

APM 153 LECTURE EIGHTEEN – Declaring Variables in VBA, Vapor Pressure vs. Elevation Part Two.

Declaring Variables

- (1) Up till now we have not had to tell either Matlab or VBA what kind of data will be stored in any of our variables.
- (2) When we said **a = input** (“**Enter the value of a :**”) Matlab had no problem letting us enter any number or letter of the alphabet.
- (3) Note: together, all the symbols on your keyboard (numbers, letters, punctuation marks, etc.) are known as **alphanumerics**.
- (4) When we wanted to store a vector of numbers or even a matrix of numbers in a variable, Matlab did not require us to first set up the matrix or the vector.
- (5) In other words, we did not need to **declare** what type of data, or how many piece of data we were going to stored in any variable. We did not need to **specify** anything.
- (6) Because we did not need to declare or specify anything about our variables, we say that the Matlab programming language is **lightly specified**.
- (7) In other programming languages, such as FORTRAN, you need to tell the program what type of data and how many pieces of data will be stored in every variable.
- (8) Because you have to **declare** variables in FORTRAN we say it is **highly specified**.
- (9) In FORTRAN there are three data types REAL, INTEGER, and CHARACTER
- (10) In addition, when you declare a variable, you also dimension the variable if it is supposed to hold more than one piece of data at a time. For example,

```
REAL,      DIMENSION(20, 30) :: BOX1  
INTEGER,   DIMENSION (10)   :: BOX2
```

BOX1 is a 20 X 30 matrix of real numbers and BOX2 is a vector of 10 integers.

Declaring Variables in VBA

(9) If your program is relatively simple, you often do not need to declare your variables in VBA. For Assignment Eight, however we will need to declare our output.

(10) In VBA, input and output arguments and other variables may be declared as either Character, Double, Integer, or Variant

Double - means the data consists of real numbers stored using “double precision”
Integer - stores integers
Character - stores any number or letter as an alphanumeric character
Variant - wildcard, means the data type may change

(11) When you write a function in VBA, the **name of the function** itself is the output argument.

(12) So, if we want the function to be able to return either a number or a message, we must declare the function “As Variant” as in the line of code below.

```
Function Boiling_Point (altitude) As Variant
```

(13) For Assignment Eight on Friday, we will begin writing a function in VBA that takes in an altitude in meters and then returns either the boiling point of water or a message.

(14) The equation we will be using is only valid in the range of 611.213 Pa to 22.064 MPa. If the pressure is outside this range, the function will return the message, “Pressure value outside of valid range”.

(15) You can try this on your own by first creating a column of numbers in Excel from 5 to 100 by 5’s and then typing the function below into a module and running it.

```
Function try_it (number_in) As Variant
```

```
If number_in < 55 Then
```

```
    try_it = Log(number_in)
```

```
ElseIf number_in > 56 Then
```

```
    try_it = “Value out of range”
```

```
Else
```

```
    try_it = “Hi there!, I’m 55!”
```

```
End If
```

```
End Function
```