Level 3 Advanced Technical Extended Diploma in Digital Technologies (720)

Application Development

(5220-32-046)

Synoptic Assignment 2019 – v1.0

General guidance for candidates

General guidance

This is a formal assessment that you will be marked and graded on. You will be marked on the quality and accuracy of your practical performance and any written work you produce. It is therefore important that you carry your work out to the highest standard you can. You should show how well you know and understand the subject and how you are able to use your knowledge and skills together to complete the tasks. This means you will usually have to write down your thinking and the reasons behind the way you have carried out the tasks and how/why you have made your decisions. This may be part of your planning, reflections, or evaluations.

Your assessor will observe you throughout the practical element of this assignment and will produce an observation record that will be used to assess your competence.

Plagiarism

This is an assessment of your abilities, so the work must be all your own work and carried out under the conditions stated. You will be asked to sign a declaration that you have not had any outside help with the assessment.

Your tutor is allowed to give you some help understanding the assignment instructions if necessary, but they will record any other guidance you need and this will be taken into account during marking.

Plagiarism is the failure to acknowledge sources properly and/or the submission of another person's work as if it were your own. Plagiarism is not allowed in this assignment.

Where research is allowed, your tutor must be able to identify which work you have done yourself, and what you have found from other sources. It is therefore important to make sure you acknowledge all sources and clearly reference any information taken from them.

Timings and planning

Where you have to plan your time, you should take care to make sure you have divided the time available between tasks appropriately. In some assignments, there are specified timings which cannot be changed and which need to be taken into account. You should check your plan is appropriate with your tutor.

If you have a good reason for needing more time, you will need to explain the reasons to your tutor and agree a new deadline date. Changes to dates will be at the discretion of the tutor, and they may not mark work that is handed in after the agreed deadlines.

Health and safety

You must always work safely, in particular while you are carrying out practical tasks.
You must always follow any relevant Health and Safety regulations and codes of practice.
If your tutor sees you working in a way that is unsafe for yourself or others, they will ask you to stop immediately, and tell you why. Your tutor will not be able to reassess you until they are sure you are ready for assessment and can work safely.

Presentation of work

- All images included in the word processed documentation must be individually named and presented in sequential order.
- Presentation of work must be neat and appropriate to the task.

- You should make sure that each piece of evidence including any proformas eg record/job cards are clearly labelled with your name and the assignment reference.
- All electronic files must be given a clear file name that allows your tutor to identify it as your work.
- Written work eg reports may be word processed but this is not a requirement.
- All sketches and drawings should be neat and tidy, to scale and annotated.
- Calculations should be set out clearly, with all working shown, together with any assumptions made. You should use appropriate units at all times and answers must be expressed to a degree of accuracy, consistent with the requirements of the task.
- The use of non-programmable scientific calculators is acceptable.

Assignment Brief

You are employed as a software developer for an advice centre that helps clients manage the major costs of their budget at home. The centre wants you to develop a prototype application that will run on a Windows PC as an executable application.

The program will be used to allow the centre's advisers and clients to work out how much they will pay for the following major recurring costs:

- repayment mortgage
- gas and electricity
- water
- Council tax.

The functionality of the program is defined below.

The application should open with a screen used as a repayment mortgage cost calculator that works out the annual and monthly cost of a mortgage, based on the following data:

- cost of the property
- deposit available from the client
- term of the mortgage in years
- interest charged by the lender

The mortgage calculator must calculate and display the following information formatted for the local currency:

- total cost of the repayment mortgage over the whole term
- annual repayment cost
- monthly repayment cost

The mortgage calculator screen must provide a link to an additional help feature explaining how the mortgage calculator is used. The prototype must produce accurate costs for the mortgage based on the variables specified above and based on typical mortgage costs at the time of assessment, without applying any special offers.

The user must be able to move from the mortgage cost calculator to the second screen of the application where weekly costs for the following can be entered:

- gas
- electricity
- water
- Council tax.

The user must be able to go from this screen to a third, summary screen showing the cost of all the items (mortgage, gas, electricity, water, and council tax) as an annual and monthly cost formatted for the local currency.

For the other budgeting costs other than the mortgage costs, the following sample data must be used for development and testing:

Item	Cost per week
Gas	9.00
Electricity	8.00
Water	9.00
Council tax	30.00

The application must demonstrate the changes in annual and monthly costs when any, or all, of the values are changed. The prototype application does not have to permanently store the data values calculated.

Full design documentation is required before production of a fully-working prototype.

The prototype must be developed using one of the following programming paradigms:

- Object Oriented Programming
- Event Driven Programming
- Procedural Programming.

Technical documentation is required by the users of the prototype and the development team who will implement the proposed production application. The technical documentation must recommend methodologies and systems to be used in development of the production version of the application.

