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

\[ \begin{align*} 
X &= \text{CDbl}( ) \\
X &= \text{CInt}( ) \\
X &= \text{CStr}( ) \\
X &= \text{InputBox}( ) \\
X &= \text{Pmt}( ) \\
X &= \text{IsNumeric}( ) 
\end{align*} \]
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 ...

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

- Parameters can be sent to a functions 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
A complete program (Calling a Function)

Option Explicit On
Option Strict On

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