T-LEVELS | Institute for Apprenticeships & Technical Education

T Level Technical Qualification in Digital Production, Design and Development

Mark Scheme (Results)

Summer 2022

Paper 1: Digital Analysis, Legislation and Emerging Issues

Pearson

General Marking Guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Learners must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks if the learner's response is not rewardable according to the mark scheme.
- Where judgement is required, a mark scheme will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the mark scheme to a learner's response, a senior examiner should be consulted.
- Crossed out work should be marked unless the learner has replaced it with an alternative response.
- Accept incorrect/phonetic spelling (as long as the term is recognisable) unless instructed otherwise.

Points-Based Mark Scheme Guidance

Points-based mark schemes are made up of:

1. Mark scheme rubric

   A mark scheme rubric instructs an examiner as to how each mark is awarded.
2. Example Responses

   These demonstrate the type of acceptable responses that a student might provide and where each mark is awarded.
3. Additional marking Guidance

   This informs examiners about any parameters which should be applied e.g. 'accept any other appropriate/alternative responses'.

Applying the points-based mark scheme guidance

Examiners should follow the mark scheme rubric and use the example responses as a guide for the relevance and expectation of the responses. Students must be credited for any appropriate response. Should candidates provide answers that meet the rubric but in an alternative order, credit should be given.

Levels-Based Mark Scheme Guidance

Levels-based mark schemes (LBMS) have been designed to assess students' work holistically. They consist of two parts:

1. Indicative content

   Indicative content reflects content-related points that a student might make but is not an exhaustive list. Nor is it a model answer. Students may make some or none of the points included in the indicative content as its purpose is as a guide for the relevance and expectation of the responses. Students must be credited for any appropriate response.

2. Levels-based descriptors

   Each level is made up of a number of traits which when combined together articulate the quality of response that a student needs to demonstrate. The traits progress across the levels to demonstrate the different expectations of each level. When using a levels-based mark scheme, the 'best fit' approach should be used.

Applying the levels-based descriptors

Examiners should take a 'best fit' approach to determining the mark.

- Examiners should first make a holistic judgement on which level most closely matches the student's response. Students will be placed in the level that best describes their answer. Answers can display characteristics from more than one level, and where this happens markers must use any additional guidance (e.g. weighting of traits) and their professional judgement to decide which level is most appropriate.
- The mark awarded within the level will be decided based on the quality of the answer and will be modified according to how securely all traits are displayed at that level:
  - Marks will be awarded at the top of that level if the student has evidenced each of the descriptor traits securely.
  - Where the response does not securely meet all traits, the marks should be awarded based on how closely the descriptor has been met.

Section A

Question Number	Answer	Mark
1	**Award one mark for each of the following up to a maximum of two marks.** • Permitted activities (1) • Restricted activities (1) • Avoiding wilful damage /misuse of equipment (1) • Sanctions that may be applied (1) • Suitable etiquette used when communicating electronically with others (1) • Exemption to any rules (1) **Accept any other appropriate responses.** **Additional Guidance** Accept specific examples of/restricted activities for example: **Permitted** – access personal email only during break, **Restricted** – sending malicious emails, don't access another employee's account, accessing prohibited materials	**(2)**

Question Number	Answer	Mark
2	**One mark for each complete step, up to a maximum of four marks.** Step 3 23 16 6 18 14 9 17 4 Step 4 23 16 6 18 14 9 17 4 Step 5 16 23 6 18 9 14 4 17 Step 6 6 16 18 23 4 9 14 17 **Additional Guidance** Award follow through marks if a step is correct based on an incorrect previous step.	**(4)**

