Universiti
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PAHANG
Engineering • Technology • Creativity

Computer Systems & Application

Introduction to Application Development

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Chapter Description

- Aims
  - Understand the basic knowledge of computer application development, and know how to develop it based on application development process.

- Expected Outcomes
  - Leaner's are able to know how to implement software/application planning into their works
  - Leaner's are able to follow best practice in computer application development
  - Leaner's are able to learn the fundamentals of Visual Basic operation

- Main References
  - http://www.comsc.ucok.edu/~franklin/spring05/vp_ppt/Chap001.ppt?cv=1
  - https://www.coursehero.com/file/1888585/cis284chap01/

- Other related Information
  - Introduction to Visual Basic – OCW UTM
  - Information Technology I – MIT OpenCourseWare

- References
  - Sole, Alessandro Del. 2016. Visual Basic 2015 unleashed. Indianapolis, IN: Sams
  - Newsome, Bryan. 2016. Beginning Visual Basic 2015. John Wiley & Sons.

Contents

- Definition of Application.

- Application Development Process.

- Different Types of Application Development Tools.

- Introduction to Visual Basic.

- The Visual Studio Environment

Definition of Application

- Always been called as office software similar to MS Access (database program), MS Word (text processing) and MS Excel (spreadsheet or accounting)

- This software stay on above of systems software due to incapability's to execute without OS and utility system

MS – Microsoft, OS – operating systems

Application Development Process

1. Running a program on computer
   - Forecast Output
   - Evaluate Input
   - Choose the best process to blend input into considered output
2. Program Planning
3. Program Development Cycle

Ali (not a real name) is a university student's. He is now in the second semester but the problem is, he did not even like or love the Computer Science courses. He hates math, he hates programming etc. There are two options:

1. To keep hating the course until graduated (if he did). Live in so much hate and bored.
2. To proceed the course with strong determination and enjoy the student life.

What is your advice to Ali? Why.

Problem Solving at a Glance

Input

Processing

Output

Program Planning

- A list of groceries to buy is one of the best example of a plan
- Item in list is based on what you need, and budget
- The list itself is an input
- How you want to buy is the process
- Groceries in trolley is your output

Program Planning Tips

- Always have a plan before trying to write a program
- The more complicated the problem, the more complex the plan must be
- Planning and testing before coding saves time coding

Program Development Cycle

- Multiple instruction for computer – software
- Computer will worked as the programmer told so
- If the programmer want to make computer works, he should key in the step (program)
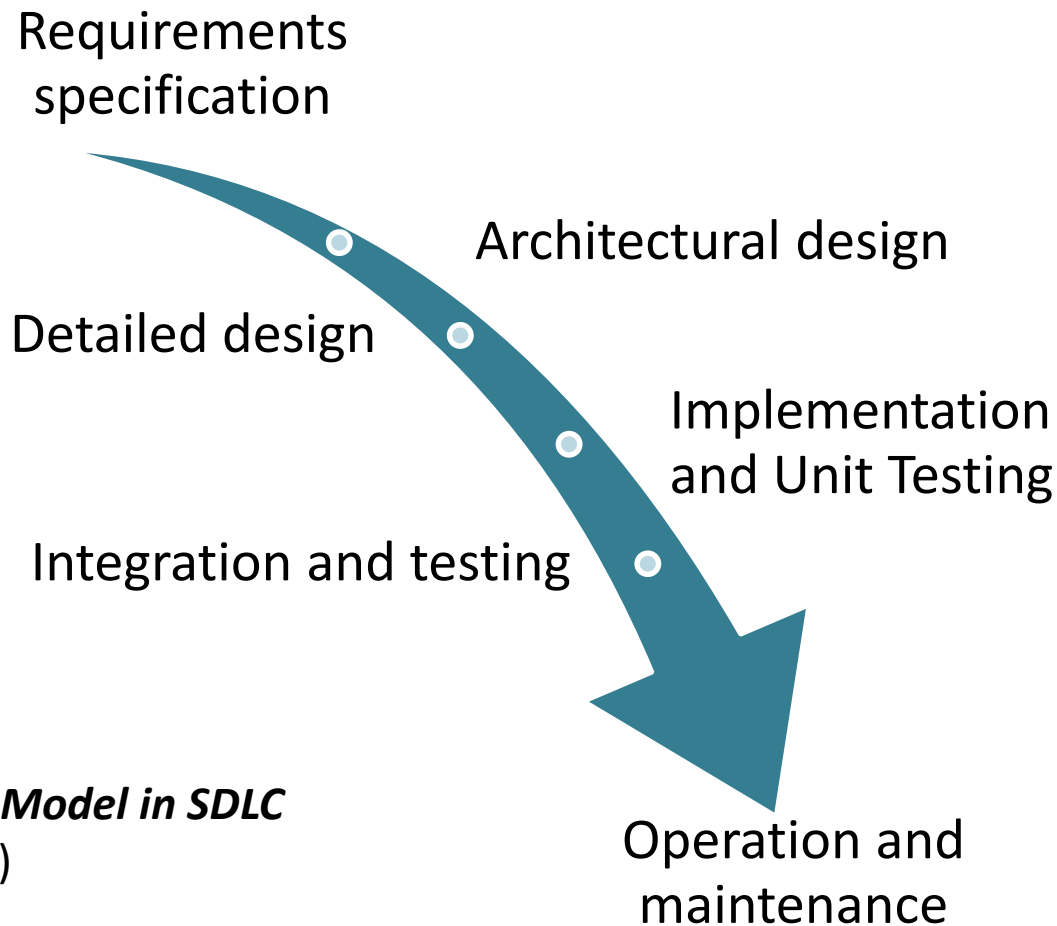- Therefore, programmer need to know how to solved the problem first

