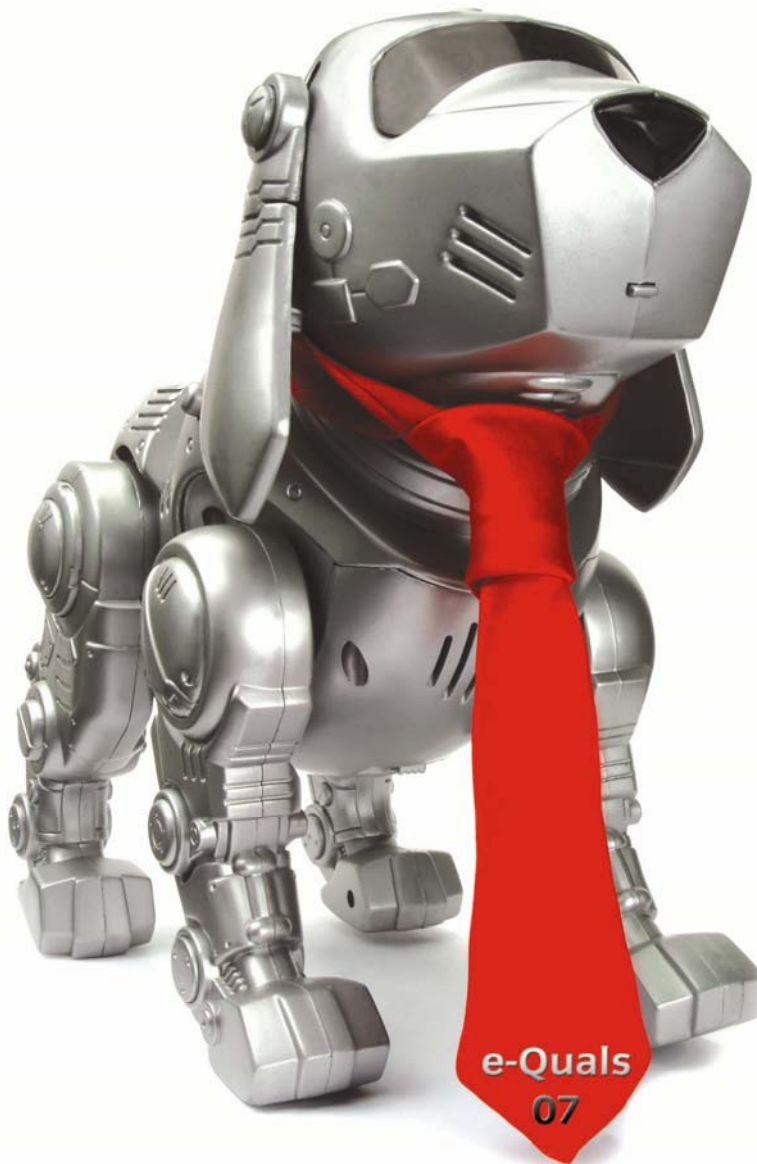


e-Quals Unit Syllabus

Level 2 Create software components using Visual Basic.NET

7266/7267-207



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Rationale

The aim of this unit is to enable candidates to understand the principles required to create software using the Visual Basic.NET programming language. Candidates will develop the skills required to create and test software components or small software systems to solve a given problem.

Learning outcomes

There are **five** outcomes to this unit. The candidate will be able to:

Manage the development environment

Create a Graphical User Interface (GUI)

Create code for a specified software component

Use the debug facilities of the development environment

Test a software component and produce printed output

Guided learning hours

It is recommended that 60 hours should be allocated for this unit. This may be on a full time or part time basis.

Connections with other qualifications

This unit contributes towards the knowledge and understanding required for the following qualifications:

Outcome	This award contributes to the knowledge and understanding of the following Areas of Occupational Competence in the City & Guilds NVQ for IT Practitioners (4324)
1,2,3,4,5	211 Software development, component creation 2

Key Skills

This unit contributes towards the Key Skills in the following areas:

Communication	C3.2
Application of Number	N1.1
Information technology	None
Working with others	None
Improving own learning	LP3.1, LP3.2, LP3.3
Problem solving	PS3.1, PS3.2, PS3.3

Assessment and grading

Assessment will be by means of a **set assignment covering** practical activities, and a **multiple choice test** covering underpinning knowledge.

