Windows Programming and Scripting Language.

Outline

1. Introduction to the Course:
    1.1. Hypertext Mark up Language(HTML).
    1.2. Cascading Style Sheets(CSS).
    1.3. Java Script(JS).
    1.4. Windows Programming.
2. Recommended Books.

1. Introduction to the Course:

Motivation:

- Creating Web-application is a complicated task involving lots of moving parts and interacting components.
- Least Requirements: Editors, browsers.
- Editors:
  - Integrated Development Environment(IDE): Eclipse, Visual Studio.
  - GUI editors: Sublime, Notepad++, VSCode, Vim.

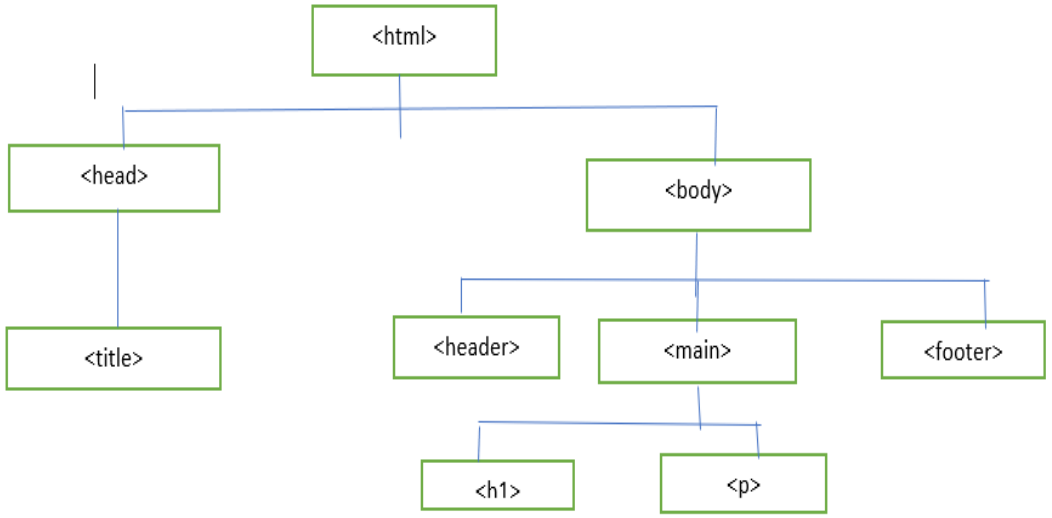
1. Introduction to the Course:

1.1. HTML:

- Def^{n}: HTML is a mark-up language that lets us use tags to define structure referred to as DOM {Document Object Model} to create visual rendering of the page.
- Def^{n}: DOM is a hierarchical structure and can be easily represented using tree-diagram, which intern captures the notion of parent-child relationship between tags/elements.
- Def^{n}: Tag represents structural elements/structural building block. is a important tag which allows us to define more fine-grained structure over basic building blocks.

1. Introduction to the Course:

1.1. HTML:



First Application

Hello World!

Introduction to Course.

www.first.org

1. Introduction to the Course:

1.2. Cascading Style Sheet(CSS):

- Def^{n}: CSS file is a collection of ruleset and ruleset is simply a collection of style rules that are applied to some subset of the structural elements/tags.
- It describes how specific elements of the html should be displayed by the browser.

