T Level Technical Qualification in Digital Production, Design and Development

Mark Scheme (Results)

Summer 2024

Paper 1: Digital Analysis, Legislation and Emerging Issues

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(a)	**One mark for correctly identified constant.** • ENTRY_COST	**(1)**

Question Number	Answer	Mark
1(b)	**One mark for correctly identified variable.** • **NumofTickets** • **CostofTickets**	**(1)**

Question Number	Answer	Mark
1(c)	**Award one mark for each of the following linked descriptive points, up to a maximum of three marks.** Sensible naming styles (1) such as CamelCase/Meaningful identifiers (1) clearly convey the purpose of each variable (1) Sensible naming styles (1) such as CamelCase (1) allow the reader to more easily identify the start and end of words/names (1) PEP 8 (conventions) (1) such as spacing (1) has been used to clarify code structure (1) **Note Accept other alternative naming styles such as Snake/Pascal case**	**(3)**

Question Number	Answer	Mark
1(d)	**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.** Because the input is a string (1) and must be converted to an integer (1) in order to avoid (runtime) errors/ to be used in calculations (1)	**(3)**

Question Number	Answer	Mark
2	**One mark each identified organisation up to a maximum of two marks.** • ISO • W3C • IETF • BCS • IEEE • NTSE	**(2)**

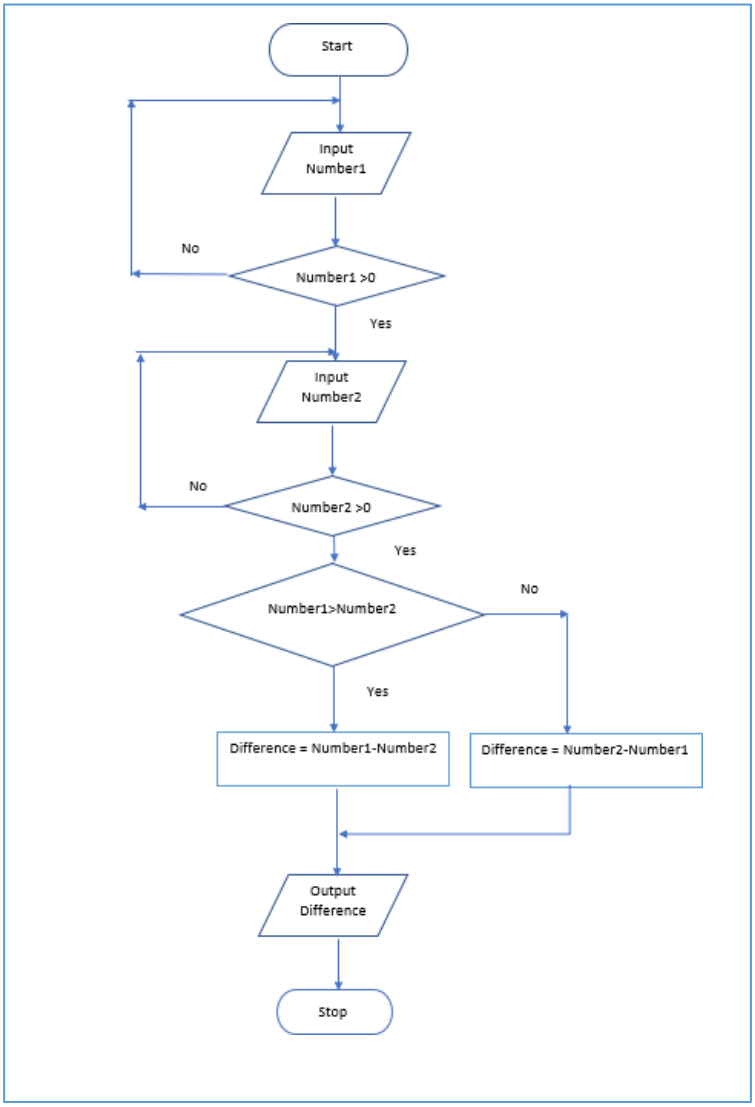
Question Number	Answer	Mark
3	**Award one mark for each of the following linked descriptive points, up to a maximum of three marks.** Define company values (1) and clearly communicate these values to existing employees (1) and employ people who fit with these values/train existing employees in this culture (1) **Accept any other appropriate responses.**	**(3)**