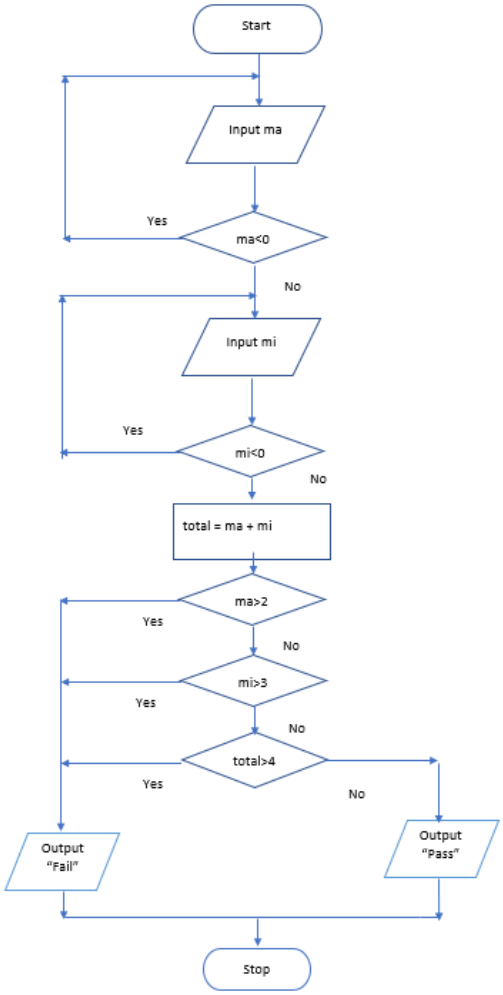
Question Number	Answer	Mark
3(a)	**Award one mark for each identification and one mark for an appropriate linked explanation reason up to a maximum of four marks.** **Form**: Character/string (1) Form is a **single** character/letter (1) **Library_Card_Issued:** Boolean (1) (as library_card_issued)is **limited** to only True/False values / only 2 states (1)	**(4)**

Question Number	Answer	Mark
3(b)	**Award one mark for each identification and one mark for an appropriate linked explanation up to a maximum of four marks.** May identify trends/similarities (1) between the current problem and existing solutions (1) Can reuse design principles (1) used in similar existing solutions (1) Can identify repeated processes within a problem (1) to identify code that can be reused (1) Make prediction and assumptions (1) based on identified behaviours (1) **Accept any other appropriate responses.**	**(4)**

Question Number	Answer	Mark
4(a)	**Award one mark for identification of the reason, one mark for an appropriate linked explanation of the reason and one mark for a further expansion of the explanation, up to a maximum of three marks.** Reduces the number steps/workload in the development process (1) by removing the need to write flowcharts/pseudocode (1) thus saving time (1) Algorithm will mirror implementation closely (1) and reduce the need for interpretation by developers (1) as some design methods (e.g. flowcharts) cannot easily show some programming structures (1) Some problems are (relatively) simple (1) so the code can be written directly (1) without the need to plan first (1) **Accept any other appropriate responses.**	**(3)**

Question Number	Answer	Mark
4(b)	**Award one mark for each correctly identified written line** Line 4: high = len(data)**-1** Line 8: middle = (low + high) **//2** Line 15: low = middle **+** 1 Line 21: posn=binary_search(**mylist**,**target**)	**(4)**

Question Number	Answer	Mark
5	**Award one mark for each identification and one mark for an appropriate linked explanation up to a maximum of four marks.** Use 0 or 1 (1) to test the lower boundary (1) Use 10 or 11 (1) to test the upper boundary (1) Using e.g. 6 (1) to test the program accepts valid data (1) Using e.g. 23 (1) to test the program rejects invalid data (1) **Accept any other appropriate responses.** **Additional guidance** Accept explanation of test instead of identification of actual test data (e.g. erroneous data) accept 1…10 for valid data accept any invalid data choice (such as 'xyz')	**(4)**

Question Number	Indicative content:	Mark
6	**Award one mark for each correct logical component (in the appropriate flowchart symbol(s)) up to a maximum of six marks:** • Number of major faults entered (1) • Number of minor faults entered (1) • Correct logic for failing on major faults used (1) • Correct logic for failing on minor faults used (1) • Correct logic for failing on total faults used (1) • Final decision output (1) **Example flowchart, note other solutions can be used.**  	

	Additional Guidance Credit alternative solutions that use correct logic and would produce the expected outcome. Penalise incorrect use flowchart symbols once only	**(6)**