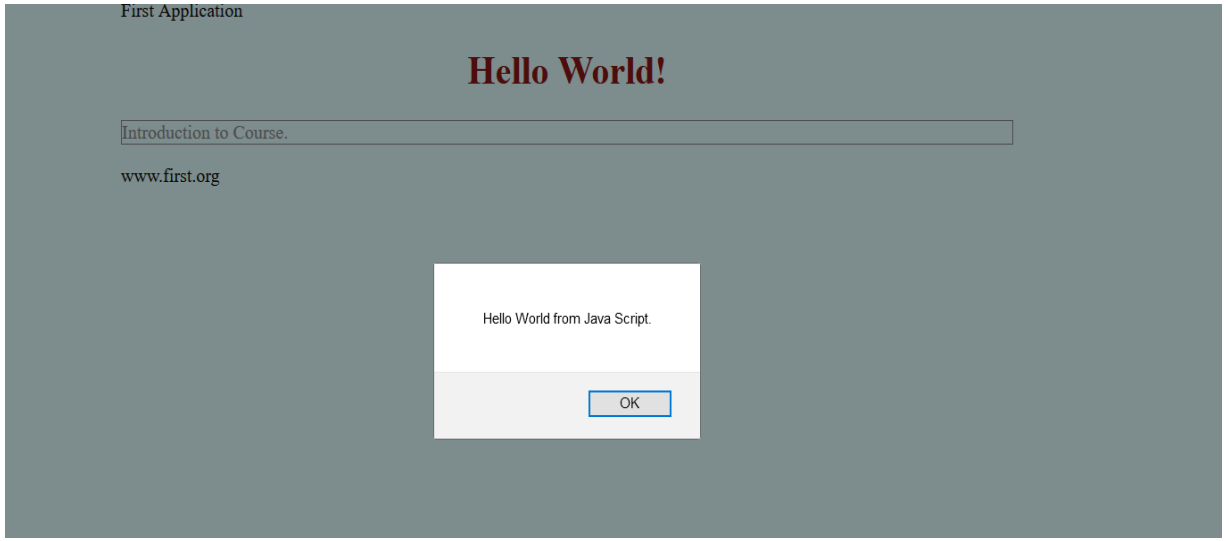
1.3. Java Script(JS):

- Def^{n}: Java Script is a high-level, dynamic, untyped language. It is very much suited for object oriented programming and functional type programming.
- JS is a language of the web, by which we can attach behaviour/computation/action to web page, respecting the structure formed using the html building blocks.
- Created by Netscape, now Mozilla.
- Called ECMAScript/Core Language Part: Standardization by European Computer Manufacture Association.

1. Introduction to the Course:

1.3. Java Script(JS):

- Host-environment for JS is browser, and API for browser is called Client-Side Java Script.
- JS allows us to define behaviour for the document with event handling.
- An Event handler is a JS function that we register with browser and browser invokes when some specified type of event occurs.



1. Introduction to the Course:

1.4. Windows Programming {Background}:

- C++ as a language can be seen from two perspective:
  --- Native IS0/ANSI C++ Windows application development.
  --- Development of C++/CLI windows applications using windows Forms.
- Microsoft .Net Framework:
  --- The .Net framework is a central-concept in visual C++ as well as other .Net development products from Microsoft. The .Net framework consists of two elements.
    --- The Common Language Runtime(CLR), in which the application execute, and
    --- a set of libraries called the .Net framework class libraries.
  --- .Net framework class libraries provides the functional support to the code, when it is executing the CLR, regardless of the programming language used.
  --- So, .Net programs written in C++ or any other language that support the .Net framework all use the same .Net libraries.

1. Introduction to the Course:

1.4. Windows Programming {Background}:

- Basically there are two fundamental different kinds of C++ applications, we can develop with visual C++:
  --- Application that natively execute on our computer. These applications are referred to as native C++ programs. We write native C++ program in the version of C++ that is defined by ISO/ANSI language standard.
  --- We can also write applications to run under the control of the CLR in an extended version of C++, called C++/CLI. These Programs are referred to as CLR program or C++/CLI Program.
- The .Net framework is not strictly part of visual C++, but rather a component of the windows operating system that makes it easier to build Software(s/w) application.
- Advantage of .Net Framework:
  --- Code Reliability(Fault Tolerance), Security, and Ability to integrate C++ code with other languages that targets the .Net framework.

1. Introduction to the Course:

1.4. Windows Programming {Background}:

- Definition: {Common Language Runtime, CLR}

  The CLR is a standardized-environment for execution of program written in a wide-range of high-level languages including visual C++.

- Important: The specification of the CLR is standardized by European Computer Manufacturer (ECMA) standard for the Common Language Infrastructure (CLI), and CLR is an implementation of that standard for Microsoft Windows.

  --- That is why C++ for CLR is referred to as C++/CLI, as it is the implementation of specification of CLI by CLR.