A sample of application of user help documentation, only for the mortgage calculator feature, is required to demonstrate the intended style of end-user support documentation.

The development process must be evaluated and proposals made to support the development of a production version of the application.

Tasks

Terminology

The terms 'application' and 'program' are used interchangeably throughout this document, and there is no difference in meaning or definition between them when considered in the context of this assignment.

Task 1

Create the design documentation for the prototype application.

Conditions of assessment:
You must carry the task out on your own, under controlled conditions.
It is expected that this task will take no more than **3 hours**.

What you must produce for marking:
A single word-processed document containing the design documentation.

Task 2

Using the data values provided by your assessor, create the prototype version of the application.

Conditions of assessment:
You must carry the task out on your own, under supervised conditions.
It is expected that this task will take no more than **7 hours**.

What you must produce for marking:
A single word-processed document containing:

- annotated screen prints clearly showing how the working prototype application is used for recording and reporting data. The images must be individually named and presented in sequential order.
- readable screen prints of all of the application code used to create the prototype.

Additional evidence of your performance that must be captured for marking:
An Assessor Observation record that demonstrates the working application's features.

Task 3

Create the technical documentation.

Conditions of assessment:
You must carry the task out on your own, under controlled conditions.
It is expected that this task will take no more than **3 hours**.

What you must produce for marking:
A single word-processed document containing complete technical documentation.

Task 4

Create the sample application user help documentation for the mortgage calculator.

Conditions of assessment:

You must carry the task out on your own, under controlled conditions.
It is expected that this task will take no more than **2 hours**.

What you must produce for marking:

A single word-processed document containing the sample of application user help documentation.

Task 5

Review the prototype development process in line with the requirements of the brief.

Conditions of assessment:

You must carry the task out on your own, under controlled conditions.
It is expected that this task will take no more than **3 hours**.

What you must produce for marking:

A single word-processed document containing the review of the development processes.

Task instructions for centres

Resources

Candidates must have access to a suitable range of resources to carry out the tasks In addition to software used to create designs and documentation, all candidates must use an identical software development package to create the prototype using the selected programing paradigm. There is no minimum requirement or specification for hardware used to operate the prototype, but the prototype must function correctly for the recording and reporting of data.

Use of images as evidence

All images included in the word-processed documentation must be individually named, readable and clearly presented in sequential order representing the order of processes carried out.

Terminology

The terms 'application' and 'program' are used interchangeably throughout this document, and there is no difference in meaning or definition between them when considered in the context of this assignment.

Task 1

Design documentation must be appropriate for the development of a program prototype meeting the assignment brief.

Task 2

Candidates must be provided with a current mortgage rate that will be used in the prototype application. It is important that the rate is a standard rate to be applied throughout the term of the mortgage, without special rates applying in any part of the term of the mortgage. This rate will be represented as a simple numerical value such as 3.7, representing the percentage charged by the lender.

Candidates should also be supplied with standard property value, deposit available and term for the mortgage so that a uniform calculation can be checked.

The assessor must supply a set of alternative data values to confirm the functionality of the application.

The development of the prototype must be completed using a single development paradigm, and methods and structures must be appropriate to the chosen paradigm.

The whole development must be completed using one of the following:

- Object Oriented Programming
- Event Driven Programming
- Procedural Programing

Many online resources exist providing algorithm designs for calculating repayment mortgage costs based on the data in the client brief. The candidate can be directed to sites offering such algorithms specific to the development language used for the application.

An example of such a site based on the use of C# is:

https://teamtreehouse.com/community/loan-payment-formula-in-c

It makes use of a built-in library called Math and this is a good approach to take in this situation to avoid excessive complexity.

Use of suitable search terms in a search engine, such as 'mortgage calculator python', or 'mortgage calculator c#' will provide a range of results. Candidates must always provide suitable attribution of sources used.

Data displayed as a result of manipulation or calculation must be displayed in a correct currency format with appropriate cultural styling for the currency, eg the use of the '£' sign as a prefix and two decimal places of accuracy.

Task 3

Technical documentation must reflect the design and development processes used for the prototype. Where changes are proposed for the production version, these should be brief and refer to the review to be completed in Task 5.

Task 4

The sample of application user help documentation must be prepared in accordance with current industry best practice.

Task 5

The review must be evaluative, with recommendations being justified.

Time

The recommended time allocated for the completion of the tasks and production of evidence for this assessment is approximately **eighteen** hours. It is the centre's responsibility to arrange how this time is managed to fit with timetables during the assessment period. Candidates should be required to plan their work and have their plans confirmed for appropriateness in relation to the time allocated for each task.