Question Number	Answer	Mark
4(a)	**Award one mark for each of the following linked descriptive points, up to a maximum of three marks.** • The multiplication operator (1) • Is used with the length and height (1) • to calculate the area (1)	**(3)**

Question Number	Answer	Mark
4(b)	**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.** The sequencing is wrong / area will always be zero entering the decision (1) as the area is calculated after the decision (1) so the program will never state if the job will take more than one day / condition will never be true (1) **Accept any other appropriate responses.** <u>Additional guidance</u> Accept reference to logical errors	**(3)**

Question Number	Answer	Mark
5(a)	**Award one mark for each correct part.** **Example response:** *CostOfStay = calc_cost(6,12)* • Declaring a variable (e.g. Cost_of_Stay =) (1) • Calling function correctly (1) • Passing NumofNights parameter correctly (1) • Passing Month parameter correctly (1) **Note Parameters must be in correct order.**	**(4)**

Question Number	Answer	Mark
5(b)	**Award one mark for each of the following linked descriptive points, up to a maximum of two marks.** • Greater than 4 / less than 9 (1) checking if month in range / to allocate correct price (1)	**(2)**

Question Number	Indicative content:	Mark
6	**Award one mark for any of the following up to a maximum of six marks.** Correct Symbols used (1) Both numbers entered (1) Invalid numbers rejected (1) Decision used to determine highest number (1) Difference calculated (1) Difference output (1) **Example flow chart, note other solutions can be used.**  	

	Additional guidance Penalise incorrect symbols once only Credit alternative solutions that use correct logic and would produce the expected outcome. Accept solutions which treat zero as a positive number. (e.g. use of >-1 as comparator)	**(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.** **Benefits** Problem is continually broken down, into smaller subunits. This allows the designer to clarify what the program needs to do. As the subunits are decomposed further they becomes less complex and easier to design/code. It can lead to the production of reusable code as units of code are written to do specific tasks. **Drawbacks** It can be inflexible, as many major decisions are made at a very early stage. It can be time consuming, especially in the initial stages There could be many stages before code is written. Testing is more complicated as a fully functioning program does not exist until the very latter stages, so stubs must be used. The modules written tend to be very specific to the particular application. Using top down design can prevent the use existing components, as decisions taken early in the design project can prevent their effective use	

	Conclusion A conclusion that draws upon the points made in the body of the response and makes a supported judgement as to whether or not top down design is appropriate for developing this program. **(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.**
	
	SET Duration to 0
	RECEIVE Start_Time FROM DEVICE
	RECEIVE End_Time FROM DEVICE
	RECEIVE Avg_Heart_Rate FROM DEVICE
	Duration=End_Time – Start_Time
	IF Duration<30 THEN
	Level =”Low”
	ELSEIF Duration>30 AND Avg_Heart_Rate > 150 THEN
	Level =”High”
	ELSE
	Level =”Medium”
	SEND Level TO DISPLAY	

	Award one mark for each related descriptive point up to a maximum of six marks. All required data is input(1) Duration calculated correctly (1) Correct logic used to decide on low training level (1) Correct logic used to decide on high training level (1) Correct logic used to decide on medium training level (1) Training level output (1) (one output only – missing else) **Accept any other relevant phrasing/wording.** **Credit alternative solutions that use correct logic and would produce the expected outcome.** Note do not penalise boundary errors (ie <=30) Ignore any attempt at validation – correct or not – not asked for in question Ignore attempts at changing hours to minutes etc	**(6)**

Question Number	Answer	Mark
8(b)	**Award one mark for each of the following linked points, up to a max of four marks.** • Decide on the needed outputs (1) to formulate key actions in the program (1) • Identify necessary data/filter out unnecessary detail (1) through deciding on the inputs to the system (1) • Identify data needs (1) by deciding on what will vary (1) **Accept any other appropriate responses.**	**(4)**