- Definition: {Common Language Infrastructure, CLI}

  The CLI is a specification for a Virtual Machine environment that enables applications written in diverse high-level programming language to be executed in different system environment, without changing or recompiling the original source code.

1. Introduction to the Course:

1.4. Windows Programming {Background}:

- The CLI specifies a standard intermediate language for the virtual machine to which the high-level language code is compiled. With .Net framework, this intermediate language is called Microsoft Intermediate Language(MSIL). The code in the intermediate language is ultimately mapped to machine code by a Just-In-Time(JIT) compiler, when we execute the program.

  --- Code in the CLI intermediate language can be executed within any other environment that has a CLI implementation.

- The CLI also defines a common set of data types called the Common Type System(CTS), that should be used for program written in any programming language targeting a CLI implementation.

  --- The CTS specifies how data types are used within the CLR and includes a set of predefined types. We can Create our own datatypes, but that must be consistent with CTS.

1. Introduction to the Course:

1.4. Windows Programming {Designing C++ Application}:

- Console Application: Command line character-based program. Two ways of writing console application:

  --- Win32 Console applications, compile to native code. (way we have seen so far).

  --- CLR Console application.

- Windows Application: GUI based program. Three ways of constructing windows application:

  --- Using Windows Operating System API.

  --- This will enable us to understand how a windows application works behind the scene. This is the fundamental interface that the windows operating system provides for communications between itself and the applications that are executing under its control.

  --- Using Microsoft Foundation Class (MFC): Set of classes that encapsulates the Windows operating system API for GUI creation and program development.

1. Introduction to the Course:

1.4. Windows Programming {Designing C++ Application}:

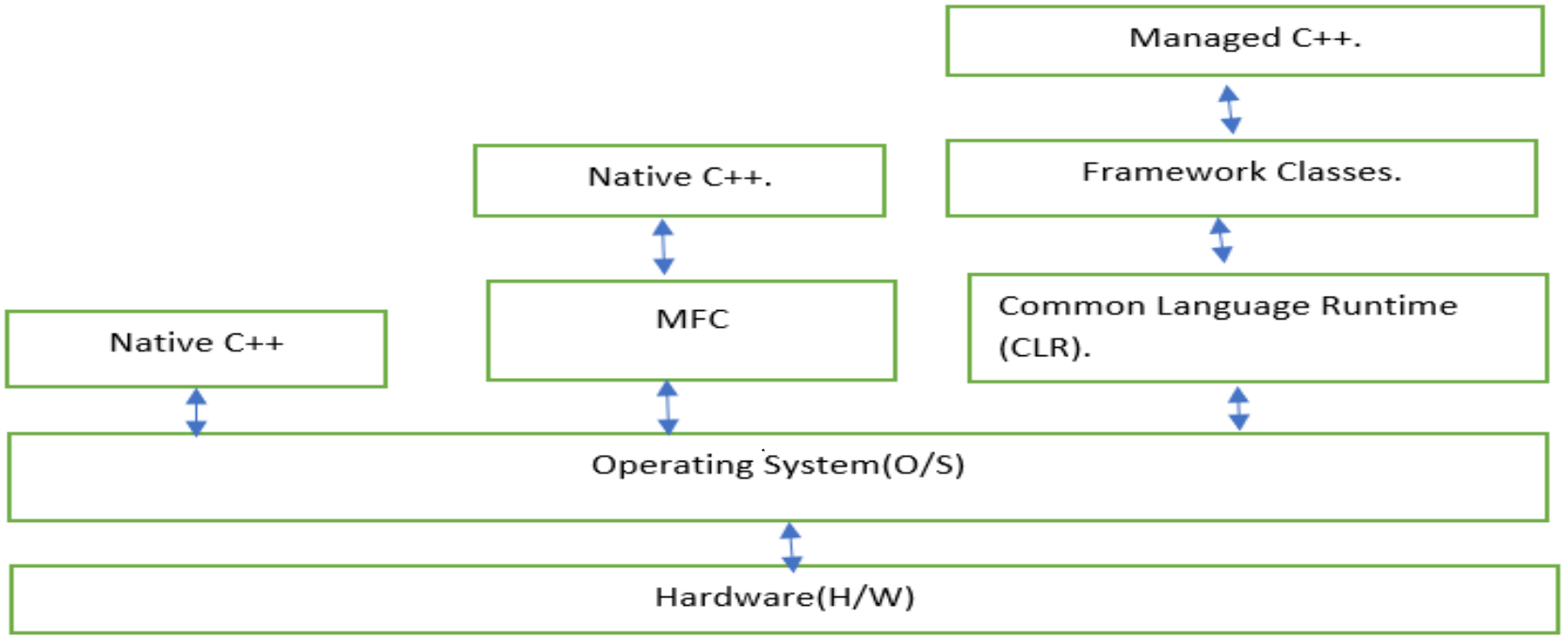
--- Using Windows Forms, that will execute with the CLR.

