OCR
Oxford Cambridge and RSA

Cambridge **TECHNICALS LEVEL 2**

IT

Cambridge TECHNICALS 2016

Unit 4

Creating programming solutions for business

F/615/1353

Guided learning hours: 60

Version 1 September 2016

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F/615/1353

Guided learning hours: 60

Essential resources required for this unit: Internet access, programming software

This unit is internally assessed and externally moderated by OCR.

UNIT AIM

This unit will enable you to explore the job role of a software practitioner. You will then go on to explore programming languages and the contexts in which these may be used.

You will plan a business solution using a programming language, create the program using an appropriate development environment, test the program and reflect on the program created.

On completing this unit you will know about language options together with syntax, structure and layout of a programming language and be able to apply them to a programming solution.

This unit is a mandatory unit in the Digital Software Practitioner pathway in the Diploma.

It is highly recommended that this unit is completed at the end of your learning programme as you will need to draw on the synoptic knowledge and understanding from other units you have studied in this pathway.

TEACHING CONTENT

The teaching content in every unit states what has to be taught to ensure that learners are able to access the highest grades.

Anything which follows an i.e. details what must be taught as part of that area of content. Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples in their work, although these do not need to be the same ones specified in the unit content.

For internally assessed units you need to ensure that any assignments you create, or any modifications you make to an assignment, do not expect the learner to do more than they have been taught, but must enable them to access the full range of grades as described in the grading criteria.

Learning outcomes The Learner will:	Teaching content Learners must be taught:
1. Understand the roles of software practitioners	1.1. The role of a software practitioner, i.e.: • understanding requirements of the task • identifying functionality • creating designs • constructing software solutions • testing software solutions • documenting software solutions • modifying requirements due to enhanced understanding of the task • updating software solutions 1.2. Employment opportunities, e.g.: • Analysts • Architects • Developers • Testers • Technical support • Managers
2. Be able to research the features of programming languages used for business solutions	2.1. Programming languages used for business solutions, i.e.: • high level (e.g. VB, VBA, C++, JavaScript, HTML, Python, asp.net, Visual Studio, App inventor, Android Studio, Xcode) • low level (e.g. assembly language) 2.2. Features of a programming language suitable for business solutions, i.e.: • consideration of target platform • intended use • compatibility • security needs • user needs • maintenance • support
3. Be able to plan business solutions using programming languages	3.1. Planning methods, i.e.: • flowchart • pseudo code 3.2. Screen layout, i.e.: • input of data (e.g. input boxes, drop-down lists, screen prompts)

Learning outcomes The Learner will:	Teaching content Learners must be taught:
	• output of information (e.g. colour, position, content) • robotics 3.3. Justification of programming language selected, i.e.: • consideration of target platform • intended use • compatibility • security needs • user needs • maintenance • support
4. Be able to create business solutions using programming languages	4.1. Programming a solution, i.e.: • syntax of programming languages • arithmetic operators • variables • naming variables • data input • data output • Selection (e.g. IF..THEN, IF..THEN..ELSE) • Iteration (e.g. count-controlled, condition-controlled) • Boolean logic (e.g. =, >, >=, <, <=, <>, AND, OR, NOT) • arrays • lists • procedures • functions • libraries 4.2. Formatting program code, i.e.: • Indentation 4.3. Annotating program code, i.e.: • comments 4.4. Testing the functionality of the program, i.e..: • errors (e.g. syntax, logic, run-time) • use of a test plan to test a program (i.e. what is being tested, boundary data, extreme data and success criteria) • recording results of testing (e.g. pass/fail) and use of appropriate comments in test plan • modifications and retesting 4.5. Evaluation of the functionality of the program, i.e. • evaluation of test results against the expected outcomes • evaluation of the program against the design specification

GRADING CRITERIA

LO	Pass	Merit	Distinction
	The assessment criteria are the Pass requirements for this unit.	To achieve a Merit the evidence must show that, in addition to the Pass criteria, the candidate is able to:	To achieve a Distinction the evidence must show that, in addition to the pass and merit criteria, the candidate is able to:
1. Understand the roles of software practitioners	P1: Describe the role of a software practitioner		
2. Be able to research the features of programming languages used for business solutions	P2: Investigate the features of programming languages for different business solutions		
3. Be able to plan business solutions using programming languages	P3: Create a plan for the program to meet the business need	M1: Justify why the selected programming language is appropriate for the planned program	
4. Be able to create business solutions using programming languages	P4: Create the program from the plan	M2: Format the program code using appropriate layout	D1: Annotate the program code with appropriate comments
	P5: Test the functionality of the program	M3: Implement changes to the program as a result of testing	D2: Evaluate the functionality of the program

SYNOPTIC ASSESSMENT AND LINKS BETWEEN UNITS

When learners are taking an assessment task, or series of tasks, for this unit they will have opportunities to draw on relevant, appropriate knowledge, understanding and skills that they will have developed through other units. See section 6 of the Centre Handbook for more information on synoptic assessment.