Total – **18** hours
Task 1 – **3** hours
Task 2 – **7** hours
Task 3 – **3** hours
Task 4 – **2** hours
Task 5 – **3** hours

Centre guidance

Guidance provided in this document refers to this specific assignment. The following documents available on the City & Guilds website provide essential generic guidance for centres delivering Technical qualifications and **must** be referred to alongside this guidance:

- ***Technical qualifications – marking and moderation*** – updated annually
- ***Technical qualifications – teaching, learning and assessment***

This synoptic assessment is designed to require the candidate to make use their knowledge, understanding and skills they have built up over the course of their learning to tackle problems/tasks/challenges.

This approach to assessment emphasises to candidates the importance and applicability of the full range of their learning to practice in their industry area, and supports them in learning to take responsibility for transferring their knowledge, understanding and skills to the practical situation, fostering independence, autonomy and confidence.

Candidates are provided with an assignment brief. They then have to draw on their knowledge and skills and independently select the correct processes, skills, materials, and approaches to take to provide the evidence specified by the brief.

During the learning programme, it is expected that tutors will have taken the opportunity to set shorter, formative tasks that allow candidates to be supported to independently use the learning they have so far covered, drawing this together in a similar way, so they are familiar with the format, conditions and expectations of the synoptic assessment.

You should explain to candidates what the Assessment Objectives are and how they are implemented in marking the assignment, so they will understand the level of performance that will achieve them high marks.

The candidate should not be entered for the assessment until the end of the course of learning for the qualification so they are in a position to complete the assignment successfully.

Health and safety

Candidates should not be entered for assessment without being clear of the importance of working safely, and practice of doing so. The tutor must immediately stop an assessment if a candidate works unsafely. At the discretion of the tutor, depending on the severity of the incident, the candidate may be given a warning. If they continue to work unsafely however, their assessment must be ended and they must retake the assessment at a later date.

Observation

Where the tutor is required to carry out observation of performance, detailed notes must be taken using the Practical observation (PO) form provided. This may be a generic form or tailored to the specific assignment. The centre has the flexibility to adapt the form, or produce their own to suit local requirements as long as this does not change or restrict the type of evidence collected (eg to use tablet, hand-written formats, or to ease local administration).

The number of candidates a tutor will be able to observe at one time will vary depending on local conditions eg layout of the assessment environment, support for different tasks, staggered starts etc. Tutors must consider the logistics of collecting sufficient evidence; whether there are any points that will need additional support or any that are quieter, and trial the planned arrangements where

possible during formative assessment. It is suggested however that no more than six candidates should be observed by a single tutor at one time.

As far as possible, candidates should not be distracted, or their performance affected by the process of observation and evidence collection.

Observation notes form part of the candidate's evidence and must describe **how well** the activity has been carried out, rather than stating the steps/ actions the candidate has taken. The notes must be very descriptive and focus on the **quality** of the performance in such a way that comparisons between performances can be made and which provide the evidence on which the award of marks can be made by the marker and, if sampled, the moderator.

Identifying **what it is** about the performances that is **different** between candidates can clarify the qualities that are important to record. Each candidate may carry out the same steps, so a checklist of this information would not add information to help differentiate between them, but qualitative comments on **how well** they do it, and quantitative records of accuracy and tolerances would.

The tutor should refer to the marking grid to ensure appropriate aspects of performance are recorded. These notes will be used for marking and moderation purposes and so must be detailed, accurate and differentiating.

Tutors should ensure that any required additional supporting evidence including eg photographs or video can be easily matched to the correct candidate, are clear, sufficiently well-lit and showing the areas of particular interest for assessment (ie taken at appropriate points in production, showing accuracy of measurements where appropriate).

If candidates are required to work as a team, each candidate's contribution must be noted separately. The tutor may intervene if any individual candidate's contribution is unclear or to ensure fair access (see below).

Technical qualifications – marking and moderation centre guidance document is an essential guidance document available on the City & Guilds website, providing further information on gathering evidence suitable for marking and moderation, and must be referred to when planning and carrying out assessment.

Minimum evidence requirements

The sections:

- ***What you must produce for marking***, and
- ***Additional evidence of your performance that must be captured for marking***

in the assignment list the minimum requirements of evidence to be submitted for marking and moderation.

Evidence above and beyond this may be submitted, but should provide useful information for marking and moderation.

Where candidates have carried out some work as a group, the contribution of each candidate must be clear. It is not appropriate to upload identical information for each candidate without some way for the moderator to mark the candidates individually.

Where the minimum requirements have **not** been met, the moderation remark and any subsequent adjustment will be based on the evidence that has been submitted. **Where this is insufficient to provide a mark on moderation, a mark of zero may be given.**

Preparation

Candidates should be aware of which aspects of their performance (across the AOs) will give them good marks in assessment. This is best carried out through routinely pointing out good or poor performance during the learning period, and through formative assessment. Candidates should be

encouraged to do the best they can and be made aware of the difference between these summative assessments and any formative assessments they have been subject to. Candidates may not have access to the full marking grids, as these may be misinterpreted as pass, merit distinction descriptors. See the ***Technical qualifications – teaching, learning and assessment*** centre guidance document for further information on preparing candidates for Technical qualification assessment.

