week13

November 20, 2018

1 Custom Data Structures

- When using lists or dictionaries, we always stored single values (i.e. strings or integers)
- What if we want to store a complete record:
  - e.g. student record containing id, name, gpa, major ..etc
- We use classes to create custom data structures

2 Adding a New Class to Your Project

3 Defining Classes

Classes are an Object-Oriented feature of VB, you add a new class to the project and define it as:

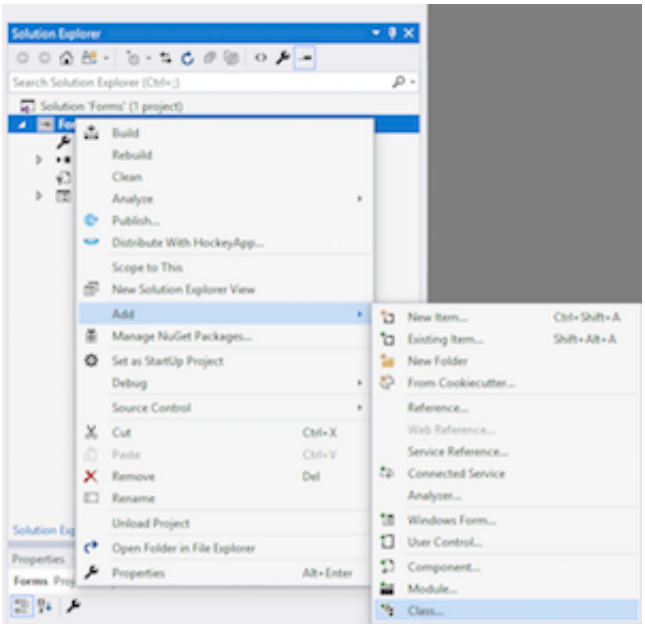
```
Public Class StudentRecord
    Public ID As Integer
    Public Name As String
    Public GPA As Double
    Public Major As String
End Class
```

4 Using Classes

After the class is defined, it can be used in your program exactly like you would use any other data type:

```
'define a variable to hold the record
Dim myRecord As New StudentRecord()

'store the values, the record is known as an object
myRecord.ID = 20121234
myRecord.Name = "Ahmed Ali"
myRecord.Major = "MIS"
myRecord.GPA = 3.25
```



5 Using The Data in the Object

You access each value individually if you want to use it

```
MsgBox("Student Name is " & myRecord.Name " and student ID is " & myRecord.ID )
```

6 Storing Classes in Lists

```
Dim studentRecords as new List(of StudentRecord)

' create a student record object as explained in previous slide
' add the student record object to the list

studentRecords.add(myRecord)
```

7 Using Classes in Lists

```
' You use the lists of records as you have learend before
' But it might be easier to fetch a record into a variable

' fetch the first record from the list
Dim aRecord = studentRecords(0)

' now you can use the record as you have leared

MsgBox("Student Name is " & aRecord.Name " and student ID is " & aRecord.ID )
```

8 Storing Classes in Dictionaries

```
' we will use the student id as they key, so the key is an integer
Dim studentRecords as new Dictionary(of Integer, StudentRecord)

' create a student record object as explained in previous slide
' add the student record object to the dictionary with student id as key

studentRecords.add(myRecord.ID, myRecord)
```

9 Using Classes in Dictionaries

```
' You use the dictionary of records as you have learend before
' But it might be easier to fetch a record into a variable

' fetch the student with id 20121234 record from the dictionary
Dim aRecord = studentRecords(20121234)

' now you can use the record as you have leared

MsgBox("Student Name is " & aRecord.Name " and student ID is " & aRecord.ID )
```

10 Challenge

- Modify the last version of the shopping list to use classes
- Identify which groups of information should be stored within a single instance of a class
- You should be able to get rid of one of the collections you are using

11 Another Challenge

Create an HR application where employee records are stored: - Record must contain: Employee ID, First name, Last Name, Date of employment, yearly sales - Display two lists the first contains the employee ID, the second contains a combination of first name and last name - When an employee is selected, his record is displayed - User can delete/update/create records - Provide statistics for employee yearly sales which include: Total sales, average sales, min (display also name of min salesman), and max (display name of max salesman)