This unit and specific LO	Name of other unit and related LO
LO2: Be able to research the features of programming languages used for business solutions	**Unit 1: Essentials of IT** LO2: Know about software components **Unit 2: Essentials of cyber security** LO1: Know about aspects of Cyber Security LO2: Understand the threats and vulnerabilities they can makeLO3: Understand how organisations/individuals to minimise impacts from cyber security attacks **Unit 6: Participating in a project** LO2: Be able to contribute to a project **Unit 8: Using emerging technologies** LO1: Know the technologies currently emerging LO2: Be able to explore how emerging technologies can support business needs LO3: Be able to reflect on future impacts of emerging technologies **Unit 13: Creating websites** LO2: Be able to review existing websites in relation to business needs **Unit 15: Games creation** LO1: Know the fundamentals of game design
LO3: Be able to plan business solutions using programming languages	**Unit 1: Essentials of IT** LO2: Know about software components LO3: Know how to install and upgrade hardware and software LO4: Know about the Internet and related technologies LO5: Know about the benefits of using IT in business **Unit 2: Essentials of cyber security** LO1: Know about aspects of Cyber Security LO2: Understand the threats and vulnerabilities they can make LO3: Understand how organisations/individuals to minimise impacts from cyber security attacks **Unit 6: Participating in a project** LO2: Be able to contribute to a project **Unit 7: Pitching the product** LO2: Be able to pitch a product to internal stakeholders **Unit 8: Using emerging technologies** LO1: Know the technologies currently emerging LO2: Be able to explore how emerging technologies can support business needs LO3: Be able to reflect on future impacts of emerging technologies **Unit 13: Creating websites**

This unit and specific LO	Name of other unit and related LO
	LO1: Know how websites are used by organisations LO2: Be able to review existing websites in relation to business needs **Unit 14: Creating mobile applications for business** LO2: Be able to create mobile applications to meet business requirements LO3: Be able to improve a] mobile applications based on feedback **Unit 15: Games creation** LO1: Know the fundamentals of game design LO2: Be able to generate games designs
LO4: Be able to create business solutions using programming languages	**Unit 1: Essentials of IT** LO2: Know about software components LO3: Know how to install and upgrade hardware and software LO4: Know about the Internet and related technologies LO5: Know about the benefits of using IT in business **Unit 2: Essentials of cyber security** LO1: Know about aspects of Cyber Security LO2: Understand the threats and vulnerabilities they can make LO3: Understand how organisations/individuals to minimise impacts from cyber security attacks **Unit 6: Participating in a project** LO2: Be able to contribute to a project **Unit 7: Pitching the product** LO2: Be able to pitch a product to internal stakeholders **Unit 8: Using emerging technologies** LO1: Know the technologies currently emerging LO2: Be able to explore how emerging technologies can support business needs LO3: Be able to reflect on future impacts of emerging technologies **Unit 13: Creating websites** LO1: Know how websites are used by organisations LO2: Be able to review existing websites in relation to business needs **Unit 14: Creating mobile applications for business** LO2: Be able to create mobile applications to meet business requirements LO3: Be able to improve a] mobile applications based on feedback **Unit 15: Games creation** LO1: Know the fundamentals of game design LO3: Be able to create games from game designs

ASSESSMENT GUIDANCE

LO1 Understand the role of a software practitioner

P1: Learners must describe what the role of a software practitioner is in the IT industry. Evidence could be in the format of a presentation with detailed speaker notes, a report or job fact sheets.

LO2 Be able to research the features of programming languages used for business solutions

P2: Learners should investigate different programming languages and outline the features of programming languages used for different business solutions and how such features facilitate the creation of business solutions in the programming languages. Evidence could be in the format of a presentation with detailed speaker notes, a report or a recording of delivering a presentation.

LO3 Be able to plan business solutions using programming languages

P3: For a given assignment task, the learner will produce a plan for the program that they will need to create for the business need. Evidence could be in the format of a report or a plan of the intended programme using pseudo code.

M1: Evidence will be a justification for the use of the programming language to produce the program planned in P4. Evidence could be in the format of a presentation with detailed speaker notes, a report or a recording of delivering an oral presentation.

