I101 / B100

Basic Hardware Concepts (ROM, RAM, CPU, ALU, CU, Input/Output/Storage/Network Devices)

Programming Paradigms Procedural

Object Oriented Event Driven

### What is VB.Net?

Windows Applications (Object Oriented, Event Driven) Console Applications (Procedural or Object Oriented)

## The Object Model

Class Objects (Built-in and user-defined) Properties Methods

Steps in Writing a Typical VB project.

 Planning:
 (GUI, properties, pseudocode or flowchart)

 Coding/Debugging:
 (Convert the GUI to Forms and Controls, Set the properties, Convert the Pseudocode to VB code, Test and Debug.)

The Software Development Life Cycle (SDLC)

Planning Analysis Design Implementation Testing Maintenance

Errors (syntax vs. run-time vs. logical errors)

Variables (represents memory, has a type and size)

DIM strName as string integer, double, decimal, boolean, char, byte, string, etc. Global vs. Local Why initialize variables?

## Constants

CONST TAX\_RATE As Decimal = 0.08

### Variable and Constant Scope

1) Module level (variable declared within the scope of class or module)

2) Local level (variable declared within a procedure)

## **Compiler Directives**

Option Explicit ON (Variables cannot be used without being declared first.)

**Option Strict ON** 

(Makes VB a strongly typed language, No automatic type conversion. Must use the type conversion functions)

Type Conversion functions Cint(x), Cstr(x), Cdec(x), Clng(x), Cdbl()

**GUI** Components:

- Forms, Label, Textbox, Checkbox, Button, RadioButton, ListBox, Combobox, PictureBox, GroupBox

#### Concatenation and Continuation characters: (& and \_)

Arithmetic operators (+ , - , / , \, \* , MOD, ^)

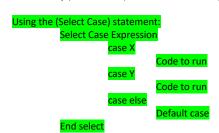
Relational operators (= , <= , >= , <>)

Input and output

Console Mode: Windows Applications: Console.Readline(), Console.Writeline() MessageBox.Show(), InputBox()

## Branching /Conditional:

Using the IF Statement: (If, If-then-else, nested if statements)



Loops

(For.. next, Do while ...Loop, do Until ... Loop) Necessary conditions for a loop (how to get in, and how to get out)

#### Truth Table

OR	AND	NOT
T OR T = T	T AND T = T	NOT T = F
T OR F = T	T AND F = F	NOT F = T
F OR T = T	F AND T = F	
F OR F = F	F AND F = F	

Problem Solving Methodology

Top down design Break the problem into smaller, more manageable tasks. Divide and conquer Encourages modular design Defers the details till later Functions and Procedures

Procedures and Functions:

Passing arguments (Pass by value vs. Pass by reference, when?, why?) Formal vs. actual parameters Returning values from functions Via the **return** statement vs. the function's parameter list. Event Procedures (hint: look for "Handles" keyword at the end of procedure declaration)

Arrays

Homogeneous aggregate of data elements Creating many variables and accessing them via one variable name Uses of arrays Operations on the Array: Array as an Abstract Data Type (ADT) Initialize, load, print, search, sort, etc...

#### Structures

Structures provide a heterogeneous aggregate of data elements

## Classes and Objects

Encapsulation, Inheritance, Polymorphism Creating new classes Private vs. Public class variables Private vs. Public methods Instantiating objects Class Constructor Overloading Overriding

File Concepts and operations imports system.io The stream concept Reading, Writing

What are the ramifications of designing "BAD" systems or writing "BAD" code, or designing "BAD" interfaces? on other humans on the society

## On Your Own Reading

## Robust I/O and Input validation: IsNumeric()

# Formatting Functions:

\$12 = FormatCurrency(12) 5% = FormatPercent(0.05)

## String Manipulation:

String Length, TrimStart(), TrimEnd(), Trim(), Remove(), StartsWith(), EndWith(), ToUpper(), ToLower(), SubString Manipulation, Replace(), Mid(), PadLeft(), PadRight(), Insert(), IndexOf(), the Like Operator.

# Advanced Concepts (Optional)

#### Database Concepts

Basic DB concepts: (Database, file, record, field, meta data, DBMS, SQL, QBE) VB concepts and objects for accessing databases. (ADO.Net, DataAdapter, Connection, DataSet objects, SQL statements.

## Binding VB controls to Database Fields

Textbox, Comboboxes, Label, DataGrid

## Dynamic (programmatic) allocation of controls

Such as (Textboxes, CheckBoxes, RadioButtons, etc.)

# **Event Handling**

Sharing event handlers (Handling multiple events via the same event procedure) Using Ctype() function to convert generic senders to