- C++ code that execute with CLR is described as managed C++ and C++ code that directly converted in to machine code by the compiler without Intermediate code, are called Native C++ Code.
- Progression from most program intensive to least program intensive.

- In Console applications, we get input from keyboard and write output directly to the command line directly, where as a windows program can access the input and output facility by way of functions given by windows operating system. No direct access to the hardware (h/w) resources are permitted.

1. Introduction to the Course:

1.4. Windows Programming {Designing C++ Application}:



1. Introduction to the Course:

1.4. Windows Programming {Designing C++ Application}:

- Event-Driven Program:

  ---An event in a windows application are occurrence of something like user action of mouse click or key press.

  --- An event that originates with user interface will result in a code to be executed, called event handler.

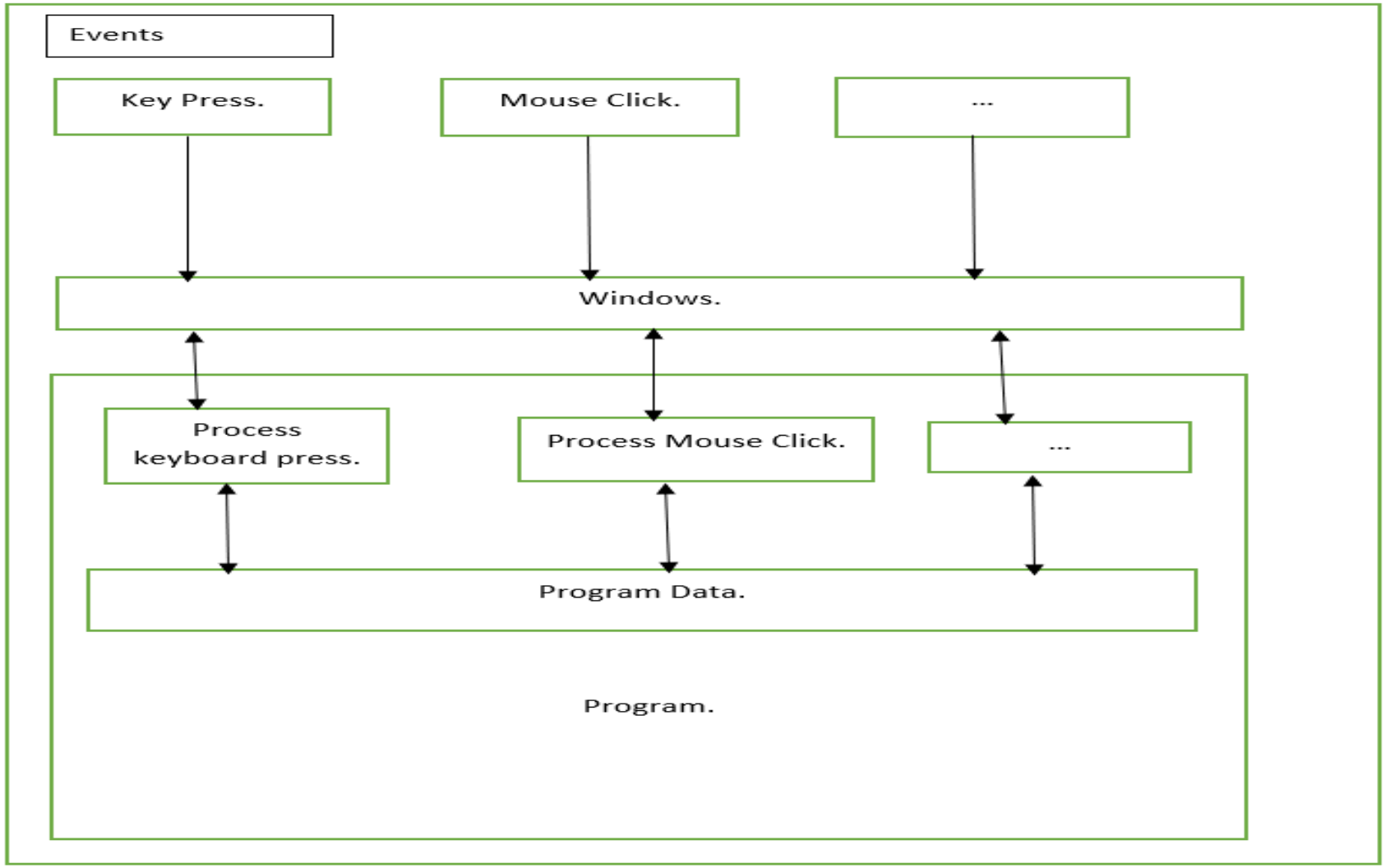
  --- How program proceeds therefore depends upon user action. This way of looking at program design is called Event-Driven-Programming.

