



AS Computer Studies: PROGRAMMING

USER DEFINED TYPES

Starter (5 mins)

- What are the different pieces of information you would need to give when joining a gym? Write them down in column.
- What variables you would need to store all this information (name, data type).

Starter Review

- What are the different fields of information?
- How many variables did you need to have?
- This was just for ONE person to join a gym.
 - What if you have 1000 customers?
 - How many variables would you have?
 - How much memory would this use?
 - How would your code cope with so many variables?
 - What would be a better way of storing the variables? How could they be grouped?

Objectives

- Understand the concept of **user defined types**.
- Know how to **create** a user defined type.
- Work with user defined types within programming.

The Concept of User Defined Types

- So far, each variable can only store **ONE** thing of **ONE** type (e.g. an integer)
- What if you wanted to store all this about a customer:

Customer Name ▾	Customer Title ▾	Address Line 1 ▾	Town ▾	Postcode ▾	Telephone Number
Chris Smith	Mr	3 Green Lane	Billingham	TS23 4RE	(01642) 566777

- Then you would have:

<i>CustomerRecord</i>					
Name	Title	Address	Town	P/Code	Balance
String	String	String	String	String	Single

Creating your own type

- So, we know you have integers, singles, strings etc.
- You could create **your OWN type** and make it up of **more than one built-in type**.
- Underneath “Module 1,” BEFORE the first Sub, you use the **Structure...End Structure** block
- Here we have made our own Customer type, made up of 3 strings and a single.

```
Module Module1

    'declare my own type using the Structure keyword.
    'define elements of my user defined type.
    Structure Customers
        Dim forename As String
        Dim surname As String
        Dim accountNum As String
        Dim balance As Single
    End Structure

End Module
```

Using your type

- You would declare it as you would any other variable.
- You would use the dot (.) notation to reference parts of it.

```
Sub Main()  
    'declare a variable of my user defined type  
    Dim customer1 As Customers  
  
    'initialise variable, by defining parts of the records using the dot notation  
    customer1.forename = "Chris"  
    customer1.surname = "Jones"  
    customer1.accountNum = "AB1223NC"  
    customer1.balance = 254.22  
  
    'display information appropriately.  
    Console.WriteLine(customer1.forename & " " & customer1.surname)  
    Console.WriteLine("Account: " & customer1.accountNum & " Balance: " & FormatCurrency(customer1.balance, 2))  
  
    'pause for input.  
    Console.ReadLine()  
  
End Sub
```

- Work through the questions in **TASK 9: User Defined Types** (page 19-20).
 - DO Q3,4,5 programs
 - Complete ON THE BOOKLET question 6.
- Use your blue guide (page 22) to help you.
- We will go through each of them throughout the lesson.

Homework

Finish off the task on the previous slide.

Required Reading

- Each week you will be given required reading.
- If you fail to do this, you will 100% find the lessons which follow it EXTREMELY difficult.
- Before next lesson you should have read:
- **Pre-reading 20-25**

- What is a user-defined type?
- How is it different to an ordinary variable?
- Why would it be used?
- What are the problems which still exist, even when using user defined types?