Program Development Cycle

1. **Analyze**: Identified the causes.
2. **Design**: Draft the solution.
3. **Choose the interface**: Decide which object could represent your solution (text box, list)
4. **Code**: Translate sketch/chart/pseudocode into programming.
5. **Test and debug**: Detect any error, and analyze it
6. **Complete the documentation**: Prepare the report for the systems

Software Development Life Cycle

Requirements
specification

Architectural design

Detailed design

Implementation
and Unit Testing

Integration and testing

Waterfall Model in SDLC
(Dix. 2004)

Operation and
maintenance

Different Types of Application Development Tools

- Boolean C++
- Visual basic
- ASP - <u>Active Server Pages</u>, a web-scripting interface by Microsoft
- PHP – an open source programming language
- Dream Viewer
- Lotus Note
- Oracle
- Microsoft Access

Introduction to Visual Basic

- Windows Graphical User Interface
- Window = Form
- Toolbox of elements called Controls
    - Text Box
    - Label
    - Check Box
    - Button

Programming Languages

- Procedural
  - Program specifies exact sequence
- Event Driven (VB 6.0 and previous)
- Object Oriented Programming (VB)
  - User controls sequence
    - Click event
    - Double Click event
    - Change event

Visual Studio .NET

Included in Visual Studio .NET

- Visual Basic (can also be purchased separately)
- Visual C++
- C#
- J#
- .NET Framework

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Visual Studio .NET Editions

- Standard
- Professional
- Enterprise Developer
- Enterprise Architect

Visual Basic.NET

- An object oriented language
- Object oriented programming terminology

Object Oriented Programming Terminology

1. Object ==> Noun
   - Form and Controls
2. Property ==> Adjective
   - Color of a Form
3. Method ==> Verb
   - Move a Form
4. Event ==> Occurs when the user takes action
   - User clicks a button, User moves a form
5. Class ==> Template to create new object
   - Each control added is an Instance of a Class

Dot Notation

- Used to reference object's properties and events in code
  - Object dot Property
    - `Form.Text, TextBox.Text`
  - Object dot Event
    - `Form.Hide( ),  TextBox.Focus( )`
- To reference an object's events use an underscore instead of a dot
    - `Button_Click, ListBox_TextChanged`

Object Oriented Analogy

- Class = automobile
- Properties = make, model, color, year
- Object = each individual car
  - Object is also an Instance of the automobile class
- Methods = start, stop, speedup, slowdown
- Events = car arrives, car crashes

Writing Visual Basic Projects

- ## Planning
  - Design Interface
  - Plan Properties
  - Plan Code
- ## Programming
  - Create Forms and Controls
  - Set Properties
  - Write Code

