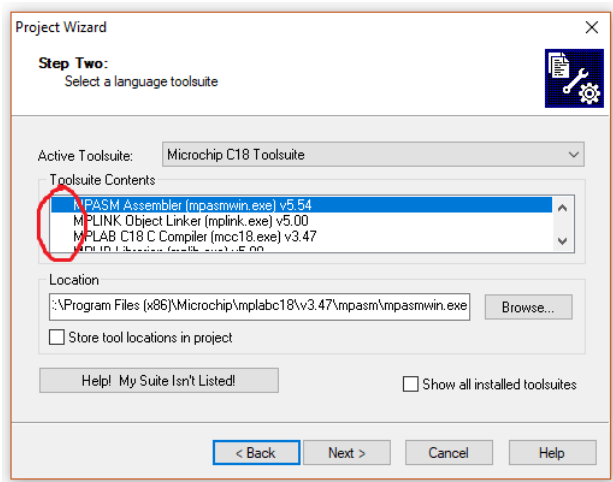
# First project using MPLAB

Select the controller of our interest. It is 'PIC18F4550' for the Aurum board. Select it and click next.



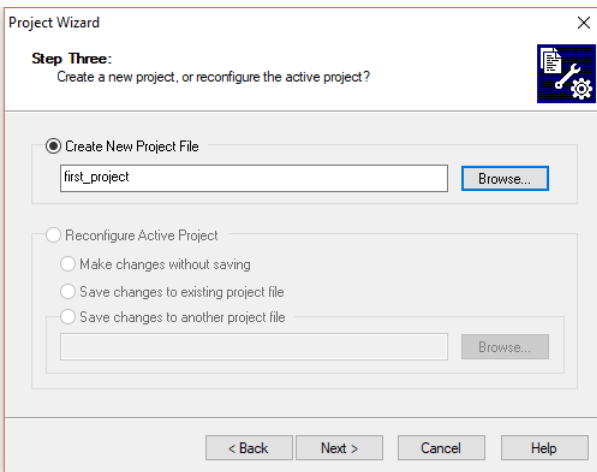
# First project using MPLAB

Now in this step we have to select compiler toolsuite select microchip c18 toolsuite from drop down menu and make sure the exe files mentioned don't have any cross mark in front of them. If they do, you have to do the setup again.



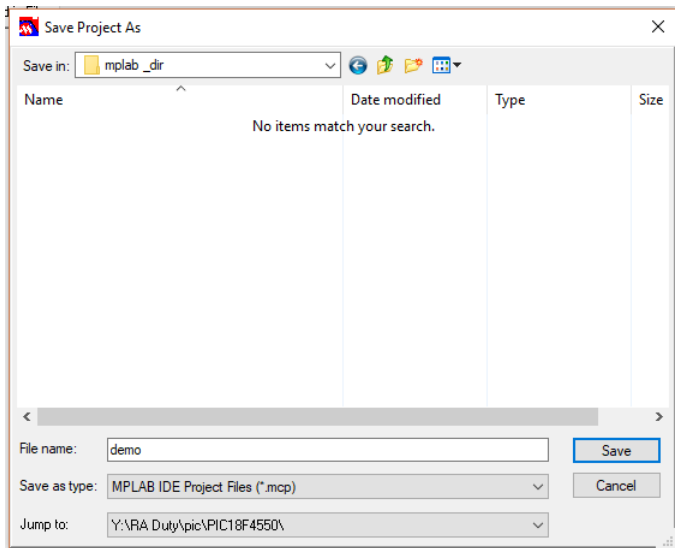
# First project using MPLAB

Now create new project file, in order to do that browse for the directory where you want to save your completed project files this will be your workspace.



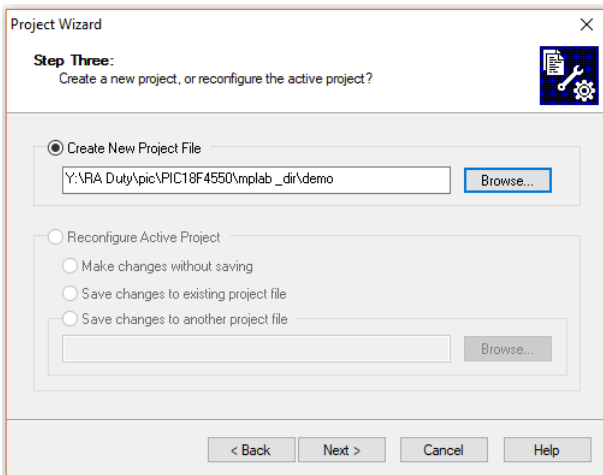
# First project using MPLAB

I have created a file named demo in directory named mplab dir.



