

2006 Information Systems

Higher

Finalised Marking Instructions

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1. Change more than one occurrences of phone number (idea of repetition) **(1 mark)** which would result in:

- data inconsistency
- errors
- update anomalies. **(1 mark)**

(mention of errors on its own with no link to them being caused by changing more than one occurrence = 0 marks)

- 2.
- Other S3 tutors may have the same initials (not S3 pupils).
 - When S3 move to S4 need to recreate the key (pupil or tutor).
 - Problem relying on name as name could change.

(Any 2 bullets for 2 marks)

3. Primary key **(1 mark)** and Non-null. **(1 mark)**

OR

Non-null primary key **(1 mark)** and no multi-valued attributes. **(1 mark)**

4. Pupil Number or Pupil Name **(1 mark)** as each pupil has only one value for each. **(1 mark)**

5. (a)
- No decimal point
- OR
- Whole number only
 - Needs to be stored as a number for calculations/comparison/range check. **(1 mark)**

(b) real **(1 mark)**

6. Provide detailed information about the attributes stored in the database/shows metadata

- Provides detailed design of the database.
- Provides detailed design/plan of the database.
- Any example of structure eg format, validation, type, size, etc.
- Helps set up tables.
- Prior to implementation.

(Any 2 bullets for 2 marks)

7. (a) one to one **(1 mark)**

(b) one to one **(1 mark)**

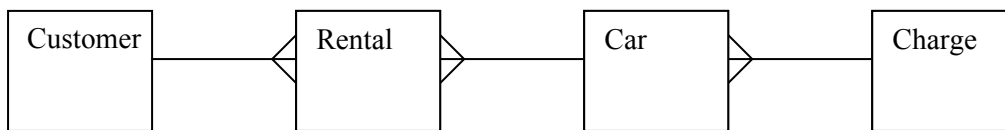
8. Data is raw figures/characters without meaning or context whereas information is data with meaning and given a context and/or structure. **(1 mark)**
Example of data: AF653. **(1 mark)**
Example of information: Flight number AF653. **(1 mark)**
(1 mark for difference and 1 mark for each example)
9. A distributed database is a database that consists of two or more files (or different parts of the database **(1 mark)** located at different sites on a computer network. **(1 mark)**
(1 mark for different parts of the database, 1 mark for different locations on a network)
10. (a) visual **(1 mark)** and aggregated **(1 mark)**
- (b)
- Poor level of detail
 - No indication of percentages
 - No numbers to find out who has won.
- (Any 2 bullets for 2 marks)**
11. To provide a manager with all the information needed. **(1 mark)**
To make decisions OR plan ahead. **(1 mark)**
- 12.
- Functionality
 - Future proofing
 - Maintain legacy systems
 - Hardware compatibility
 - Software compatibility
- (Any one with reason for consideration for 2 marks)**
13. (a) USA **(1 mark)**
- (b) Outwith the EU **(1 mark)** does not have equivalent legislation harmonised with EU countries. **(1 mark)** OR outwith EU. **(2 marks)**

SECTION II

14. (a) 1NF
 (i)&(ii) Customer no
 Customer name
 Customer address
 Customer telephone **1 mark**
0 marks for primary key (carried over from above)
- Item number
Order date
 Number ordered **2 marks for all attributes, 1 mark if Customer no omitted**
- Description **Supplier name**
2 marks for full concatenated key, -1 mark for each part omitted
- Supplier name
 Supplier address **1 mark for Customer no as foreign key**
 Supplier telephone
 Price
- Customer no* **If order date is put in customer entity then 2 marks for concatenated key of item number & customer no.**
- (b) 2NF
 (i)&(ii) Customer no
 Customer name
 Customer address
 Customer telephone **0 marks for carry forward from above**
- Item number*
Order date
Customer no*
 Number ordered **1 mark for Item number as foreign key**
- Item number
 Description **4 marks for attributes correct – across 2 new tables**
(-1 mark for each attribute in the wrong entity)
- Supplier name
 Supplier address
 Supplier telephone
 Price **1 mark for Item number as primary key**

- (c) 3NF
- (i)&(ii) Customer no
 Customer name
 Customer address
 Customer telephone *0 marks for carry forward from above*
- Item number*
Order date
Customer no*
 Number ordered *0 marks for carry forward from above*
- Item number
 Description
 Price
 Supplier name* *2 marks, minus 1 mark for any mistake,
 1 mark for Supplier name as foreign key*
- Supplier name
 Supplier address
 Supplier telephone *1 mark for correct
 1 mark for Supplier name as primary key*

15. (a)



- 1:M between Customer and Rental *(2 marks)*
 1:M between Car and Rental *(2 marks)*
 1:M between Charge and Car *(2 marks)*
(1 mark for link, 1 mark for cardinality) (-1 mark for each extra link shows)

- (b) (i) Mention of attributes
 Car Registration *(1 mark)*
 Date Rented *(1 mark)*
 Price per day AND number of days *(1 mark)*
- Mention of entries
 Car *(1 mark)*
 Rental and Charge *(1 mark)*
(-1 mark for inclusion of car make, car model or any attribute from customer)
- (ii) A summary field or group footer or report footer *(1 mark)* using the SUM function
 (NOT summing or totalling) *(1 mark)*

