I101/B100
Problem Solving with Computers

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What do we need to learn in order to write computer programs?

- Fundamental programming constructs:
  - Variables,
  - Arithmetic operators,
  - Input and output
  - Conditionals,
  - Loops,
  - Procedures and functions,
  - Arrays,
  - Structures, classes and objects,
  - Files
Functions

- Functions are similar to sub-procedures, but in addition to performing a specific task, functions also return a value.
Functions

- VB .Net has many **built in functions**:

  \[
  X = \text{CDbl}( ) \\
  X = \text{CInt}( ) \\
  X = \text{CStr}( ) \\
  X = \text{InputBox}( ) \\
  X = \text{Pmt}( ) \\
  X = \text{IsNumeric}( )
  \]
Functions

- Visual Basic allows the programmers to create their own functions
Functions

Syntax:

**Private Function**  FunctionName([OptionalParameterList])  As DataType

[Statements]
Return (Expression)

End Function
Functions:

A function can do anything that a procedure can do ...

- No parameter needed
- The time
- Specification of work
- Architectural drawing
- Room number
- No Room Found
- House Location
- Fire is out

It always return a value..
Passing Parameters to a Function

- Parameters can be sent to a function either 'By Value' or 'By Reference'.

- Same as sending parameters to a procedure!!
Calling a Function:

Private Function Cube(ByVal Number As Integer) As Integer

    Return (Number * Number * Number)

End Function

Sub Main()
    Dim result As Integer
    result = Cube(5) 'Pass by value
End Sub
Module Module1

Sub Main()

    Dim result As Integer
    result = Cube(5)
    Console.WriteLine("The result is {0}", result)

End Sub

Private Function Cube(ByVal Number As Integer) As Integer

    Return (Number * Number * Number)

End Function

End Module
Documenting your Functions and Procedures

'-------------------------------------------------------------
'Function name:    Cube()
'Description: Accepts an integer as a parameter, then
'              calculates and returns the cube of that number.
'Input:           Integer value
'Output:          NONE
'Preconditions:   NONE
'Postconditions:  No Side effect.
'-------------------------------------------------------------

Private Function Cube(ByVal Number As Integer) As Integer

    Return (Number * Number * Number)

End Function
Pre and Post Conditions:

Preconditions:
- Indicates what is assumed to be true before the procedure or function is called.

Postconditions:
- Indicates the effect of the procedure or function on the rest of the program. (what should be true after the module is executed)
Review:

Reasons for using Procedures and Functions:

- Modularity (divide and conquer)
- Reusability (to eliminate repetition of code)
- Easier to manage
- Easier to understand