Guidance on assessment conditions

The assessment conditions that are in place for this synoptic assignment are to:

- ensure the rigour of the assessment process
- provide fairness for candidates
- give confidence in the outcome.

They can be thought of as the rules that ensure that all candidates who take an assessment are being treated fairly, equally and in a manner that ensures their result reflects their true ability.

The conditions outlined below relate to this summative synoptic assignment. These do not affect any formative assessment work that takes place. Formative assessment will necessarily take a significant role throughout the learning programme where support, guidance and feedback (with the opportunity to show how feedback has been used to improve outcomes and learning) are critical. This approach is not, however, valid for summative assessment. The purpose of summative assessment is to confirm the standard the candidate has achieved as a result of participating in the learning process.

Authentication of candidate work

Candidates are required to sign declarations of authenticity, as is the tutor. The relevant form is included in this assignment pack.

The final evidence for the tasks that make up this synoptic assignment must be completed under the specified conditions. This is to ensure authenticity and prevent malpractice as well as to assess and record candidate performance for assessment in the practical tasks. Any aspect that may be undertaken in unsupervised conditions is specified. It is the centre's responsibility to ensure that local administration and oversight gives the tutor sufficient confidence to be able to confirm the authenticity of the candidate's work.

Candidate evidence must be kept secure to prevent unsupervised access by the candidate or others. Where evidence is produced over a number of sessions, the tutor must ensure learners and others cannot access the evidence without supervision. This might include storing written work or artefacts in locked cupboards and collecting memory sticks of evidence produced electronically at the end of each session.

Where the candidate or tutor is unable to, or does not confirm authenticity through signing the declaration form, the work will not be accepted at moderation and a mark of zero will be given. If any question of authenticity arises eg at moderation, the centre may be contacted for justification of authentication.

Accessibility and fairness

Where a candidate has special requirements, tutors should refer to the *Access arrangements and reasonable adjustments* section of the City& Guilds website.

Tutors can support access where necessary by providing clarification to **any** candidate on the requirements or timings of any aspect of this synoptic assignment. Tutors should **not** provide more

guidance than the candidate needs as this may impact on the candidate's grade, see the guidance and feedback section below.

All candidates must be provided with an environment and resources that allows them access to the full range of marks available.

Where candidates have worked in groups to complete one or more tasks for this synoptic assessment, the tutor must ensure that no candidate is disadvantaged as a result of the performance of any other team member. If a team member is distracting or preventing another team member from fully demonstrating their skills or knowledge, the tutor must intervene.

Guidance and feedback

Guidance must only support access to the assignment and must not provide feedback for improvement. The level and frequency of clarification & guidance must be

- recorded fully on the candidate record form (CRF),
- taken into account along with the candidate's final evidence during marking
- made available for moderation.

Tutors **must not** provide feedback on the quality of the performance or how the quality of evidence can be improved. This would be classed as malpractice.

Tutors **should** however provide general reminders to candidates throughout the assessment period to check their work thoroughly before submitting it, and to be sure that they are happy with their final evidence as it may not be worked on further after submission.

Candidates can rework any evidence that has been produced for this synoptic assignment during the time allowed. However, this must be as a result of their own review and identification of weaknesses and not as a result of tutor feedback. Once the evidence has been submitted for assessment, no further amendments to evidence can be made.

Tutors should ensure that candidates' plans for completion of the tasks distribute the time available appropriately and may guide candidates on where they should be up to at any point in a general way. Any excessive time taken for any task should be recorded and should be taken into account during marking if appropriate.

It is up to the marker to decide if the guidance the candidate has required suggests they are lacking in any AO, the severity of the issue, and how to award marks on the basis of this full range of evidence. The tutor must record where and how guidance has had an impact on the marks given, so this is available should queries arise at moderation or appeal.

What is, and is not, an appropriate level of guidance

- A tutor **should** intervene with caution if a candidate has taken a course of action that will result in them not being able to submit the full range of evidence for assessment. However this should ***only*** take place once the tutor has prompted the candidate to check that they have covered all the requirements. Where the tutor has to be explicit as to what the issue is, this is likely to demonstrate a lack of understanding on the part of the candidate rather than a simple error, and full details should be recorded on the CRF.
- The tutor **should not** provide guidance if the candidate is thought to be able to correct the issue without it, and a prompt would suffice. In other words only the minimum support the candidate actually needs should be given, since the more guidance provided, the larger the impact on the marks awarded.
- A tutor may **not** provide guidance that the candidate's work is not at the required standard or how to improve their work. In this way, candidates are given the chance to identify and

correct any errors on their own, providing valid evidence of knowledge and skills that will be credited during marking.