Visual Basic Application Files

- One Solution File .sln
- Solution User Options File .suo
- Form Files .vb
- Resource File for the Form .resx
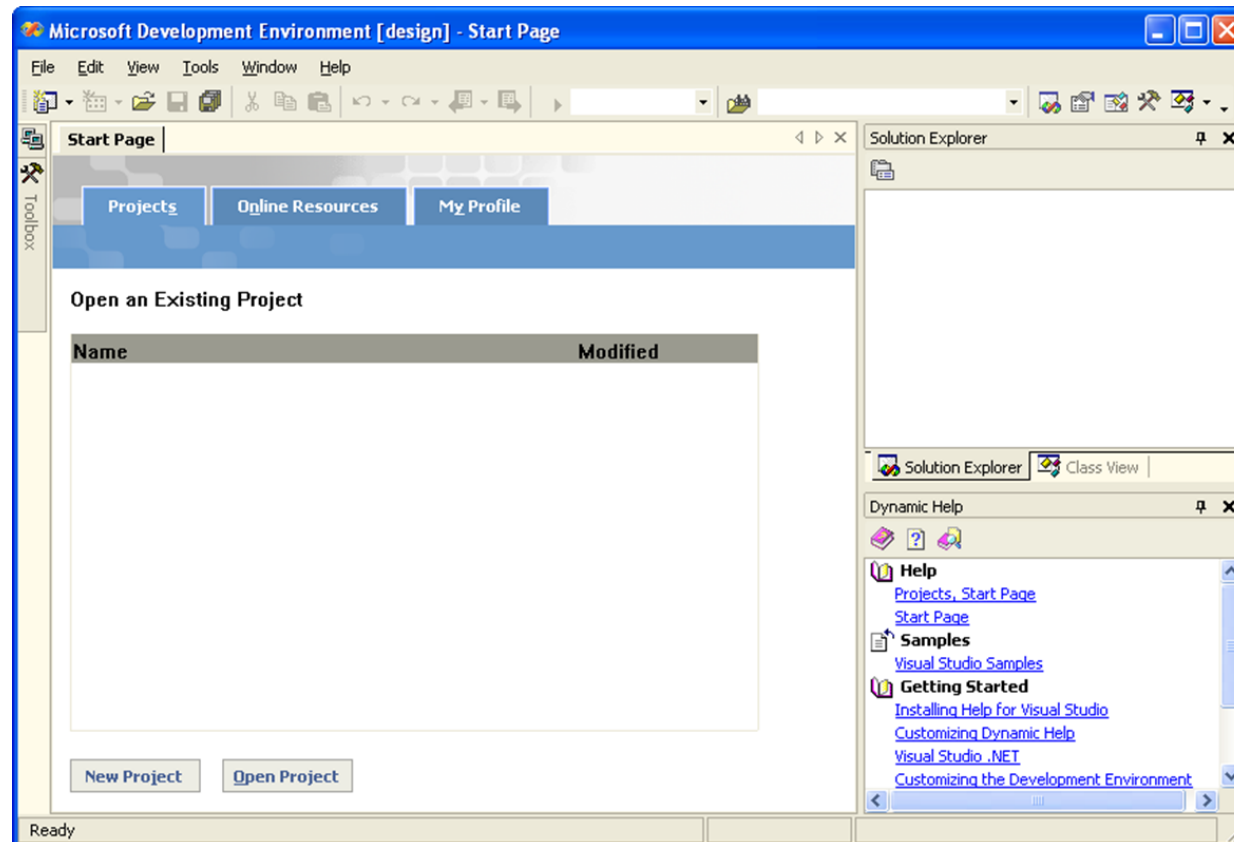- Project Files .vbproj
- Project User Options File .vbproj.user
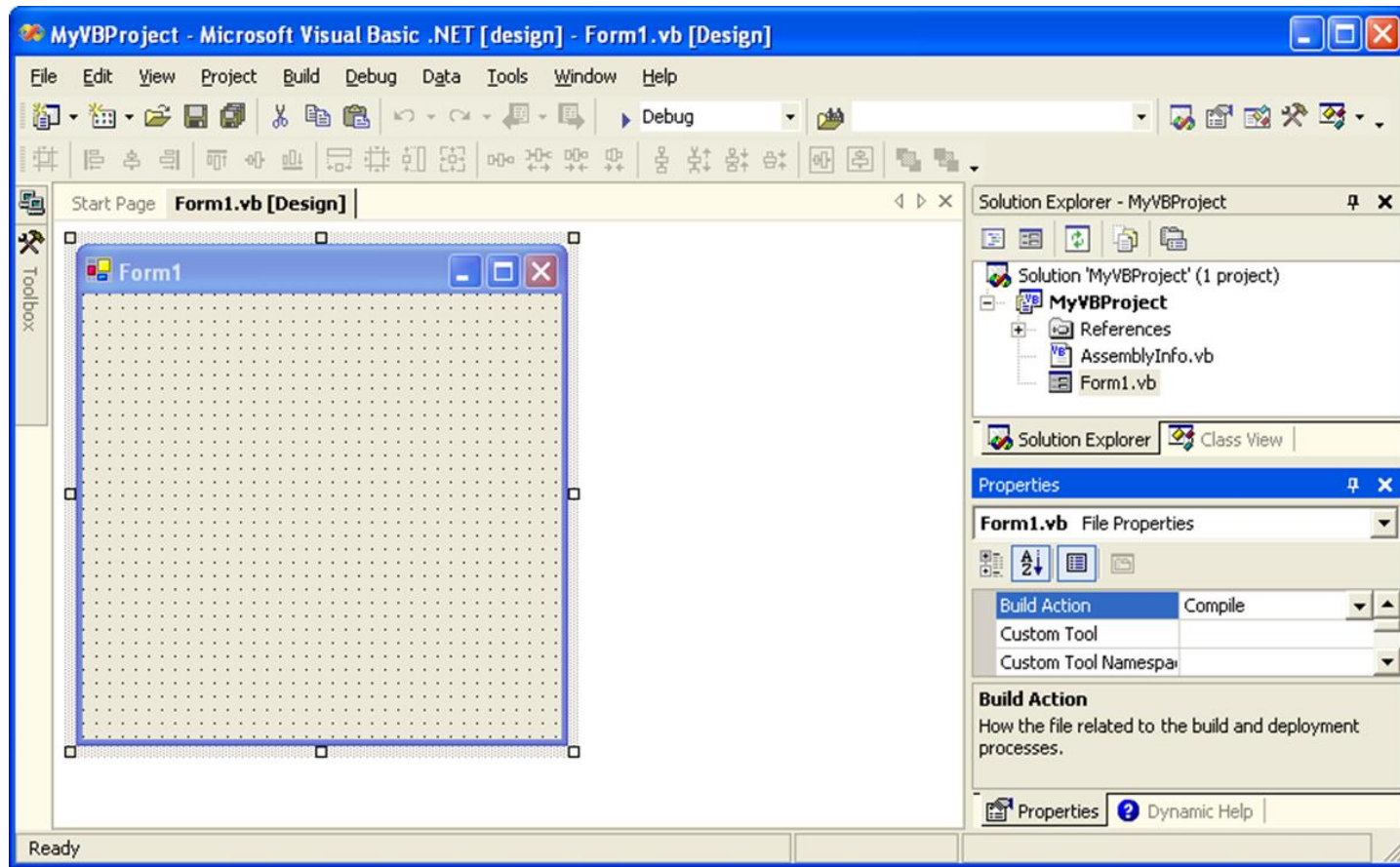
The Visual Studio Environment