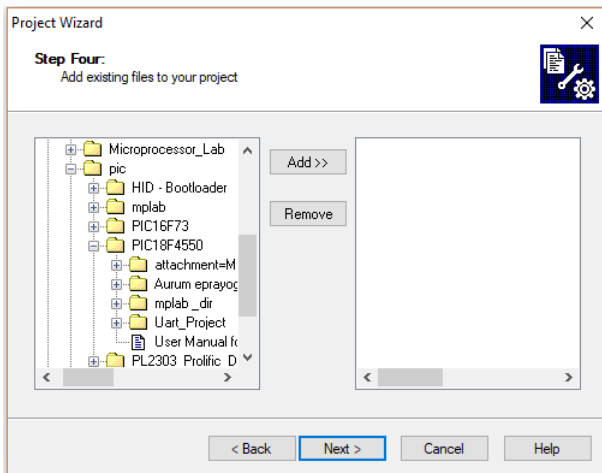
# First project using MPLAB

Select directory and click next.



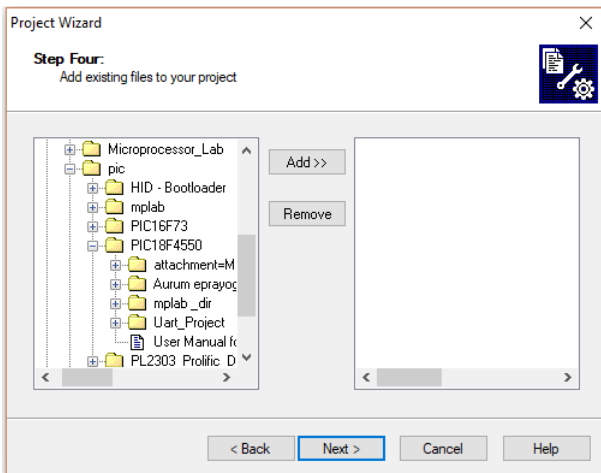
# First project using MPLAB

In this step, you can add the source files or header files which are already present with you. As it's our first project we are not going to add anything.



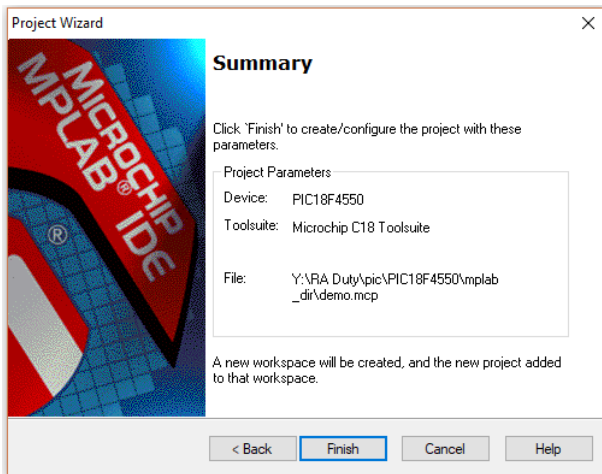
# First project using MPLAB

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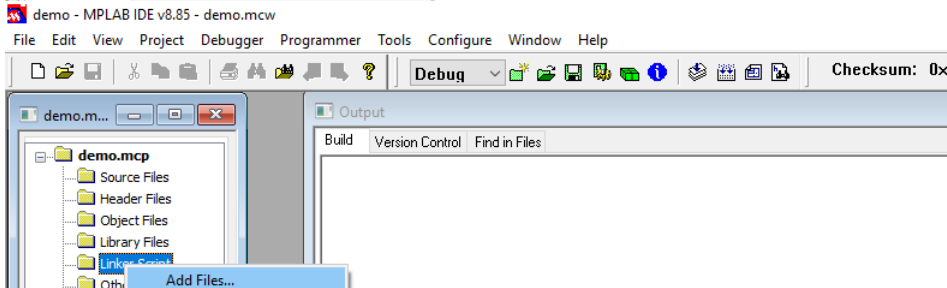
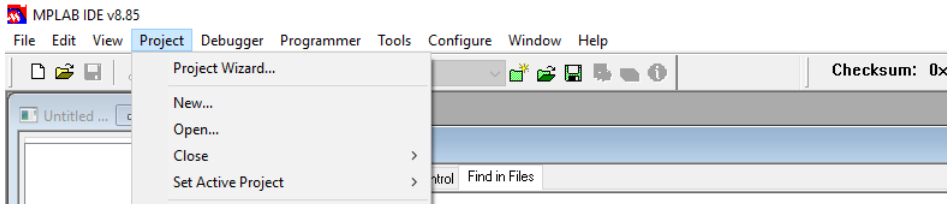
# First project using MPLAB

Wooh.Finally our first project is created.Just go through project summary check for device(PIC18F550),toolsuite(C18 toolsuite) and project directory.