All specific prompts and details of the nature of any further guidance must be recorded and reviewed during marking and moderation.

Guidance on marking

Please see the ***Technical qualifications – marking and moderation*** centre guidance document for further information on gathering evidence suitable for marking and moderation, and on using the following marking grid.

The Candidate Record Form (CRF) is used to record:

- Details of any guidance or the level of prompting the candidate has received during the assessment period
- Rough notes made while reviewing the evidence – alternatively these may be captured on the marking and moderation platform.
- Summary justifications when holistically coming to an overall judgement of the mark.

Marking grid

For any category, 0 marks may be awarded where there is no evidence of achievement

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
10	**AO1 Recall of knowledge relating to the qualification LOs** • Does the candidate seem to have the full breadth and depth of taught knowledge across the qualification to hand • How accurate it their knowledge • Are there any gaps or misunderstandings evident • How confident and secure does their knowledge seem	**(1-2 marks)** **Recall shows some weaknesses in breadth and/or accuracy.** Hesitant, gaps, inaccuracy	**(3-4 marks)** **Recall is generally accurate and shows reasonable breadth. Inaccuracy and misunderstandings are infrequent and usually minor.** Sound, minimal gaps	**(5-6 marks)** **Consistently strong evidence of accurate and confident recall from the breadth of knowledge.** Accurate, confident, complete, fluent, slick
		Examples of types of knowledge expected: Data types eg numeric, alpha numeric and logical; structures eg Arrays; conventions eg whitespace, code indentation and use of comments; decisions eg conditional checks and conditional operations; iterations eg loop, while and for; constructs eg classes, modules, functions, methods and procedures; test methods eg functionality and usability. ***Examples of knowledge expected:*** <u>Object Oriented Programming</u>: classes; class members. <u>Event Driven Programming</u>: modules; methods; functions; events; variables. <u>Procedural Programming</u>: procedures; functions; compiler directives.		

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
		Candidate has demonstrated a limited range of knowledge from across the qualification. The candidate has demonstrated basic knowledge of technical terminology.	Candidate has demonstrated an appropriate range of knowledge from across the qualification. The candidate has demonstrated adequate knowledge of technical terminology.	Candidate has demonstrated in-depth and detailed knowledge across the whole qualification. The candidate has demonstrated comprehensive knowledge of technical terminology.
20	**AO2 Understanding of concepts theories and processes relating to the LOs** • Does the candidate make connections and show causal links and explain why • How well theories and concepts are applied to new situations/the assignment • How well chosen are exemplars – how well do they illustrate the concept	**(1-4 marks)** **Some evidence of being able to give explanations of concepts and theories. Explanations appear to be recalled, simplistic or incomplete.** Misunderstanding, illogical connections, guessing,	**(5-8 marks)** **Explanations are logical. Showing comprehension and generally free from misunderstanding, but may lack depth or connections are incompletely explored.** Logical, slightly disjointed, plausible,	**(9-12 marks)** **Consistently strong evidence of clear causal links in explanations generated by the candidate. Candidate uses concepts and theories confidently in explaining decisions taken and application to new situations.** Logical reasoning, thoughtful decisions, causal links, justified

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
		Examples of understanding expected: Compliance and functionality; life-cycle models; specifications and designs; test planning and execution; user documentation requirements; program flow; structures of algorithms; program review strategies; understanding of mortgage rates. ***Examples of understanding expected:*** <u>Object Oriented Programming</u> structure of classes; structure of members <u>Event Driven Programming</u> structure of events; structure of functions <u>Procedural Programming</u> structure of procedures		

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
		The candidate has demonstrated a basic understanding of the documentation required to meet the brief. The candidate has demonstrated a basic understanding of the development strategies of the programming paradigm used. The candidate has demonstrated a basic understanding of the tools used in design and development. The candidate has demonstrated a basic understanding of the chosen software language.	The candidate has demonstrated an adequate understanding of the documentation required to meet the brief. The candidate has demonstrated an adequate understanding of the development strategies of the programming paradigm used. The candidate has demonstrated an adequate understanding of the tools used in design and development. The candidate has demonstrated a satisfactory understanding of the chosen software language.	The candidate has demonstrated a thorough understanding of the documentation required to meet the brief. The candidate has demonstrated a thorough understanding of the development strategies of the programming paradigm used. The candidate has demonstrated thorough understanding of the tools used in design and development. The candidate has demonstrated an in-depth understanding of the chosen software language.