- Integrated Development Environment (IDE)
- Form Designer
- Editor for entering code
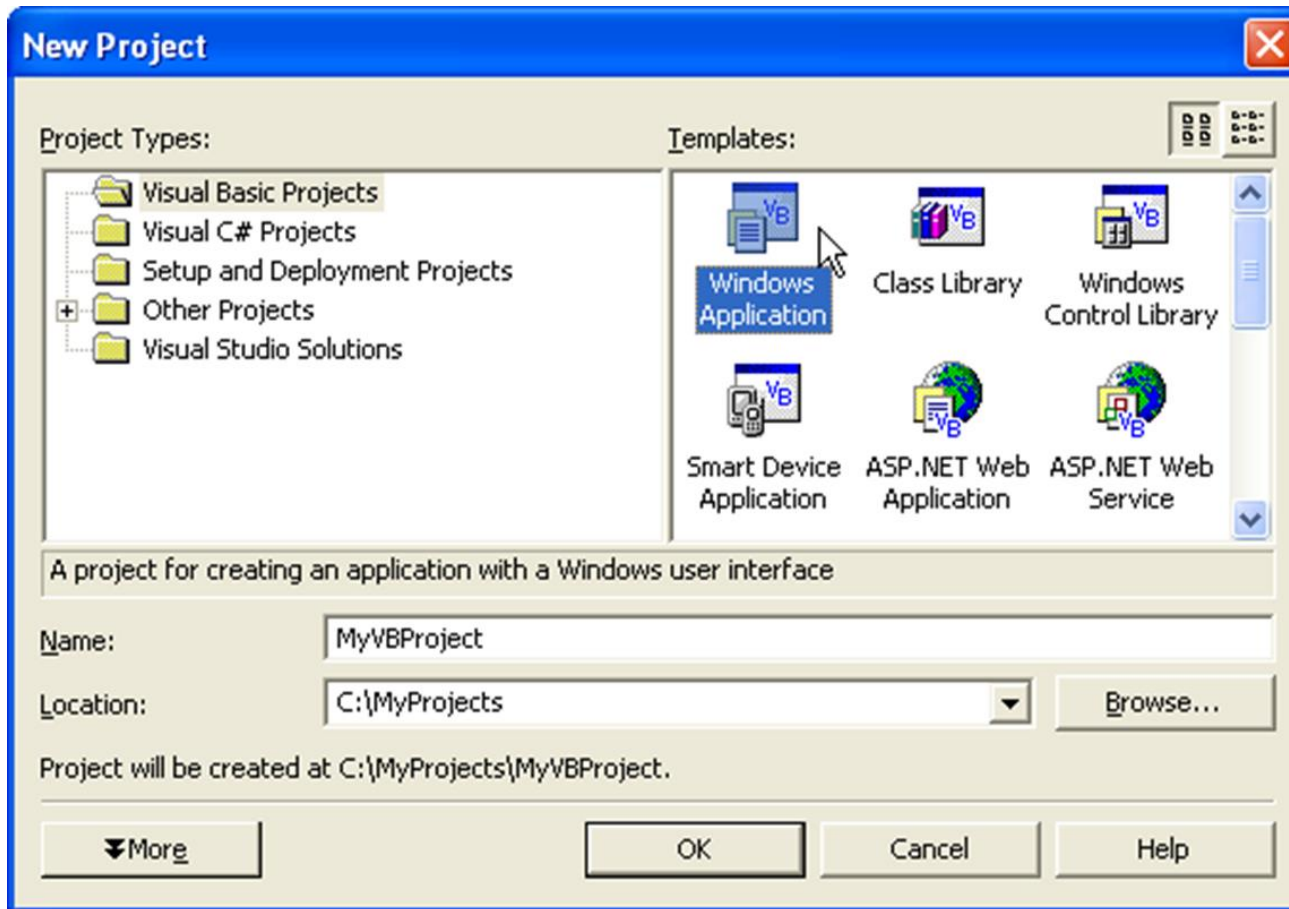- Compiler
- Debugger
- Object Browser