Unit 207

Create software components using Visual Basic.NET

Outcome 1

Manage the development environment

Practical skills

The candidate will be able to:

- 1 use the development environment
 - a help facilities
 - b menus
 - c toolbar
 - d toolbox
 - e windows (code, debug, form, solution explorer, properties)
 - f dialog boxes
- 2 use **Find** and **Find Next** to locate specified words and strings in a project
- 3 use **Replace** to replace specified words and strings throughout a project
- 4 add a control to and remove a control from the toolbox for a project
- 5 create and save form and project files with meaningful names.

Underpinning knowledge

The candidate will be able to:

- 1 describe the purpose and function of the following file types:
 - a **EXE**
 - b **VB**
 - c **VBPROJ**
 - d **SLN**
- 2 state that controls can be added to the toolbox for a project from a supplied list or purchased from third-parties.

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Create software components using Visual Basic.NET

Outcome 2

Create a Graphical User Interface (GUI)

Practical skills

The candidate will be able to:

- 1 create a form and controls
- 2 place a control on a form by drawing, selecting and dragging into position and resizing using control handles
- 3 change default properties of forms and controls at design time
- 4 give meaningful names to forms and controls using a consistent naming convention
- 5 change the settings of the text related properties of controls
- 6 change the settings of the colour properties of controls
- 7 change the settings of the functional properties of controls
- 8 change the settings of the position related properties of controls
- 9 change the settings of the display related properties of controls
- 10 use a **GroupBox** control to group and contain other controls
- 11 select multiple controls on a form to drag the controls as a group or to set a common property for the group
- 12 use copy and paste to duplicate a control on a form
- 13 use one event to handle events from multiple controls.

Underpinning knowledge

The candidate will be able to:

- 1 identify **Form1** as the default project start-up form
- 2 describe in simple terms the functions of controls
- 3 state that each type of control possesses a subset of the total number of available properties
- 4 state that, depending on the property and the control, a property setting may be: changed at design time or run-time; changed only at design time; read at run-time; not available at run-time
- 5 describe the purpose of objects, methods and properties
- 6 describe how the events from multiple controls can be handled by one event
- 7 state that copied controls copy the property values from the original control
- 8 describe the use of dialog boxes and the main design features of forms used as dialog boxes
- 9 state the functions of the dialog controls' properties:
 - a **FileName**
 - b **Filter**
 - c **FilterIndex**

- d **OverwritePrompt**
- e **FullOpen**
- 10 explain the use of controls:
 - a **CheckBox**
 - b **Button**
 - c **ColorDialog**
 - d **FontDialog**
 - e **GroupBox**
 - f **HScrollBar**
 - g **Label**
 - h **MainMenu**
 - i **OpenFileDialog**
 - j **PictureBox**
 - k **RadioButton**
 - l **SaveFileDialog**
 - m **TextBox**
 - n **Timer**
 - o **VScrollBar**
 - p **ListBox**
- 11 state the purpose of the **AcceptButton**, **CancelButton** and **StartPosition** properties of a form.
- 12 state the purpose of the text related properties of controls:
 - a **Font**
 - b **MultiLine**
 - c **Lines**
 - d **Items**
 - e **Name**
 - f **PasswordChar**
 - g **Text**
 - h **TextAlign**
 - i **WordWrap**
- 13 identify the settings of the colour properties of controls:
 - a **BackColor**
 - b **ForeColor**
- 14 identify the settings of the functional properties of controls:
 - a **CheckAlign**
 - b **Checked**
 - c **CheckState**
 - d **Enabled**
 - e **Locked**

- f **Interval**
- g **LargeChange**
- h **Maximum**
- i **Minimum**
- j **SmallChange**
- k **Value**
- l **SelectedIndex**
- m **SelectedItem**

15 state the purpose of the position related properties of controls:

- a **Location**
- b **Size**
- c **X**
- d **Y**

16 describe the purpose of display related properties of controls:

- a **AutoSize**
- b **BorderStyle**
- c **Cursor**
- d **DialogResult**
- e **Image**
- f **ScrollBars**
- g **SizeMode**
- h **TabIndex**
- i **TabOrder**
- j **TextAlign**
- k **Visible**
- l **WindowState**

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Create software components using Visual Basic.NET

Outcome 3

Create code for a specified software component

Practical skills

The candidate will be able to:

- 1 use comments to document code
- 2 use consistent indentation and presentation of code to improve readability
- 3 declare all variables before use
- 4 declare and use data types eg integer, long, string, Boolean and create new objects
- 5 declare and use constants and built-in predefined constants as appropriate
- 6 use operators:
 - a assignment operator =
 - b relational operators: =, <, >, <>, <=, >=
 - c arithmetic operators: +, -, *, /, \, MOD
 - d logical operators: AND, OR, NOT
- 7 create program constructs for iteration:
 - a **For**
 - b **Do While...Loop**
 - c **Do...Loop While**
- 8 create program constructs for selection:
 - a **If...End If**
 - b **If...Else...End If**
 - c **Select Case...End Select**
- 9 use the **MsgBox** function to display a message to the user and to obtain a return value
- 10 use the **InputBox** function to obtain an input string from the user
- 11 use methods for controls
- 12 read and write control properties during software execution
- 13 write event-handling code for events for controls
- 14 create menus using the **MainMenu** control
- 15 use dialog controls
- 16 use a **Graphics** object to draw lines, circles, ellipses and rectangles
- 17 set and change the **Pen** object **Width** and **Color** properties
- 18 set and change the **SolidBrush** object **Color** property
- 19 use methods for a **Graphics** object
 - a **CreateGraphics**
 - b **DrawLine**

- c **DrawEllipse**
 - d **DrawRectangle**
 - e **FillEllipse**
 - f **FillRectangle**
 - g **Clear**
- 20 use shortcut keys in menus and controls
- 21 access a sequential text file for reading writing or appending

Underpinning knowledge

The candidate will be able to:

- 1 explain the meaning of the terms 'data type' and 'data type mismatch'
- 2 state the difference between **Private** and **Public** declarations
- 3 describe code as being in the form of Sub procedures: either as event procedures associated with controls or general procedures associated with forms
- 4 describe the functions of the syntax checker and the use of **Option Explicit**
- 5 describe the action which triggers the following events:
 - a **Click**
 - b **DoubleClick**
 - c **Load**
 - d **MouseDown**
 - e **MouseMove**
 - f **MouseUp**
 - g **Scroll**
 - h **TextChanged**
 - i **Tick**
- 6 identify 'idle time' as the time between event processing and know that idle time is essential for a program to be able to respond to new events
- 7 state the syntax for: comments; Sub procedures; writing and reading property values
- 8 describe the logical and relational operators, the precedence rules for arithmetic and the effects of parenthesis
- 9 describe software start-up sequence with reference to **Form1** and the **Sub Main** procedure
- 10 state limitations on the use of reserved words
- 11 describe the operation of iteration program constructs: **For**, **Do While...Loop**, **Do...Loop While**
- 12 describe the operation of selection program constructs: **If...End If**, **If...Else...End If**, **Select Case...End Select**
- 13 describe the structure of a sequential file and the mode of access for reading, writing or appending
- 14 describe the operation of the **File.Exists** method and **EOF** function
- 15 explain the importance of closing a file.

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Create software components using Visual Basic.NET

Outcome 4

Use the debug facilities of the development environment

Practical skills

The candidate will be able to:

- 1 use debug facilities to locate logical errors
- 3 set and clear breakpoints in code
- 3 use single-step mode to trace code execution
- 4 obtain variable values at breakpoints using available display windows
- 5 use **Console.WriteLine** to display output in the Output window.

Underpinning knowledge

The candidate will be able to:

- 1 describe the operation and purpose of breakpoints in code.

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Create software components using Visual Basic.NET

Outcome 5

Test a software component and produce printed output

Practical skills

The candidate will be able to:

- 1 use test data to determine the expected results from a software component
- 2 compare the expected to the actual results and correct any errors
- 3 resolve syntax, logical and run-time errors found during testing.
- 4 provide evidence that the program complies with the specification
- 5 create an **EXE** file and test its operation
- 6 print forms (screen print).
- 7 print listing of code

Underpinning knowledge

The candidate will be able to:

- 1 describe and distinguish between syntax errors and logical errors
- 2 identify the cause of a run-time error
- 3 state the reasons for testing a software component prior to implementation
- 4 identify that testing for expected output can assist in determining whether or not a program is working correctly and conforms to the specification.

Unit record sheet

Use this form to track your progress through this unit.

Tick the boxes when you have covered each outcome. When they are all ticked, you are ready to be assessed.

Outcome	✓	Date
1 Manage the development environment	<input type="checkbox"/>	
2 Create a Graphical User Interface (GUI)	<input type="checkbox"/>	
3 Create code for a specified software component	<input type="checkbox"/>	
4 Use the debug facilities of the development environment	<input type="checkbox"/>	
5 Test a software component and produce printed output	<input type="checkbox"/>	

Candidate Signature Date

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