<table>
<tr><td rowspan="2">30</td><td rowspan="2">AO3 Application of practical/ technical skills
How practiced/fluid does hand eye coordination and dexterity seem
How confidently does the candidate use the breadth of practical skills open to them
How accurately/ successfully has the candidate been able to use skills/achieve practical outcomes</td><td>(1-6 marks)
Some evidence of familiarity with practical skills. Some awkwardness in implementation, may show frustration out of inability rather than lack of care.
Unable to adapt, frustrated, flaws, out of tolerance, imperfect, clumsy.</td><td>(7-12 marks)
Generally successful application of skills, although areas of complexity may present a challenge. Skills are not yet second nature.
Somewhat successful, some inconsistencies, fairly adept/ capable.</td><td>(13-18 marks)
Consistently high levels of skill and/or dexterity, showing ability to successfully make adjustments to practice; able to deal successfully with complexity.
Dextrous, fluid, comes naturally, skilled, practiced,</td></tr>
<tr><td colspan="3">Examples of skills expected:
Effective use of the features of the development environment; creation of industry standard data types; use and conversion of number formats, structures; conventions; decisions; iterations; constructs; test methods; recording of test outcomes; making changes to correct errors discovered; use of algorithms; testing methodologies, selection of appropriate controls; layout of controls in the interface; formatting of data presented to the user in the interface; passing data between interface components; addressing the needs of the operating environment; creation of well-formatted code, effective strategy for navigation between screens, creation of help documentation to meet the needs of intended audience.

Examples of skills expected:
<u>Object Oriented Programming:</u>
Creation of classes, creation of members eg properties, attributes, methods, use of the fundamentals of Object Oriented Programming eg encapsulation, inheritance and polymorphism.
<u>Event Driven Programming:</u>
Creation of: modules, methods, functions, events, variables.
<u>Procedural Programming:</u>
Creation of: procedures, functions, compiler directives.</td></tr>
</table>

		The candidate has demonstrated basic logic in their approach to tasks. The candidate has partially implemented the software tasks from the brief. The candidate has completed basic test planning with non-fundamental omissions. The candidate has demonstrated basic skills in the use of the development environment's tools and features. The candidate has demonstrated basic skills in the use of the programing language with some inefficiency in structure. The candidate has demonstrated basic skills in the manipulation and presentation of data values.	The candidate has demonstrated adequate logic in their approach to tasks. The candidate has implemented all software tasks successfully which may contain minor errors. The candidate has completed test planning and execution adequately. The candidate has demonstrated adequate skills in the use of the development environment's tools and features. The candidate has demonstrated adequate skills in the use of the programing language with code that was mostly efficient in structure. The candidate has demonstrated adequate skills in the manipulation and presentation of data values.	The candidate has demonstrated clear and consistent logic in their approach throughout the tasks. The candidate has implemented all software tasks fluently and without errors. The candidate has completed rigorous test planning and execution fully meeting the needs of the brief. The candidate has demonstrated a proficient level of skill in the use of the development environment's tools and features. The candidate has demonstrated comprehensive skills in the use of the programing language using efficient structures throughout. The candidate has demonstrated comprehensive skills in the manipulation and presentation of data values throughout.

20	**AO4 Bringing it all together - coherence of the whole subject** • Does the candidate draw from the breadth of their knowledge and skills • Does the candidate remember to reflect on theory when solving practical problems • How well can the candidate work out solutions to new contexts/ problems on their own	**(1-4 marks)** **Some evidence of consideration of theory when attempting tasks. Tends to attend to single aspects at a time without considering implication of contextual information.** Some random trial and error, new situations are challenging, expects guidance, narrow. Many need prompting.	**(5-8 marks)** **Shows good application of theory to practice and new context, some inconsistencies.** Remembers to apply theory, somewhat successful at achieving fitness for purpose. Some consolidation of theory and practice	**(9-12 marks)** **Strong evidence of thorough consideration of the context and use of theory and skills to achieve fitness for purpose.** Purposeful experimentation, plausible ideas, guided by theory and experience, fit for purpose, integrated, uses whole toolkit of theory and skills.
		Examples of bringing it all together: Considering the needs of the scenario and fulfilling the specification throughout. Conformance to the specification. Industry standard conventions. Comprehensive review processes considering all development stages. Design of the Graphical User Interface (GUI) for data input, appropriate use of colour and text. Logic of control sequence interaction. Design of the features for reporting data.		