Visual Studio IDE Start Page

IDE Main Window

New Project Dialog

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IDE Main Window

- Toolbars

- Document Window

- Form Designer

- Solution Explorer Window

- Properties Window

- Toolbox

Visual Basic Toolbox

- Holds the controls you place on a form

Visual Studio Help

- Extensive Help feature

- Includes Microsoft Developer Network library (MSDN)
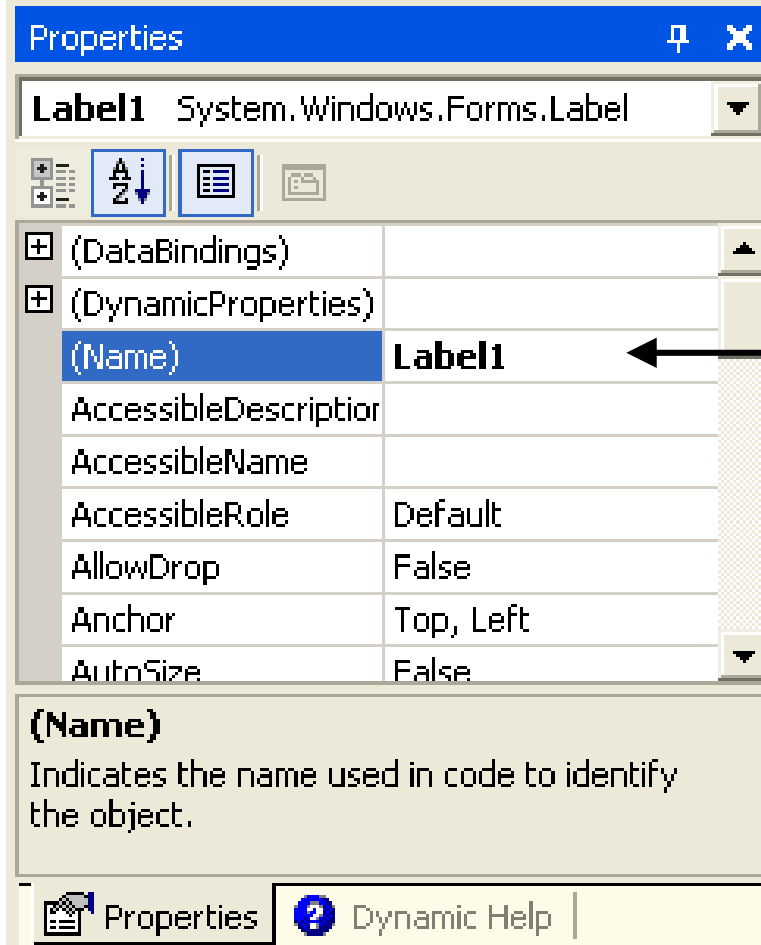
- Entire reference manual

- Coding examples

Modes

- Design Time
- Run Time
- Break Time

Properties Window - `Label1`

Rename `Label1` to `messageLabel`

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Set the Properties

- **Label**
  - Name   `messageLabel`
  - Text   leave blank
- **Button 1**
  - Name   `pushButton`
  - Text   Push Me
- **Button 2**
  - Name   `exitButton`
  - Text   Exit
- **Form**
 - Name   `helloForm`
  - Text   Hello World by *your name*

Set the Project's Startup Object

- The default startup object is `Form1`
- The name of the form should always be changed to adhere to naming rules
- Click on Project name in Solution Explorer window, choose Project menu, Properties and change the startup object to match the new form name