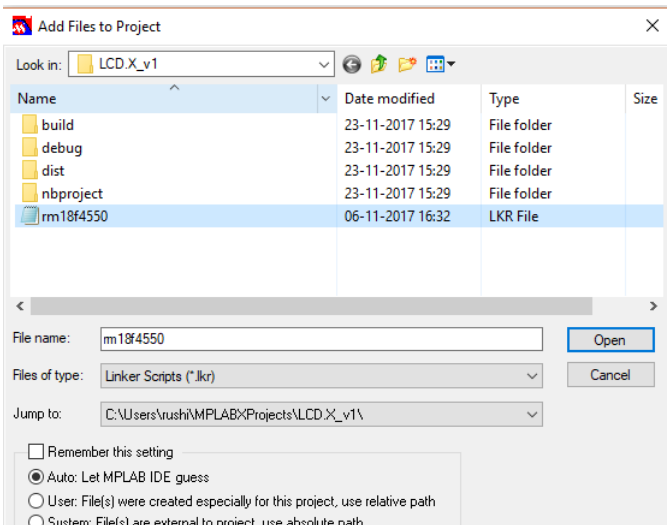
# First project using MPLAB

Now you should see two windows in front of you project window and output window. In project window under project name there are different folders viz. source files, linker files etc. Right click on linker files and go to add files option.



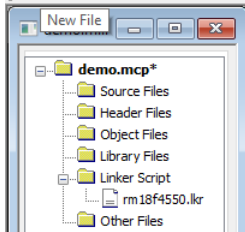
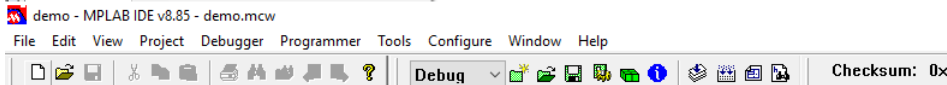
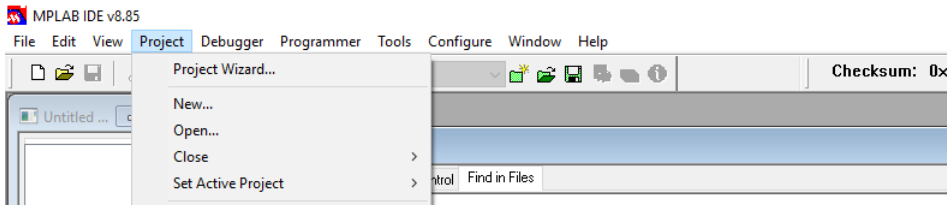
# First project using MPLAB

Select linker file 'rm18f4550.lkr' and click open. You can download this file from praprog website. Linker file has the configuration for aurum board that we have made using PIC18f4550.



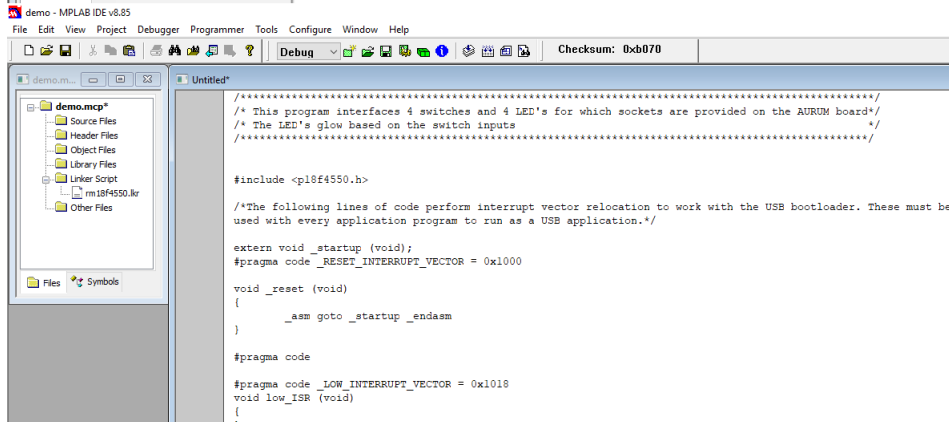
# First project using MPLAB

Now we have to create our project code and that has to be done in embedded c  
.So click on new file.



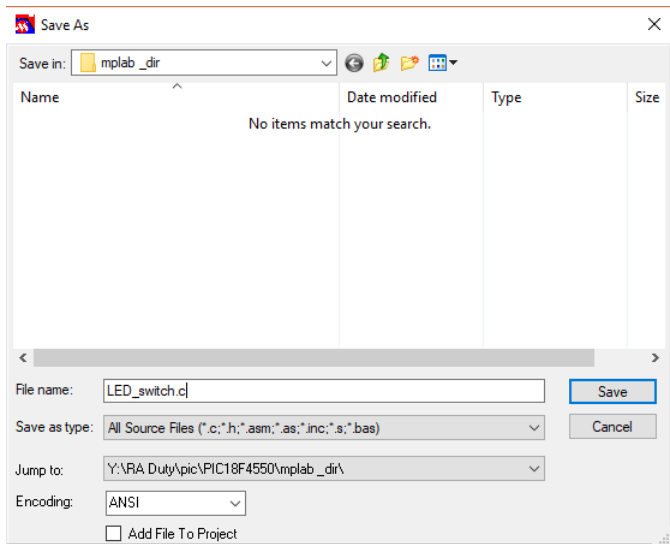
# First project using MPLAB

Write your code for desired operation in this file.