		The candidate has applied knowledge and understanding making limited links between topics across the qualification. The candidate completed some elements of the tasks with minor variations from the assignment brief. The candidate produced basic documentation that contained limited detail. The candidate made simplistic recommendations for future development of the production version of the application.	The candidate has applied a range of knowledge and understanding from across the qualification when evaluating information. The candidate completed most elements of the tasks and largely in line with the assignment brief. The candidate produced appropriate documentation that contained suitable detail. The candidate made satisfactory recommendations for future development of the production version of the application.	The candidate has applied a wide range of knowledge and understanding from across the qualification when evaluating information holistically. The candidate completed all elements of the tasks coherently and fully in-line with the assignment brief. The candidate produced well-developed documentation meeting professional standards. The candidate made detailed recommendations for future development of the production version of the application.
20	**AO5 Attending to detail/ perfecting** • Does the candidate routinely check on quality, finish etc and attend to imperfections/ omissions • How much is accuracy a result of persistent care and attention (eg measure twice cut once)	**(1-4 marks)** **Easily distracted or lack of checking. Insufficiently concerned by poor result; little attempt to improve. Gives up too early; focus may be on completion rather than quality of outcome.** Careless, imprecise, flawed, uncaring, unfocussed, unobservant, unmotivated.	**(5-8 marks)** **Aims for satisfactory result but may not persist beyond this. Uses feedback methods but perhaps not fully or consistently.** Variable/intermittent attention, reasonably conscientious, some imperfections, unremarkable.	**(9-12 marks)** **Alert, focussed on task. Attentive and persistently pursuing excellence. Using feedback to identify problems for correction.** Noticing, checking, persistent, perfecting, refining, accurate, focus on quality, precision, refinement, faultless, meticulous.

	• Would you describe the candidate as a perfectionist and wholly engaged in the subject	***Examples of attending to detail:*** Variable naming consistency; data types eg numeric, alpha numeric and logical; structures eg Arrays; conventions eg whitespace, code indentation and use of comments; decisions eg conditional checks and conditional operations; iterations eg loop, while and for; constructs eg classes, modules, functions, methods and procedures; test methods eg functionality and usability. Specification structure and format, format of numbers in input and output. Review and support documentation; suitable for target audience, appropriate layout, structure and sequencing of information.		
		The candidate's use of technical language was limited and contained errors. The candidate has demonstrated basic formatting in documents. The candidate has demonstrated limited care in the formatting of the user interface. The candidate has made basic use of conventions applied to the creation of software with non-fundamental errors.	The candidate's use of technical language was adequate and mostly accurate. The candidate has demonstrated appropriate formatting in documents. The candidate has demonstrated adequate care in the formatting of the user interface, with some variation in number formats. The candidate has made appropriate use of conventions applied to the creation of software which may contain minor errors.	The candidate's use of technical language was fluent and entirely accurate. The candidate has demonstrated consistent, professional styling throughout all documents. The candidate has demonstrated entirely consistent formatting of the user interface with correct number formats throughout. The candidate has made highly-effective use of conventions applied to the creation of software throughout.

Declaration of Authenticity

Candidate name	Candidate number
Centre name	Centre number

Candidate:

I confirm that all work submitted is my own, and that I have acknowledged all sources I have used.

Candidate signature	Date

Tutor:

I confirm that all work was conducted under conditions designed to assure the authenticity of the candidate's work, and am satisfied that, to the best of my knowledge, the work produced is solely that of the candidate.

Tutor signature	Date

Note:

Where the candidate and/or tutor is unable to, or does not confirm authenticity through signing this declaration form, the work will not be accepted at moderation and a mark of zero will be given. If any question of authenticity arises, the tutor may be contacted for justification of authentication.

Candidate Record Form (CRF)

Candidate Name: **Assessment ID:**

Candidate Number: **Centre Number:**

Total Mark:

	Summary justification	AO Mark
A01 Recall		
A02 Understanding		
A03 Practical/ technical skills		
A04 Bringing it all together		
A05 Attention to detail		

Tutor/assessor signature: **Date:**

Candidate Record Form (CRF)

Marker Notes

<table>
<tr><td>AO1 - Recall
Breadth, depth, accuracy</td><td colspan="3">Examples of types of knowledge expected:
Data types eg numeric, alpha numeric and logical; structures eg Arrays; conventions eg whitespace, code indentation and use of comments; decisions eg conditional checks and conditional operations; iterations eg loop, while and for; constructs eg classes, modules, functions, methods and procedures; test methods eg functionality and usability.

Examples of knowledge expected:
<u>Object Oriented Programming</u>:
classes; class members.
<u>Event Driven Programming</u>:
modules; methods; functions; events; variables.
<u>Procedural Programming</u>:
procedures; functions; compiler directives.</td></tr>
<tr><td>10%</td><td>Band 1 1-2 marks</td><td>Band 2 3-4 marks</td><td>Band 3 5-6 marks</td></tr>
<tr><td>Mark:</td><td colspan="3">Notes/Comments</td></tr>
<tr><td>AO2 - Understanding
Security of concepts, causal links</td><td colspan="3">Examples of understanding expected:
Compliance and functionality; life cycle models; specifications and designs; test planning and execution; user documentation requirements; program flow; structures of algorithms; program review strategies; understanding of mortgage rates.

