Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019

Digital Technology

Assessment Unit AS 1

assessing

Approaches to System Development

[SDT11]

TUESDAY 21 MAY, MORNING

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.

AVAILABLE MARKS

1 (a) **User interface**
The user can interact with/communicate with/control the computer system
The user can input data
The system outputs results
Types: command line/GUI(Windows)/menu driven/form based/natural language
(2 × [1])

Process
A function/task/subtask/action/activity carried out by a computer system
(Usually) takes raw data and converts it into information
The results from one process may be passed to other processes
(2 × [1]) [4]

(b) (i) A program written in a high level language/assembly language
… in human readable form/including comments/formatting/white space/meaningful identifiers
It has to be translated/assembled/compiled before it can be executed
(2 × [1]) [2]

(ii) To document code
… to make code more meaningful/readable
… by including comments/meaningful identifiers
(2 × [1])

To test code
… during module/integration/system testing/using black box/white box testing
… following the test plan
(2 × [1])

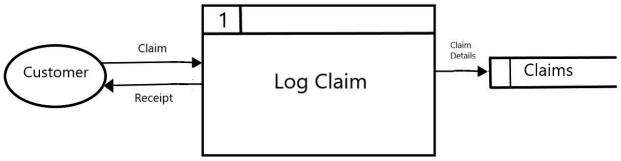
To debug code
To detect/correct errors
… discovered during testing
(2 × [1]) [6]

(c) **Observation**
Users are shadowed
… as they perform a particular task/their everyday tasks
… to identify what their role entails/the data required/the processes
(3 × [1])

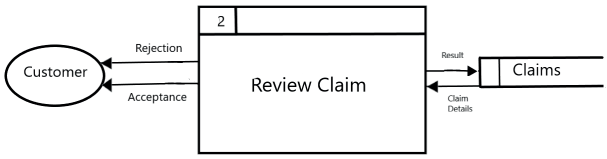
Interviews
Users are asked questions
… on a one-to-one basis/in groups
The interview may be structured/unstructured
Follow up questions can be asked
(3 × [1]) [6]

AVAILABLE MARKS

(d)



[1] for Log Claim process
[1] for single labelled dataflow **to** Claims datastore from Log Claim process
[1] for two dataflows from Log Claim process to Customer entity



[1] for Review Claim process
[1] for two labelled dataflows **to/from** Claims datastore **from/to** Review Claim process
[1] for two dataflows from Review Claim process to Customer entity [6] 24

2 (a) Design:
To produce the systems specification
To specify the user interface /IO layouts/storyboards
… data structures/data validation and verification/DFDs/ERMs
… structure diagrams/flow diagrams/algorithms/pseudocode
… test plans/test schedule/test data
(2 × [1])

Development:
To implement the design/system specification
To create the software/code
To create the data structures
To create the user interface
(2 × [1]) [4]

(b) Each screen/page
… of the user interface
… will be represented as a diagram
… showing the content of each screen/page
… and the navigation paths/sequences/branches/links
(4 × [1]) [4]

(c) (i) Does it meet its objectives/the user requirements? Does it provide the required functionality? Is it fit for purpose?
Is it compatible with existing hardware/software?
Is it error free/robust?
(2 × [1]) [2]

(ii) Is the user interface intuitive/easy to learn?
Can existing skills be transferred?
Does it require training/is it a common or standard interface?
Does the UI match the ICT expertise of the users?
(2 × [1]) [2]

AVAILABLE MARKS

(iii) Alpha testing:
Carried out in-house/by the developers/programmers
Includes module testing
… integration testing
… system testing
… white box/black box testing
… using module specifications/test plan/test schedule
(3 × [1])

Beta testing:
Performed by potential users
… who test a pre-release version
… in a realistic/real-life environment
… using real volumes of data
(3 × [1]) [6]

(d) (i) Adaptive maintenance [1]
The software is modified in response to changing user requirements
These may be internal/due to changing business functions
… or external/due the new legislation/regulations
(3 × [1]) [4]

(ii) **Component:** System specification/module specifications [1]
How used: To identify the part of the system
… which needs changing/correcting/debugging
(2 × [1])

Component: DFDs/ERDs/database structures/query designs/report designs/DD [1]
How used: To identify the part of the database
… which need changing/correcting
(2 × [1])

Component: Program documentation/pseudocode/flowcharts/listings/code [1]
How used: To identify the code
… which needs changing/correcting/debugging/optimising
(2 × [1])

Component: Test plans/test schedule/test data/test results [1]
How used: To retest the system/module
... after it has been modified
(2 × [1])

Component: HW/SW Configuration [1]
How used: To identify how the system might benefit/be improved/perfected
… from advances in technology/software
(2 × [1])

(2 × [3]) [6] 28

AVAILABLE MARKS

3 (a) (i) The project is divided up into a series of builds
… each of which is developed separately/in parallel/has its own lifecycle
Additional functionality is added and tested
… in stages/until the software is complete
(2 × [1]) [2]

(ii) **Agile:**
The system is split up into a number of small modules/iterations. Each module/iteration is developed concurrently by a group of collaborators
A leader supervises the work of all groups

The end user is involved through the development as they are represented/consulted by each group of collaborators via workshops