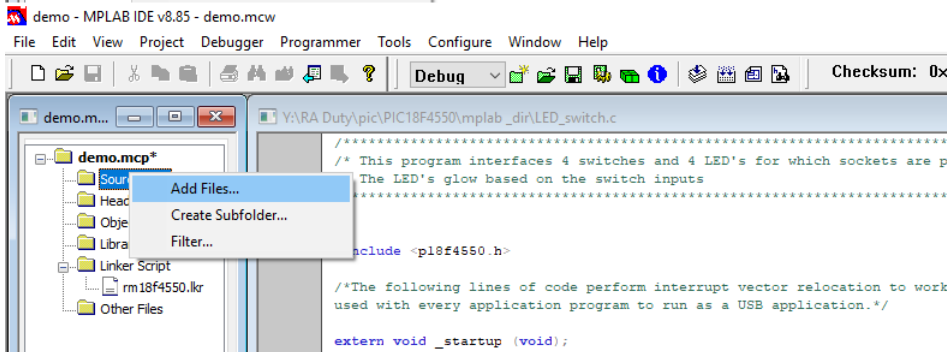
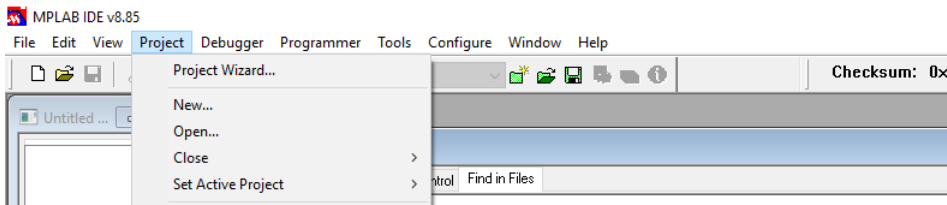
# First project using MPLAB

Now save this file with extension '.c' into the workspace you have created earlier.



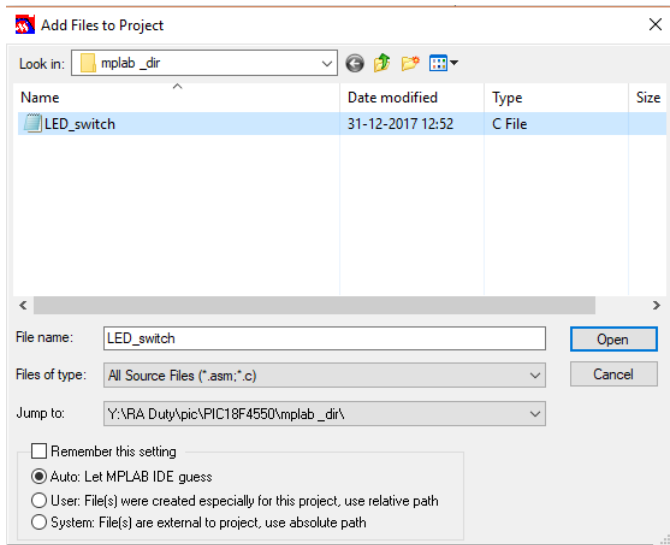
# First project using MPLAB

Now right click on source files and follow it with add files.



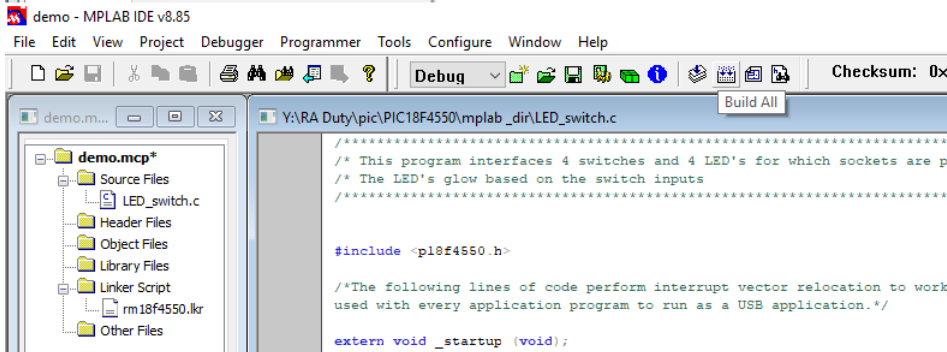
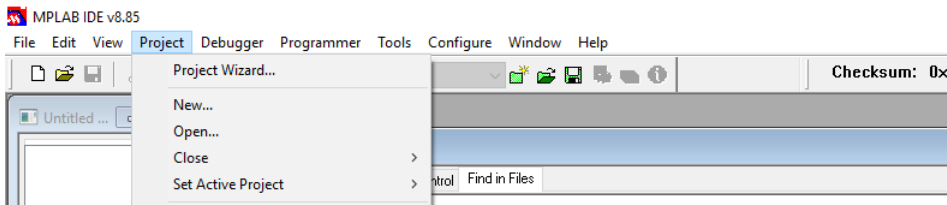
# First project using MPLAB

Go to the workspace and select the file file that we have created just now. And click open.