Examples of understanding expected:
<u>Object Oriented Programming</u>
structure of classes; structure of members
<u>Event Driven Programming</u>
structure of events; structure of functions
<u>Procedural Programming</u>
structure of procedures</td></tr>
<tr><td>20%</td><td>Band 1 1-4 marks</td><td>Band 2 5-8 marks</td><td>Band 3 9-12 marks</td></tr>
<tr><td>Mark:</td><td colspan="3">Notes/Comments</td></tr>
<tr><td>AO3 - Practical skill
Dexterity, fluidity, confidence, ease of application</td><td colspan="3">Examples of skills expected:
Effective use of the features of the development environment; creation of industry standard data types; use and conversion of number formats, structures; conventions; decisions; iterations; constructs; test methods; recording of test outcomes; making changes to correct errors discovered; use of algorithms; testing methodologies, selection of appropriate controls; layout of controls in the interface; formatting of data presented to the user in the interface; passing data between interface components; addressing the needs of the operating environment; creation of well-formatted code, effective strategy for navigation between screens, creation of help documentation to meet the needs of intended audience.</td></tr>
</table>

	Examples of skills expected: <u>Object Oriented Programming:</u> Creation of classes, creation of members eg properties, attributes, methods, use of the fundamentals of Object Oriented Programming eg encapsulation, inheritance and polymorphism. <u>Event Driven Programming:</u> Creation of: modules, methods, functions, events, variables. <u>Procedural Programming:</u> Creation of: procedures, functions, compiler directives.		
30%	Band 1 1-6 marks	Band 2 7-12 marks	Band 3 13-18 marks
Mark:	Notes/Comments		
AO4 – Bringing it together use of knowledge to apply skills in new context	***Examples of bringing it all together:*** Considering the needs of the scenario and fulfilling the specification throughout. Conformance to the specification. Industry standard conventions. Comprehensive review processes considering all development stages. Design of the Graphical User Interface (GUI) for data input, appropriate use of colour and text. Logic of control sequence interaction. Design of the features for reporting data.		
20%	Band 1 1-4 marks	Band 2 5-8 marks	Band 3 9-12 marks
Mark:	Notes/Comments		
AO5 - Attending to detail / perfecting Repeated checking, perfecting, noticing	***Examples of attending to detail:*** Variable naming consistency; data types eg numeric, alpha numeric and logical; structures eg Arrays; conventions eg whitespace, code indentation and use of comments; decisions eg conditional checks and conditional operations; iterations eg loop, while and for; constructs eg classes, modules, functions, methods and procedures; test methods eg functionality and usability. Specification structure and format, format of numbers in input and output. Review and support documentation; suitable for target audience, appropriate layout, structure and sequencing of information.		
20%	Band 1 1-4 marks	Band 2 5-8 marks	Band 3 9-12 marks
Mark:	Notes/Comments		

Please refer to the full marking grid for the qualification for full details of marking requirements.
Where marker notes and justifications are captured on the marking and moderation platform, this form is not required

Assessor Observation Form (Task 2)

Candidate Name: **Assessment ID:** **5220-046**

Candidate number: **Centre Number:**

Task Number	Element demonstrated	Achieved	Not Achieved
2	Repayment mortgage calculator data value entry:		
	Property cost		
	Deposit available from client		
	Term of mortgage in years		
	Rate of interest to be charged		
	Repayment mortgage calculated values:		
	Total amount repayable on the mortgage over the whole term		
	Annual mortgage cost		
	Monthly mortgage cost		
	Other costs entered as weekly amounts		
	Gas		
	Electricity		
	Water		
	Council tax		
	Summary calculated budgeting values shown:		
	Annual costs for all items		
	Monthly costs for all items		
	Data entry and help		
	Input data changes produce accurate data calculations		

Notes for Assessor:

Use the above Assessor checklist. The learner's performance should be marked against the criteria on the Assessor checklist and the Marking grid. Additional Assessor notes must be included to comment on how well the candidate carried out each criterion. The learner should be familiar with the performance criteria above before commencement of the task but should not have a copy with them during the assessment.

Assessor observations and mark justification:

....

Assessors Name **Assessors Name**

(please print) (please sign)

Practical Observation Form (PO)

Candidate Name: **Assessment ID:**

Candidate Number: **Centre Number:**

AO1 - Recall
Breadth, depth, accuracy

AO2 - Understanding
Security of concepts, causal links

AO3 - Practical skill
Dexterity, fluidity, confidence, ease of application

AO4 – Bringing it all together
use of knowledge to apply skills in new context

AO5 - Attending to detail / perfecting
Repeated checking, perfecting, noticing

Notes

Tutor/Assessor signature: **Date:**