Project Property Page Dialog

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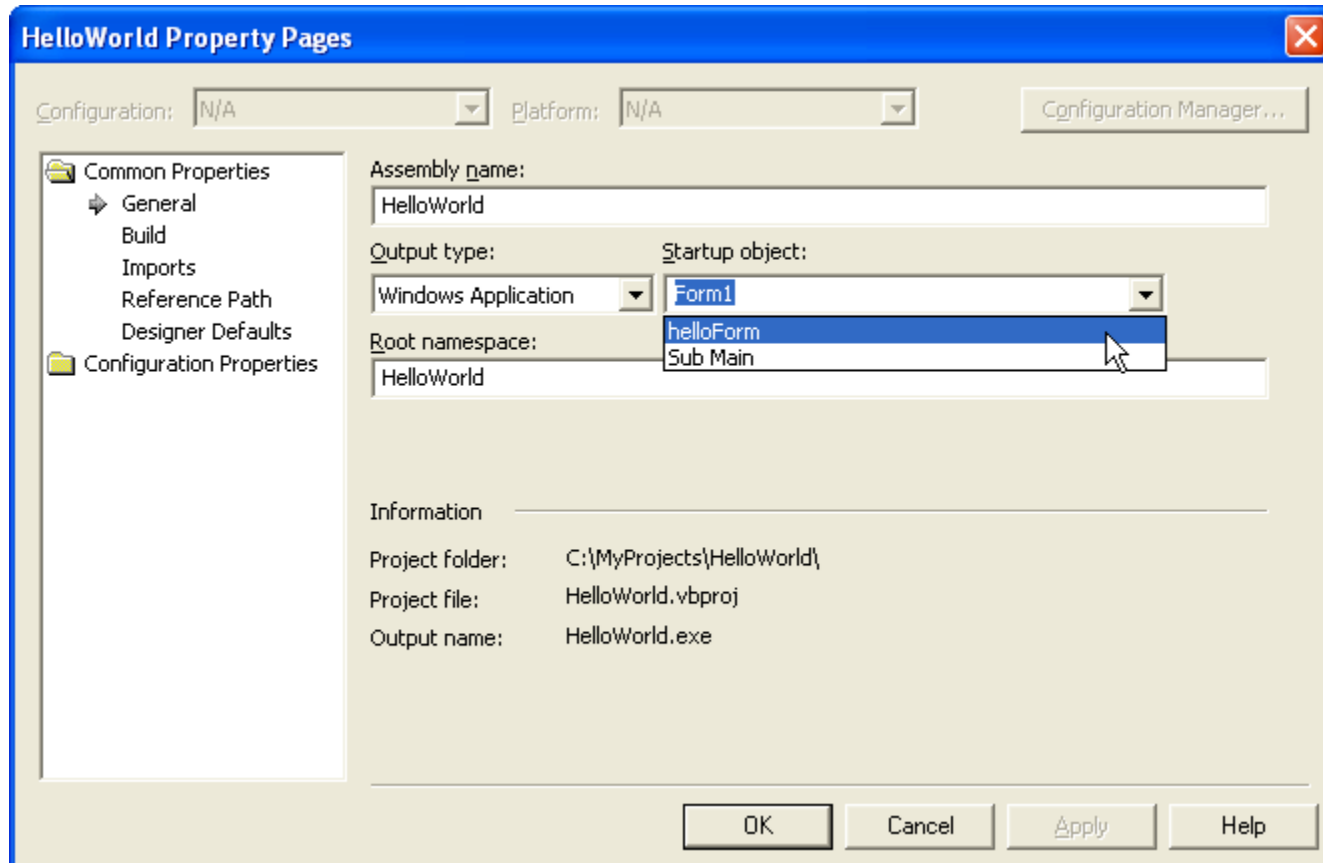
Write Code

- While the project is running the user can perform actions

- Each action by the user causes an Event to occur

- Write code for the events you care about, the events you want to respond to with code

- Code is written as event procedures

- VB will ignore events for which you do not write code

Remark Statement

- Also known as Comment, used for documentation

- Non-executable

- Automatically colored Green in Editor

- Begins with an apostrophe (')
  - On a separate line from executable code
  - At the right end of a line of executable code

```
' Display the Hello World message.
```

Editor Window

- Declarations Section
- Class list
- Method list

Assignment Statement

- Assigns a value to a property or variable
- Operates from right to left
- Enclose text strings in quotation marks (" ")

```
messageLabel.Text=" Hello World "
```

Ending a Program

- Execute the Close Method of the Form
- Methods always have parentheses (this will help you distinguish them from Properties which never have parentheses)
- Current Form may be referenced as **Me**

```
Me.Close( )
```

Test and Debug

- Save Project - File Menu, Save All
- Run Project
  - Debug Menu, Start
  - Start   (F5)
  - Start Without Debugging   (CTRL F5)
- Correct any Errors and Rerun
  - Compile errors
  - Run-Time Errors
  - Logic errors
  - Syntax errors

"Help is always available from the Help Menu or by pressing F1."

Recommended Naming Conventions for VB Objects

Object Class	Example
Form	`dataEntryForm`
Button	`exitButton`
TextBox	`paymentAmountTextBox`
Label	`totalLabel`
Radio Button	`boldRadioButton`
CheckBox	`printSummaryCheckBox`
Horizontal ScrollBar	`rateHorizontalScrollBar`
Vertical ScrollBar	`temperatureVerticalScrollBar`
PictureBox	`landscapePictureBox`
ComboBox	`bookListComboBox`
ListBox	`ingredientsListBox`

"Help is always available from the Help Menu or by pressing F1."

Naming Rules and Conventions

- Have a set of standards and always follow them
- No spaces, punctuation marks or reserved words
- Use camel casing
  - Examples
    - `messageLabel`
    - `exitButton`
    - `dataEntryForm`
    - `paymentAmountTextBox`

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        - `paymentAmountTextBox`

Conclusion

You have learned

- how to implement software/application planning when developing a systems

- best practice in computer application development

- the fundamentals of Visual Basic operation

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