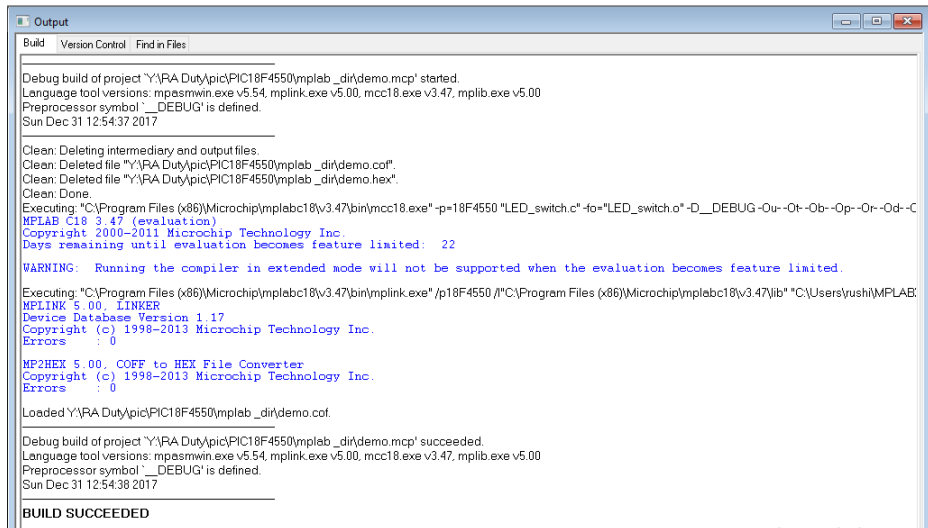
# First project using MPLAB

Now the coding work is done. So lets build the project by clicking build all option.



# First project using MPLAB

You should be able to see the output window showing build succeeded. If build fails there might be some errors with your setup or in code.



```
Output
Build Version Control Find in Files

Debug build of project 'Y:\RA Duty\pic\PIC18F4550\mplab_dir\demo.mcp' started.
Language tool versions: mpasmwin.exe v5.54, mmlink.exe v5.00, mcc18.exe v3.47, mplib.exe v5.00
Preprocessor symbol '_DEBUG' is defined.
Sun Dec 31 12:54:37 2017

Clean: Deleting intermediary and output files.
Clean: Deleted file "Y:\RA Duty\pic\PIC18F4550\mplab_dir\demo.cof".
Clean: Deleted file "Y:\RA Duty\pic\PIC18F4550\mplab_dir\demo.hex".
Clean: Done.
Executing: "C:\Program Files (x86)\Microchip\mplab18\v3.47\bin\mcc18.exe" -p=18F4550 -LED_switch.c -fo="LED_switch.o" -D__DEBUG -Ou -Ot -Ob -Op -Or -Od -C
MPLAB C18 3.47 (evaluation)
Copyright 2000-2011 Microchip Technology Inc.
Days remaining until evaluation becomes feature limited: 22

WARNING: Running the compiler in extended mode will not be supported when the evaluation becomes feature limited.

Executing: "C:\Program Files (x86)\Microchip\mplab18\v3.47\bin\mmlink.exe" /p18F4550 /"C:\Program Files (x86)\Microchip\mplab18\v3.47\lib" "C:\Users\yushi\MPLAB:
MPLINK 5.00, LINKER
Device Database Version 1.17
Copyright (c) 1998-2013 Microchip Technology Inc.
Errors : 0

MP2HEX 5.00, COFF to HEX File Converter
Copyright (c) 1998-2013 Microchip Technology Inc.
Errors : 0

Loaded Y:\RA Duty\pic\PIC18F4550\mplab_dir\demo.cof.

Debug build of project 'Y:\RA Duty\pic\PIC18F4550\mplab_dir\demo.mcp' succeeded.
Language tool versions: mpasmwin.exe v5.54, mmlink.exe v5.00, mcc18.exe v3.47, mplib.exe v5.00
Preprocessor symbol '_DEBUG' is defined.
Sun Dec 31 12:54:38 2017

BUILD SUCCEEDED
```

# First project using MPLABx

Now lets see how project is created in mplabx.

After opening mplabx you will see following window.

MPLAB X IDE v4.01

File Edit View Navigate Source Refactor Production Debug Team Tools Window Help

Start Page x MPLAB X Store x

MPLAB X IDE

LEARN & DISCOVER | MY MPLAB X

PROJECTS

- Open Sample
- Create New
- Import Legacy
- Import Prebuilt

Recent Projects

<no recent project>

Microchip Login

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LOGIN [Forgot Password?](#)

