



*Rewarding Learning*

**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2024**

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## **Digital Technology**

**Assessment Unit AS 1**

*assessing*

**Approaches to System Development**

**[SDT11]**

**FRIDAY 17 MAY, AFTERNOON**

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**MARK  
SCHEME**

## General Marking Instructions

### Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

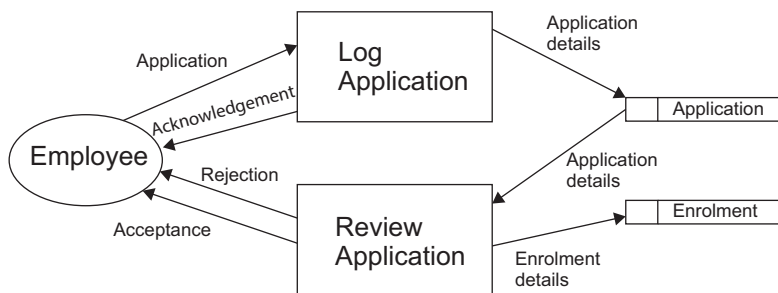
- 1 (a)** Projects running over-time  
 Software did not meet requirements/did not match the users' IT skills  
 Software was very inefficient/advances in hardware and software underutilised/HW developing faster than software/software systems were becoming more complex  
 Projects were poorly managed  
 Code was difficult/expensive to maintain  
 3 × [1] [3]
- (b)** Allows the user to interact with the hardware and the software.  
 Allows data to be entered for processing  
 Outputs the results of processing.  
 3 × [1] [3]
- (c)** Personnel  
 Hardware  
 Software  
 3 × [1] [3]
- (d)** To oversee the development of the new system  
 To schedule/manage the project/budget  
 To monitor progress  
 To identify/respond to risk or bottlenecks  
 To liaise with clients  
 2 × [1] [2]
- (e) Gantt charts**  
 It is a barcode showing the project schedule/progress  
 It shows:  
 The name/start date/finish date/duration of each stage  
 The predecessor/successor of each stage/the dependencies between stages  
 The resources required for each stage  
 The current status of the project  
 3 × [1] [3]
- Critical path analysis**  
 It is a method/algorithm/software tool for planning/scheduling the project archives  
 It identifies critical and non-critical tasks  
 ... and the earliest/latest start/finish times of each activity/task  
 The CP algorithm identifies the chain or sequence of activities which must be followed to ensure the project is completed in the minimum time  
 3 × [1] [3]

AVAILABLE  
MARKS

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- 2 (a) (i) Interviews  
Questionnaires  
Observation  
3 × [1] [3]
- (ii) Two examples of relevant documents/data  
Examples: Details of rooms, lists of bookings, room occupancy reports, historical booking patterns  
2 × [1] [2]
- (b) **A functional requirement**  
A process relating specifically to the application which must be provided  
UR103  
**A non-functional requirement**  
An additional process, not relating specifically to the application, which must be provided  
UR101 or UR102  
4 × [1] [4]
- (c) (i) The context level DFD is refined to a level 1 DFD  
The main processes are identified  
The datastores are identified  
The dataflows are identified  
... between the processes and the datastores  
... between the external entities and the processes  
4 × [1] [4]

(ii)



- [1] for correct dataflows to Employee entity  
[1] for LA process  
[1] for RA process  
[1] for Application datastore  
[1] for Enrolment datastore  
[1] for **each** of three dataflows to datastores [3] [8]

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3 (a) A non-functioning model  
 ... of the user interface is developed  
 This shows the users pathway though the system/the navigation options at each stage  
 These pathways are tested by the users  
 ... and additional interaction/navigation is added  
 3 × [1] [3]

(b) Programmers  
 ... produce the code  
 ... from the project requirements  
 ... and specifications  
 4 × [1] [4]

(c)

Test data	Type of test data	Purpose of test data
5000	Valid/normal	RefNo within the range processed correctly
-1	Invalid	A negative value should be rejected
1000	Valid	A value on the lower limit should be accepted
500	Invalid	A value outside the range should be rejected

6 × [1] [6]

(d) **System testing**  
 Performed in-house/by the development team  
 ... using the test plan/schedule  
 ... to test that the system meets the specification  
 Comprises system testing/module or unit testing/integration testing  
 White box/black box testing may be used  
 3 × [1] [3]

**Acceptance testing**  
 Performed by the user  
 To test that the system meets the user requirements  
 ... in a live environment  
 ... with real volumes of data  
 Leads to sign off  
 3 × [1] [3]

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- 4 (a) (i) If a natural disaster/flood etc. occurs  
 ... a business must be able to operate as normally as possible/in emergency mode  
 ... until the emergency/disaster is over  
 Critical or key data/processes/personnel identified/risks will be identified  
 The backup and recovery method will be described  
 An alternative location will be identified from which they can operate  
 4 × [1] [4]
- (ii) **Differential backup**  
 Backs up all data/files which have changed  
 ... since the last full backup  
 2 × [1]
- Incremental backup**  
 Backs up data/files which have changed since the last backup, whether full backup or incremental backup  
 2 × [1] [4]
- (b) **Name**  
 Adaptive [1]
- Description**  
 Software is modified in response to changing user requirements  
 ... which may be internal/due to changing business functions  
 ... or external/due the new legislation/regulations  
 ... or to changing technologies  
 ... such as developments in operating systems/hardware  
 3 × [1] [4]
- (c) Component: System specification/module specifications [1]  
 How used: To identify the part of the system which needs changing/correcting/debugging  
 Component: DFDs/ERDs/database structures/query designs/report designs/DD  
 How used: To identify the part of the database which need changing/correcting  
 Component: Program documentation/pseudocode/flowcharts/listings/code  
 How used: To identify the code which needs changing/correcting/debugging/optimising  
 Component: Test plans/test schedule/test data/test results  
 How used: To retest the system/module after it has been modified  
 Component: HW/SW Configuration  
 How used: To identify how the system might benefit from advances in technology/software  
 [1] for each of two components  
 [1] for how any component is used  
 3 × [1] [3]