Question Number	Indicative content	Mark
8c	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** • Changes in behaviour of individuals, such as a desire to have increasing fitness scores could cause some users to push themselves past safe activity levels thus endangering their health (and safety in relation to running and cycling). • Environmental issues due to the consumption of energy and finite resources to manufacture these devices. • A fear that data gathered by wearable devices could be misused if not adequately protected, by for example health insurance companies. • Location data used for targeted marketing. • Potentially sensitive information such as home/work locations and health data could be extracted from the data. This could raise privacy concerns/legal issues. • Unequal access to wearable technologies, due to cost or connectivity issues could result in some people gaining an unfair advantage when preparing for events. • Could encourage more physical activity such as walking & cycling. • Can give inaccurate health indicators.	**(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** • It will list prohibited activities (1) and the penalties for not adhering to these rules (1) • It will list permitted activities (1) which will avoid confusion to new employees (1) • It will stipulate working practices (1) which will aid data security (1) • It will stipulate etiquette rules (1) for internal and external communication (1) **Accept any other appropriate response.**	**(4)**

Question Number	Answer	Mark
9(b)	**Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.** • Flowcharts (1) which express concepts using diagrams (1) • Pseudocode (1) which uses coding concepts (1) • Written Description (1) explained as a narrative (1) • Annotated Code (1) which uses existing code (1) **Accept any other appropriate response.**	**(4)**

Question Number	Indicative content:	Mark
9c	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers.** **Benefit of VR/AR** Immersive lesson can be created that transport learners outside the classroom. This would give them the opportunity to e.g. virtually visit a hospital or to walk around a care home. AR can be used in lectures to superimpose internal organs on to the body of other pupils so learners can better appreciate anatomy. This may increase leaner engagement and improve focus and knowledge retention. It can simulate a training environment that allows nurses to practice without risk to human life. **Drawbacks of VR** At the minute technologies are still developing and the environment portrayed such as internal organs and operating theatres may not appear realistic. Health issues, with motion sickness and eyestrain being problematic and this could affect learning duration. No awareness of the real world could cause accidents to users. It may be inaccessible to some learners with eyesight problems. **Conclusion** A conclusion that draws upon the points made in the body of the response and makes a supported judgement as to whether or not the technology is appropriate to train nurses.	**(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 identification and one mark for an appropriate linked explanation, up to a maximum of four marks.** **Username** String (1) as the username could contain a mixture of characters/more than one character (1) **Credit_Added** Real/float (1) as user could add values containing pounds and pence/decimal number/ as this would allow the credit to be added to existing credit (1) **Accept any other appropriate responses.**	**(4)**

Question Number	Answer	Mark
10(b)	**Award one mark for each of the following linked points, up to a max of four marks.** • Use a Length check (1) to ensure that it contains acceptable number of characters (1) • Use a Format check (1) to ensure that no invalid characters are entered/check string starts with 0 or + (1) **Additional guidance** Do not accept type check	**(4)**

Question Number	Answer	Mark
10(c)	**Award one mark for each of the following linked points, up to a max of three marks.** Test file is created (1) by inserting test data (1) and (defining) expected results (1) **Accept any other appropriate responses.**	**(3)**

Question Number	Answer	Mark
10(d)	**Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.** • Ensure adequate security measures are in place (1) such as encryption/firewalls (1) • Appoint a data protection officer/data controller (1) monitor compliance with laws (1) • Audit data stored (1) to ensure only essential data is kept (1) • Train employees (1) to ensure that correct working practices are adhered to (1) **Accept any other appropriate response.**	**(4)**

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 Linear Search** It is easy to understand and develop. List of users does not need to be sorted before searched. **Drawbacks of Linear Search** It is very inefficient in terms of time/It can take a long time to complete. This could mean that some users could be waiting a long time before their details were retrieved. The time to execute the search increase greatly as the number of items to be sorted increases (O(N). This could hinder the growth of the number of users accessing the game. **Benefits of Binary Search** It efficient in terms of time, so users would be able to access the game with little delay. The search time does not grow rapidly as the number of items to be searched grows (O ($\log_2$N), therefore users would not notice a lag in authentication due to a growth in the number of users. **Drawbacks of Binary Search** It is a more complex algorithm to understand and develop. The data must be in order for the algorithm to work. **Conclusion** A conclusion that draws upon the points made in the body of the response and makes a supported judgement as to which search algorithm is more appropriate for the online game.	
		(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)

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