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DATA SHEETS

FMREDFED

# First project using MPLABx

In order to create new project. Click on File:-New Project

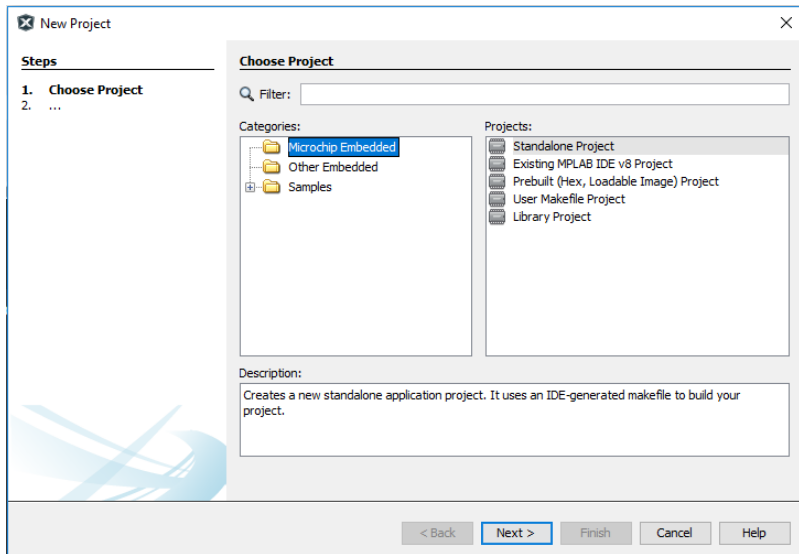
The screenshot shows the MPLAB X IDE v4.01 interface. The 'File' menu is open, and 'New Project...' is highlighted. The menu items are as follows:

- New Project... (Ctrl+Shift+N)
- New File... (Ctrl+N)
- Open Project... (Ctrl+Shift+O)
- Open Recent Project >
- Import >
- Close Project
- Close Other Projects
- Close All Projects
- Open File...
- Open Recent File >
- Project Groups...
- Project Properties
- Save (Ctrl+S)
- Save As...
- Save All (Ctrl+Shift+S)
- Page Setup...
- Print... (Ctrl+Alt+Shift+P)
- Print to HTML...
- Exit

The background shows the IDE workspace with a 'Recent Projects' section containing '<no recent project>' and a 'Microchip Login' section with fields for 'E-mail Address' and 'Password', and buttons for 'LOGIN' and 'REGISTER N'.

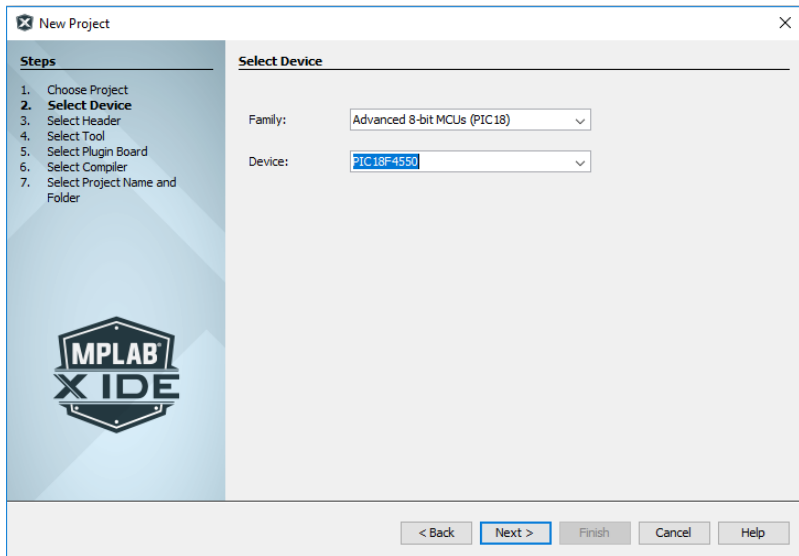
# First project using MPLABx

A new project window will open. Now select Categories:Microchip Embedded Projects:Standalone Project Click next.



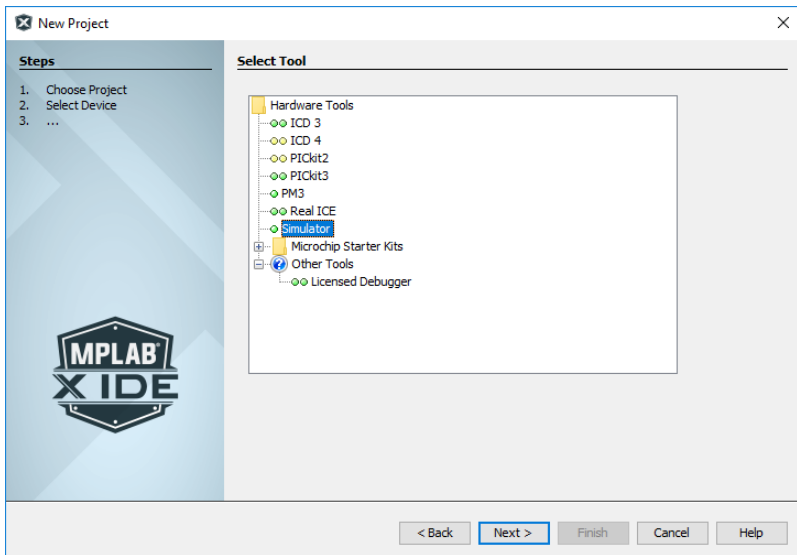
# First project using MPLABx

Now we have to select device. For that select Family: Advanced 8-bit MCUs (PIC18)  
Device: PIC18F4550 Click Next.