LO4 Be able to create business solutions using programming languages

P4: Learners will create the program from the plan produced in P4. Evidence will be the program created. Evidence is likely to be in the form of the electronic file containing the program code. There may still be minor errors in the code, but most aspects of the program should function, even if there are errors in the output.

M2: Learners will present the code using an appropriate layout showing indentation, making the code easier to read and easier to follow. Evidence is likely to be in the form of the electronic file containing the program code.

D1: Learners will enhance the readability of the code using appropriate comments, making the code easier to follow so that a competent third party would be able to amend the code later using the comments provided. Evidence is likely to be in the form of the electronic file containing the program code.

P5: Candidates will present a test plan to show that the program has been tested. Candidates are likely to generate some of the evidence for criterion P6 whilst they are creating the program in criterion P5. Errors identified may include syntax, logic and run-time errors. The test plan should clearly identify what is being tested, the test data used, the expected outcome and the actual outcome along with any explanatory notes. There should be evidence of testing boundary data and extreme data, where appropriate. Evidence will be the actual test plan fully completed.

M3: The programming solution will be refined as a result of tests carried out which did not perform as expected. If all tests have been passed in the testing process and the program is fully functioning, meeting the requirements of the business solution then this criterion may be awarded. If the program is not fully working and/or does not meet the requirements of the business solution, then this criterion cannot be achieved. There must be evidence that any tests which did not pass in criterion P6 have been re-tested after changing the program to show that the issue(s) have been resolved.

D2: The learner will evaluate the functionality of the program using the data from the test plan and the working program to consider if the program operates as planned and if the solution meets the requirements of the business as specified in the assignment task. Evidence could be in the format of a presentation with detailed speaker notes, a report or a recording of a professional discussion.

Feedback to learners: you can discuss work-in-progress towards summative assessment with learners to make sure it's being done in a planned and timely manner. It also provides an opportunity for you to check the authenticity of the work. You must intervene if you feel there's a health and safety risk.

Learners should use their own words when producing evidence of their knowledge and understanding. When learners use their own words it reduces the possibility of learners' work being identified as plagiarised. If a learner does use someone else's words and ideas in their work, they must acknowledge it, and this is done through referencing. Just quoting and referencing someone else's work will not show that the learner knows or understands it. It has to be clear in the work how the learner is using the material they have referenced to inform their thoughts, ideas or conclusions.

For more information about internal assessment, including feedback, authentication and plagiarism, see the centre handbook. Information about how to reference is in the OCR Guide to Referencing available on our website: http://www.ocr.org.uk/i-want-to/skills-guides/

MEANINGFUL EMPLOYER INVOLVEMENT - a requirement for the Technical certificate qualifications

These qualifications have been designed to be recognised as Technical certificates in performance tables in England. It is a requirement of these qualifications for centres to secure for every learner employer involvement through delivery and/or assessment of these qualifications.

The minimum amount of employer involvement must relate to at least one or more of the elements of the mandatory content. This unit is a mandatory unit in the Digital Business Practitioner pathway.

Eligible activities and suggestions/ideas that may help you in securing meaningful employer involvement for this unit are given in the table below.

Please refer to the *Qualification Handbook* for further information including a list of activities that are not considered to meet this requirement.

Meaningful employer engagement	Suggestion/ideas for centres when delivering this unit
1. Learners undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification.	Learners could explore the role of a software practitioner during work-experience or a work placement for LO1. A profile of the work carried out by the employee could be prepared.
2. Learners undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s).	Industry practitioners could be involved in setting the business problem which requires a programming solution for LO3 and LO4.
3. Learners take one or more units delivered or co-delivered by an industry practitioner(s). This could take the form of master classes or guest lectures.	Industry practitioners could engage an industry practitioner to advise the learners on how programs are tested, the documentation which needs to be produced and the evidence which needs to be generated to show that a program is fully functional for LO4
4. Industry practitioners operating as 'expert witnesses' that contribute to the assessment of a learner's work or practice, operating within a specified assessment framework. This may be a specific project(s), exercise(s) or examination(s), or all assessments for a qualification.	Industry practitioners could be involved in the assessment of the plan for a program in LO3, particularly if they have had input into the business problem which requires a business solution. Alternatively, industry practitioners could be involved in the assessment of the program created in LO4.

You can find further information on employer involvement in the delivery of qualifications in the following documents:

- Employer involvement in the delivery and assessment of vocational qualifications
- DfE work experience guidance

To find out more
ocr.org.uk/it
or call our Customer Contact Centre on **02476 851509**

Alternatively, you can email us on **vocational.qualifications@ocr.org.uk**

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