**(d) Banded response**

Features of the Agile approach  
A combination of iterative and incremental models  
Close collaboration with customers  
The project is split into a number of small modules/iterations  
Each model is developed by a separate team of collaborators scrums  
The teams work concurrently  
A project leader coordinates the teams  
Features of the waterfall model  
Consists of a number of separate stages  
Each stage must be completed before the next one can begin  
At the end of each stage the project is reviewed and a deliverable produced  
A previous stage may have to be re-visited if an error is found  
Comparison (The time taken to develop a system)  
Agile approach  
Aims for the rapid delivery of a working product  
Modules can be developed concurrently by multiple independent teams which can speed up development time  
Can adapt quickly to changes in user requirements  
Waterfall model  
A rigid model in which one stage must be fully completed before the next one commences which increases development time  
Changes in user requirements difficult/require previous stages to be repeated

**AVAILABLE  
MARKS**

Level	Marking criteria	Marks
Band 2	The candidate <ul style="list-style-type: none"><li>Provides a detailed description of both system development approaches which is correct</li><li>Addresses the suitability of both approaches wrt development time with justification</li><li>Uses the appropriate Digital Technology terminology accurately throughout the response</li></ul> Presentation, spelling, punctuation and grammar are of high standard.	[5]–[6]
Band 1	The candidate <ul style="list-style-type: none"><li>Provides a detailed description of both system development approaches which is correct</li><li>Refers to the suitability of one method wrt development time with limited justification</li><li>Uses some relevant Digital Technology terminology</li></ul> Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.	[3]–[4]
Band 0	The candidate <ul style="list-style-type: none"><li>Provides a description of one system development approach which is correct but which lacks detail</li><li>Makes limited use of Digital Technology terminology</li></ul> Presentation, spelling, punctuation and grammar are such that the intended meaning is not completely clear.	[1]–[2]

[6]

**(e) Benefit**

The results of the original system are available  
... for results comparison/training/as a backup if new system fails  
2 × [1]

**Drawback**

Duplication of resources  
... hardware/personnel  
2 × [1]

[4]

**AVAILABLE  
MARKS**

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- 5 (a) **Algorithm**  
A list of operations  
... required to complete a task or solve a problem  
2 × [1]
- Syntax**  
The rules that define the format/grammar/structure of each statement in a programming language  
... including permitted symbols, punctuation characters and key words  
2 × [1] [4]
- (b) **A sequence**  
A number of instructions performed in the order in which they are listed  
In this case: Input, If, Output  
2 × [1]
- Selection**  
One set of instructions is executed if a condition is true  
Optionally, another set of instructions is executed if the condition is false  
If mark > 40 then grade = pass else grade = fail  
3 × [1] [5]
- (c) **Count-controlled loop**  
A variable governs the number of times the loop is executed  
... for which start/end/increment values are specified  
2 × [1]
- Condition-controlled loop**  
The loop is controlled by a Boolean variable  
The variable may be tested at the start of the loop (while)  
... or at the end of the loop (until)  
2 × [1] [4]

**(d) Banded response**

Features of inheritance

A new class can inherit the attributes and behaviours of an existing class

Terminology: base/parent/super class derived/child sub class

The derived class inherits all the attributes and behaviours of the base class

New attributes and behaviours can be defined for derived classes

Evaluation (The use of inheritance in supporting code re-usability)

Inheritance is a key part of OOP

New classes are created from existing classes

The appropriate code for attributes and behaviours is automatically re-used

The code does not have to be written and tested

This reduces development time

A single base class can be used to define many sub classes

Level	Marking criteria	Marks
Band 2	The candidate <ul style="list-style-type: none"><li>Provides a detailed description of inheritance which is correct</li><li>Describes the use of inheritance in supporting code reusability with justification</li><li>Uses the appropriate Digital Technology terminology accurately throughout the response</li></ul> Presentation, spelling, punctuation and grammar are of high standard.	[5]–[6]
Band 1	The candidate <ul style="list-style-type: none"><li>Provides a description of inheritance which is correct but which lacks detail</li><li>Refers to the role of inheritance in supporting code reusability</li><li>Uses some relevant Digital Technology terminology</li></ul> Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.	[3]–[4]
Band 0	The candidate <ul style="list-style-type: none"><li>Provides a description of inheritance which is correct but which lacks detail</li><li>Makes limited use of Digital Technology terminology</li></ul> Presentation, spelling, punctuation and grammar are such that the intended meaning is not completely clear.	[1]–[2]

[6]

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**Total**

**100**

**AVAILABLE MARKS**