  --- How it different from traditional style of programming?

  --- Windows programs consists of piece of code that respond to events caused by the action of user or by windows itself.

1. Introduction to the Course:

1.4. Windows Programming {Designing C++ Application}:



1. Introduction to the Course:

1.4. Windows Programming {Designing C++ Application}:

- Windows Messages:

  ---Windows messages are record of the data relating to an event, stored in a message-queue for processing by program.

  --- Program must have functions for handling such message, typically called WndProc() or WindowProc().

  --- Within this function we define our code for processing of data.

1. Introduction to the Course:

1.4. Windows Programming {Visual Studio IDE}:

- The fundamental part of VC++, provided as part of the IDE: Editor, Compiler, Linker and Libraries.

  --- Any idea of .obj file ?

- Project and Solution:

  --- A Project is a container for all the things that make-up program of some kind. It can be a console program or windows program and usually consists of one or more source file and other files consisting of auxiliary data.

  --- All the files for a project are stored in project folder and detailed information about the project is stored in an xml file with extension .vcproj.

  --- Output of the compilation and linking are also stored in project folder.

  --- The idea of a solution is expressed by its name, in that it is a mechanism for bringing together all the program and other resources that represents a solution to a particular data processing problem.

  --- A Solution is a folder in which all the information relating to one or more projects are stored.

1. Introduction to the Course:

1.4. Windows Programming {Visual Studio IDE}:

- Output of the build process:
  --- .exe: Executable file for the project after successful compilation and linking process.
  --- .obj: Output of the compilation process, containing machine code. Used by linker for producing .exe file.
  --- .ilk: Used by linker when we rebuild project. It enables the linker to incrementally link the object file produced from the modified source code into existing .exe file. This avoids the need to re-link everything, each time we change our program.
  --- .pch: Pre-compiled header file. Files those are not subject to any modification are stored in this file. It substantially reduces the re-build time of the program.
  --- .pdb: Debug information of the program.

1. Introduction to the Course:

1.4. Windows Programming {Visual Studio IDE}:

- Debug and Release Version:
  --- Configuration information, i.e. properties of application is created by vc++ for both debug and release version.
  --- When we develop our code, we will be working with debug mode.
  --- Once the code is tested, we will re-build the solution with release mode. This will produce optimized code.

2. Recommended Books:

- The Essential guide to CSS and HTML web-design, Craig Grannael.
- Java Script: The Definitive Guide, David Flangan.
- Windows Programming, Ivor Horton.