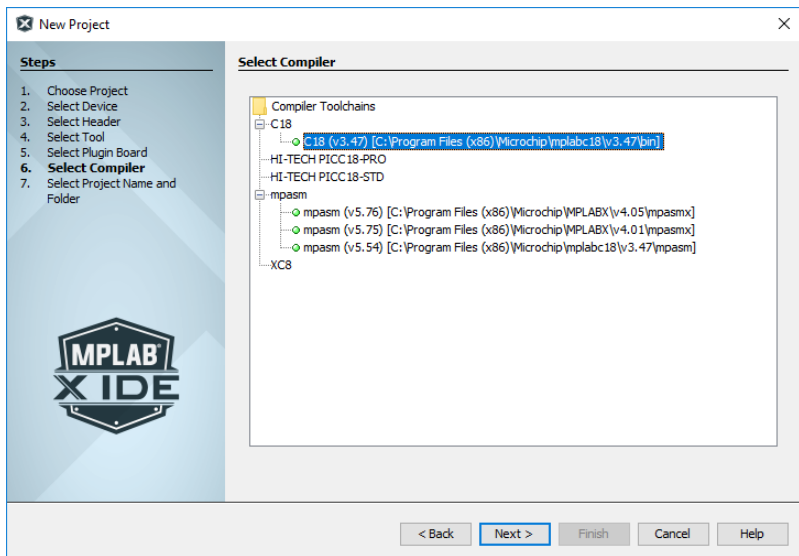
# First project using MPLABx

Select Simulator as a hardware tool and click next.



# First project using MPLABx

Now comes selection of compiler. Select c18 compiler from compiler toolchains. Click next.



# First project using MPLABx

Give a name to your project, in this case project name is demo. You can also change the project location if you want. By default projects will be stored in user location in c drive by the extension '.X'. Keep in mind hex file for the project will be created in this location.

**New Project**

**Steps**

1. Choose Project
2. Select Device
3. Select Header
4. Select Tool
5. Select Plugin Board
6. Select Compiler
7. **Select Project Name and Folder**

**Select Project Name and Folder**

Project Name:

Project Location:

Project Folder:

Overwrite existing project.

Also delete sources.

Set as main project

Use project location as the project folder

Encoding:

< Back    Next >    **Finish**    Cancel    Help

# First project using MPLABx

Now add linker file 'rm18f4550' to linker files folder in IDE. Click on add existing files.

The screenshot displays the MPLAB X IDE v4.01 interface. The main window shows the 'demo' project structure in the 'Linker Files' folder. A context menu is open over the 'Linker Files' folder, with 'Add Existing Item...' selected. The project tree on the left shows the following structure:

- demo
  - Header Files
  - Important Files
  - Linker Files
  - Source Files
  - Libraries
  - Load

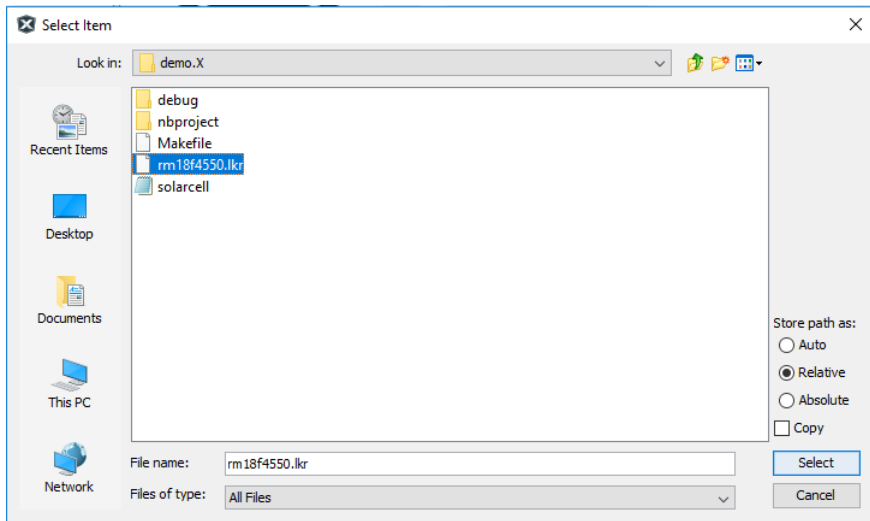
The 'demo - Dash' panel shows the following details:

- demo
  - Project
    - Device: PIC18F4550
    - Checksum: Blank, no code loaded
    - Compiler Toolchain
      - C18 (v3.47) [C:\Program Files (x86)\Microchip\mplab18\v3.47\bin\c18.exe]
      - Production Image: Optimization
    - Memory
      - Usage Symbols disabled. Click to enable Load Symbols.
      - Data 2048 (0x800) bytes
      - Program 32768 (0x8000) bytes
    - Debug Tool
      - Simulator
      - Click for Simulated Peripherals

The background shows the MPLAB X IDE logo and the Microchip website navigation menu, including 'PROJECTS', 'Recent ...', 'Microchip Login', and 'References & Featured Links'.