Question Number	Indicative content:	Mark
7	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **VR/AR leisure** Devices can be used for mobile gaming (such as Pokemon Go type games), Immersive environments for gaming. To bring remote museum relics to people **VR/AR in business** Devices can be used to advertise experiences such as theme parks and holidays. Unbuilt property viewings can be taken. Devices can be used by surgeons/electricians/plumbers to superimpose internal details onto objects. Devices can be used for detailed immersive simulations to train for a variety of roles such as military, firefighting, driving jobs **Advantages of VR/AR** Provides a rich experience, which is realistic. Allows effective realistic training to take place with vastly reduced costs/dangers. Helps to prevent **Disadvantages of VR/AR** Building a realistic VR world takes time and is a costly. It is not suitable for some users, due to specific medical issues Specialist hardware is needed and the cost of this could be prohibitive. **Conclusion** VR/AR can be beneficial in offering realistic experiences to users, however the worlds are still not as detailed as reality, and often expensive hardware is needed. But for some applications the benefits outweigh the costs	**(9)**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	• Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3) • Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2) • Demonstrates a basic assessment which partially considers different factors/events and their relative importance, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	4-6	• Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3) • Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2) • Demonstrates a good assessment which considers different factors/events and their relative importance, leading to a conclusion which is partially supported (AO3)
Level 3	7-9	• Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3) • Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2). • Demonstrates a thorough assessment which comprehensively considers different factors/events and their relative importance, leading to a conclusion which is well supported (AO3)

Section B

Question Number	Answer	Mark
8(a)	**Sample code, note other solutions can be used.** SCORE = 0 HIGHEST = -1 LOWEST=11 FINALSCORE=0 for JUDGE in range (6): MARK=input("Enter Mark") MARK=int(MARK) SCORE=SCORE+MARK IF MARK<LOWEST: LOWEST=MARK IF MARK>HIGHEST: HIGHEST=MARK FINALSCORE=SCORE-HIGHEST-LOWEST print (FINALSCORE)	
	Award one mark for each related descriptive point up to a maximum of six marks. Set scores to 0 / declare variables (1) Loop used (1) Score updated in each iteration / total score calculated (1) Correct logic used to determine lowest mark (1) Correct logic used to determine highest mark (1) Final score calculated properly (1) Final score is output (1) **Accept any other relevant phrasing/wording.** **Credit alternative solutions that use correct logic and would produce the expected outcome.**	
		(6)

Question Number	Answer	Mark
8(b)	**Award one mark for each identification and one mark for an appropriate linked explanation up to a maximum of four marks.** Duplicate keys are not allowed in dictionaries (1) so any duplicate competitor numbers would be prevented (1) Dictionaries are changeable/mutable (1) so existing scores can be edited if an error is found/new competitors added/disqualified competitors removed (1) The score is stored with a Key (identifier/skater's name) (1) making it possible to directly access entries (using key) (1) Dictionaries can hold more than one data type (1) so skater name and score can be held in the same data structure / reduces the number of variables/data structures needed (1) **Additional Guidance** Expansion for MKPT2 must be realistic such as correcting an error/adding new competitor etc	**(4)**

Question Number	Indicative content:	Mark
8(c)	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **Discussion may include:** *Definition of Intellectual Property* A person's IP is something created using that person's mind The developer would own the IP used as the developer wrote the code *Copyright* The code would automatically be afforded copyright (as it is an example of original non-literary written work such as software, web content and databases) *Registered Design* The user interface may be registered and this would protect things such as layout and colours. This must be applied for. *Patent* If the code is inventive then a patent may be applied for. To do this no similar patents must exist.	**(6)**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-2	• Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3) • Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2)
Level 2	3-4	• Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3) • Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2)
Level 3	5-6	• Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3) • Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2)

Question Number	Answer	Mark
9(a)	**Award one mark for each identification and one mark for an appropriate linked explanation up to a maximum of four marks.** No iteration is required (1) as this code would only perform one calculation (1) No selection is needed (1) as this code does not make a decision (1) (Sequencing is used as)the same instructions (1) are carried out in the same order (1) **Accept any other appropriate response**	**(4)**

Question Number	Answer	Mark
9(b)	**Award one mark for each of the following linked points, up to a max of four marks.** Check digit is contained in the barcode (1) Check digit is recalculated using other digits of barcode (1) If recalculated check digit matches scanned check digit then assume barcode properly (1) If recalculated check digit does not match scanned check digit then an error has occurred (1) **Accept any other appropriate response.**	**(4)**

Question Number	Answer	Mark
9(c)	**Award one mark for each of the following linked points, up to a max two marks.** • Integration Testing will test that modules work harmoniously (1) • Performed after unit testing (1) • Modules are integrated together (1) • Checking that they work as a complete system (1) **Accept any other appropriate response.**	**(2)**