Waterfall model:
Development consists of a sequence of discrete stages each of which must be completed before the next stage commences
A deliverable is produced at the end of each stage
An earlier stage may have to be reworked if a development error is discovered at a later stage

The end user is involved initially at the Analysis stage. The user is not involved again until implementation/testing

Level	Marking criteria	Marks
Band 2 **Excellent**	The candidate • Provides an accurate and complete description of both approaches • Accurately describes the involvement of the end user for both approaches • Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling, punctuation and grammar are of a high standard.	[5]–[6]
Band 1 **Good**	The candidate • Provides an accurate description of both approaches or of the end user's involvement in both approaches • Uses some relevant Digital Technology terminology Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.	[3]–[4]
Band 0 **Basic**	The candidate • Demonstrates a limited knowledge of both approaches or makes a simple comparison of the end user's involvement in both approaches • Makes limited use of Digital Technology terminology Presentation, spelling, punctuation and grammar are such that the intended meaning is not completely clear.	[1]–[2]

[6]

AVAILABLE MARKS

(b) Incremental backup:
This will make a copy of those datafiles that have changed since the last backup which may have been a full backup or an incremental backup

Full backup:
This will make a copy of all datafiles and provides a complete snapshot of data at time of backup

Data recovery:
Firstly, data from the previous month's full backup will be restored. Then, the daily incremental backups since the last full backup will be restored/applied to the recovered data in reverse order to the order in which the incremental backups were performed

Level	Marking criteria	Marks
Band 2 **Excellent**	The candidate • Provides an accurate description of both types of backup • Accurately describes how data is recovered • Uses the appropriate Digital Technology terminology accurately throughout the response Presentation, spelling, punctuation and grammar are of a high standard.	[5]–[6]
Band 1 **Good**	The candidate • Provides an accurate description of both types of backup • Uses some relevant Digital Technology terminology Presentation, spelling, punctuation and grammar are sufficiently competent to make the response clear.	[3]–[4]
Band 0 **Basic**	The candidate • Demonstrates a limited knowledge of both types of backup • Makes limited use of Digital Technology terminology Presentation, spelling, punctuation and grammar are such that the intended meaning is not completely clear.	[1]–[2]

[6] 14

AVAILABLE MARKS

4 **(a)** **(i)** An interpreter translates one line of the program at a time
A compiler translates the complete program in one go
(2 × [1])

An interpreter executes each line of a program immediately it is translated
A compiler produces an object version of the complete program/the complete program can be executed in one step/an interpreter does not produce object code
(2 × [1]) [4]

(ii) Incomplete programs can be translated and executed/tested/errors can be debugged as they are found [1]

(iii) The object code can be executed without translation/can be ported to other devices [1]

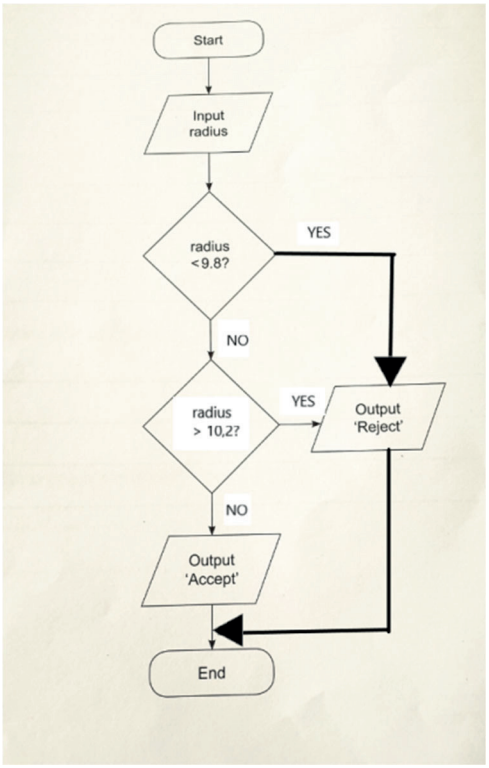
(b) **Character:**
Stores a single symbol
… from a character set
Example: 'a'
(2 × [1])

String:
Stores a sequence/list of characters
Is textual data/text
Example: "World"
(2 × [1])

Boolean:
Can only have one of two values
Example: 0 or 1/true or false/yes or no
(2 × [1]) [6]

AVAILABLE MARKS

(c)



[1] for correct condition
[1] for each correct path
[1] for each correct YES/NO

MAX [6]

(d) radius < 9.8
or
radius > 10.2?
[1] for correct conditions
[1] for 'or' [2]

20

5 **(a)** **Base class:**
A class whose attributes (properties) and behaviours (methods) are inherited
Example: A
[1] + [1]

Derived class:
A class which inherits attributes (properties) and behaviours (methods) from another class
Example: B/C
[1] + [1] [4]

(b) **Attributes:**
These are defined as variables/constants
… of the appropriate type
[1] + [1]

Behaviours:
These are defined as procedures/functions/methods
… with appropriate parameters/return types
[1] + [1] [4]

			AVAILABLE MARKS
(c)	Objects/code can be re-used New code is needed only for additional/modified methods/properties This increases productivity This reduces development time (3 × [1]) The base class will already have been tested Only the derived class/new methods/modified methods require testing This improves SW quality This reduces testing time (3 × [1])	[6]	14
		Total	**100**