# First project using MPLABx

For adding linker file, select the location where file is stored ,find linker file and click open.



# First project using MPLABx

In order to write c code you have to create new c source file.

The screenshot displays the MPLAB X IDE v4.01 interface. The title bar reads "MPLAB X IDE v4.01 - demo: default". The menu bar includes "File", "Edit", "View", "Navigate", "Source", "Refactor", "Production", "Debug", "Team", "Tools", "Window", and "Help". The toolbar contains various icons for file operations and execution. The "Projects" pane on the left shows a tree view for the "demo" project, with "Source Files" selected. A context menu is open over "Source Files", and the "New" option is chosen, leading to a sub-menu where "C Source File..." is highlighted. The main editor area shows the MPLAB X logo and a banner with the text "LEARN & DISCOVER | MY MPLAB® X IDE". Below the banner, there are sections for "Recent Projects" (showing "no recent projects"), "Microchip Login" (with fields for "E-mail Address" and "Password", and buttons for "LOGIN" and "REGISTER NOW"), and "References & Featured Links" (with a button for "Activate Win").

# First project using MPLABx

It will open new file window. Give a name to the file and select extension. We will be writing c programs only, so no need to change the extension.

**New C Source File**

**Steps**

1. Choose File Type
2. **Name and Location**

**Name and Location**

File Name:

Extension:

Set this Extension as Default

Project:

Folder:

Created File:

# First project using MPLABx

Now write c program for desired operation in code window and click on build main project.

The screenshot displays the MPLAB X IDE v4.01 interface. The main window shows a C program in the code editor, with the 'Build Main Project' button highlighted in the toolbar. The code defines hardware pins and includes standard C libraries.

```
1 #include <plib4550.h>
2 #include <stdlib.h>
3 #include <stdio.h>
4 #include <string.h>
5 #include <math.h>
6
7 //LCD data pins connected to PORTD and control pins connected to PORTE
8 /*
9 LCD DATA port----PORT D
10 signal port-----PORT E
11 rs-----PE0
12 rw-----PE1
13 en-----PE2
14 */
15 #define ldata PORTD
16 #define rs PORTEbits.RE0
17 #define rw PORTEbits.RE1
18 #define en PORTEbits.RE2
19 #define F_CPU 8000000/64 //define Baud_value(baud_rate) (((float)(F_CPU)/(float)baud_rate))
20
21 void ledcmd (unsigned char value);
22 void lcddata (unsigned char value);
23 void MSDelay (unsigned int itime);
24 void USART_Init(long);
25 void USART_TxChar(char);
26 void USART_SendString(char []);
27 void timer_isr(void);
28 int intToStr(int , char str[], int );
29 void ftoa(float , char *, int );
```

The left sidebar shows the 'demo' project structure with 'demofile.c' selected. The bottom-left pane shows the 'demo - Dashboard' and 'reverse(char\* str, int len) - Navigator'.

# First project using MPLABx

Code building will start, once it completes check output window. If you get message as 'BUILD SUCCESSFUL' you are ready to flash your code on the board. If not you must have made some mistakes with setup or in code.



The screenshot shows the 'Output - demo (Build, Load)' window in MPLABx. It displays the execution of the linker (MPLINK 5.00) and the hex-to-hex converter (MP2HEX 5.00). Both tools report zero errors. The build process concludes with the message 'BUILD SUCCESSFUL (total time: 6s)'. The final output shows the code being loaded from the production directory.

```
Output - demo (Build, Load) x
▶▶ "C:\Program Files (x86)\Microchip\mplabcl8\v3.47\bin\mplink.exe" "rml8f4550.lkr" -p18f4550 -w -m"dist/
MPLINK 5.00, LINKER
Device Database Version 1.17
Copyright (c) 1998-2013 Microchip Technology Inc.
Errors      : 0

MP2HEX 5.00, COFF to HEX File Converter
Copyright (c) 1998-2013 Microchip Technology Inc.
Errors      : 0

make[2]: Leaving directory 'C:/Users/abhishek/MPLABXProjects/demo.X'
make[1]: Leaving directory 'C:/Users/abhishek/MPLABXProjects/demo.X'

BUILD SUCCESSFUL (total time: 6s)
Loading code from C:/Users/abhishek/MPLABXProjects/demo.X/dist/default/production/demo.X.production.hex...
Loading completed
```

Activate Windows  
Go to Settings to activate Windows.

# Flashing First project on Aurum Board

Finally open the HID boot loader and connect aurum in boot loader mode(BOOT-RESET-RESET-BOOT)Select the hex file .Please note that the hex file is created by project name.Click on program/verify.And finally reset aurum.