Question Number	Answer	Mark
9(d)	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **Lack of communication/Feeling of isolation** People who do not have the latest technology can feel isolated. This is particularly true of people who live in rural areas, but is equally applicable to customers in more urban areas who may be hindered by obsolete hardware and/or limited connectivity due to cost factors. **Barrier to knowledge** Lack of access to on-line services can lead onto a lack of opportunity to improve knowledge and skills. As the app contains video tutorials it would mean that many customers would miss out on developing these skills. **Accentuation of social divide** The more well off would be more likely to have access to services such as this app, and this would result in them getting the latest special offers thereby saving money. This would not be true for many poorer customers. **Accentuation of age divide** Some older customers who may not have the experience of using digital systems, may find it more difficult to access the company's goods/services, as lack of experience/formal education in use of computers may have resulted in a lack of skills. **Accentuation of educational divide** People with lower literacy skills may find it difficult to access any text-based content. Users that lack digital literacy skills may find the app diffciult to use and be unable to effectively access the company's goods/services	**(9)**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	• Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3) • Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2) • Demonstrates a basic assessment which partially considers different factors/events and their relative importance, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	4-6	• Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3) • Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2) • Demonstrates a good assessment which considers different factors/events and their relative importance, leading to a conclusion which is partially supported (AO3)
Level 3	7-9	• Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3) • Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2). • Demonstrates a thorough assessment which comprehensively considers different factors/events and their relative importance, leading to a conclusion which is well supported (AO3)

Question Number	Answer	Mark
10(a)	**Award one mark for each of the following linked points, up to a max of three marks.** • The problem is broken up into several smaller problems • Each smaller problem is subdivided further into smaller modules • Modules are assigned to members of the team • Modules are assembled together to form working software **Accept any other appropriate responses.**	**(3)**

Question Number	Answer	Mark
10(bi)	**Award one mark for each correctly identified relational operator** == < **Additional guidance** Accept name of relational operators - I.e equal to / less than	**(2)**

Question Number	Answer	Mark
10(bii)	**Award one mark for each linked point, up to a maximum of three marks.** It works using the RawTime value (1) comparing it with 12 (1) to determine whether it is am/pm or midday (1) Calculates if it is am or pm (1) by comparing the time to a numerical value (1) and checking if the number is greater or less than 12 (1) Function accepts 24hr time as a parameter (1) if the time is before 12 then the time is returned unchanged with am postfixed (1) if the time is after 12 then 12 is subtracted from RawTime and pm is postfixed (1) **Accept any other appropriate responses.**	**(3)**

Question Number	Answer	Mark
10(c)	**Award one mark for each of the following linked points up to a maximum of three marks.** • Using meaningful variable names (1) that clearly show content/type (1) to aid debugging (1) • using common style conventions (1) such as camelCase or underscore (1) to aid readability (1) **Accept any other appropriate response**.	**(3)**

Question Number	Answer	Mark
10(d)	**Award one mark for identification of a principle and one mark for an appropriate linked explanation, up to a maximum of two marks.** The member must make it clear what they know (1) and take steps to learn what he doesn't (1). They must only undertake work that is within the member's professional competence (1) and should not claim any level of competence that they do not possess (1) **Accept any other appropriate response.**	**(2)**

Question Number	Indicative content:	Mark
10(e)	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **Discussion may include:** **Benefits of using Pre-Written code** Prewritten code may have been optimised ensuring the code is efficient Prewritten code should be pretested so it will be error free It saves development time as general functions are already written **Drawback of using Pre-Written code** Code is used in safety critical application so vital that all source code is checked for robustness Using external code could mean that standards are not met so regulators would be reluctant to certify car safety Data might need to be preprocessed/prepared before being ready to be passed into the external function and this would add to processing requirements **Benefits of writing new code** Code can be optimised to run on specific platform, this would aid high speed processing in a safety critical environment Thorough testing can be done and presented to regulators as proof of code correctness/robustness **Drawback of writing new code** Development time is longer as all code has to be implemented More testing is needed to ensure code correctness Code may not be written in the most efficient manner **Conclusion** Using prewritten code would decrease development and testing time and would probably decrease costs. There would be some drawbacks but overall the company would be better off using prewritten code.	**(12)**

The 2nd trait (AO2) carries twice as much weighting as traits 1 & 3.

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-4	• Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3) • Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2) • Demonstrates a basic evaluation which partially considers different factors/events and competing points, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	5-8	• Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3) • Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2) • Demonstrates a good evaluation which considers different factors/events and competing points, leading to a conclusion which is partially supported (AO3)
Level 3	9-12	• Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3) • Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2) • Demonstrates a thorough evaluation which comprehensively considers different factors/events and competing points, leading to a conclusion which is well supported (AO3)