16. (a) Frequency any time there is a change (**1 mark**) or regularly once a month /end of every day (**1 mark**)
- Storage (Multiple) tape or DAT tape (**1 mark**) or another external hard drive (**1 mark**) mirror drive (**1 mark**) one copy off-site (**1 mark**) off-site (**1 mark**)
- Version Control 3 copies (GF/F/S) or (GP/P/C) (**1 mark**)
Distinction between full back up and incremental back up (**1 mark**)
(**Any 5 for 5 marks**)
- (b) (i) Functionality; performance; usability; compatibility; data migration; reliability; resource requirements; portability (**Any 4 for 4 marks**)
- (ii) on the job training; in-house training; go on a course or external courses (**Any 2 for 2 marks**)
- (iii) Help desk: one central help desk to provide telephone support to all its branches
OR
Manuals: /on-line help/on-line tutorials: provided free with package, always available compared to help desk which is not
OR
FAQ's on website; bulletin board; newsgroup
(**1 mark for method and 1 mark for justification which must be from Head Office's perspective**)
- (c) (i) font size
font type
font style (font colour, bold, italic, underline, background colour)
alignment
heading/colour scheme (but not colour on its own)
page layout (page orientation, margins, border, columns, headers, footers, line spacing)
use of logo (**Any 4 for 4 marks**)
- (ii) template or stylesheet or masterpage (**1 mark**) available to all users on the network (**1 mark**)

17. (a) (i) Strategic/Tactical **(1 mark)**
- (ii) Gantt **(1 mark)**
- (iii) Project Management Software **(1 mark)**
- (iv) Time lining; resource allocation; optimisation; critical path analysis
OR a description of these ie

Timelining – the process of allocating time and dates to project tasks and milestones.

Resource Allocation – resource is often someone to work on the task but can also be machinery, computer equipment, tools, subcontractors, etc.

Optimisation – project plans optimised to meet time schedules, budgets or the requirements of the project scope.

Critical path analysis – the process of identifying the critical path in a project plan by analysing the tasks and highlighting the critical path.

(Any 2 for 2 marks)

- (b) Communication/Email: send and receive information to others involved in the project or business, contractors, clients, etc
- Contacts/Address book: store client, contractors, employee details in order to communicate
- Calendar/Diary: to plan and keep track of appointments, meetings, site visits, reminders, etc
- Task list/To-Do list: “To Do” list to ensure manager is aware of all tasks, jobs, etc that have to be done.

(1 mark for each feature and 1 mark for each use which must link to the scenario, maximum 6 marks)

Detailed:

3 features = 3 marks

- 3** generic explanations with **no** link to scenario = **1 extra mark**
- 2** generic explanations with **one** link to scenario = **2 extra marks**
- 1** generic explanations with **two** links to scenario = **3 extra marks**
- 0** generic explanations with **three** links to scenario = **3 extra marks**

SECTION III

Multimedia

18. (a)
- Backtracking: using a back/next/forward/home button to link to last page/node visited
 - Highlighting: usually shown in blue and underlined – takes you to new node/page
 - Breadcrumbs: a “trail” which has been left and can lead the user back to original place
 - Search facility: search facility to locate specific information
- 1 mark for each bullet (max 2) and 1 mark for each description***

- (b)
- Hardware system requirements
 - Software system requirements
 - User instructions
- 1 mark for each bullet (max 3)***

- (c)
- Streaming allows clip to be watched without waiting for complete download
OR
 - while downloading
 - Steaming results in no illegal copy of the video on the local computer
 - Video clip does not take up space on hard drive
 - Steaming allows clip to be watched sooner/immediately
 - Any other acceptable answer
- 2 marks for any one bullet***

- (d) Advantage
- DVD has a very fast data transfer compared to website
 - Only a DVD player required rather than computer and internet connection
- 1 mark for 1 bullet***

Disadvantage

- Difficult to update
 - Difficult to distribute changes on DVD compared to website
 - Limited storage capacity compared to website
 - Narrower audience than website
- 1 mark for 1 bullet***

***Cost is not acceptable for either**

19. (a)
 - Audience
 - Content
 - Budget
 - Timescale
 - Purpose
 - Delivery media

Description of these is acceptable

1 mark for each bullet (max 2)

- (b) (i)
 - Video clip on board a rollercoaster
 - Audio clip of ride description
 - Animated graphic of other customers
 - Photographs of attractions
 - Any other answer relating to scenario

Audio + video only 1 mark

Audio clip from theme park or other poor description – 1 mark

2 marks for each bullet (max 4)

- (ii)
 - Filename
 - Filetype
 - Size of graphic (window)
 - Length of video
 - Exact position on screen
 - Timing of media elements
 - Any other acceptable answer

1 mark for any bullet

- (c)
 - Description of graphic
 - Appropriate metaphor (sound or video control, exit or any other)
 - Description of function related to scenario (quits the tour when selected)

1 mark for each bullet

Definition of metaphor –1 mark

20. (a)
 - Linear (***1 mark***)
 - Choice of path not desirable (***1 mark***) with large audience (***1 mark***)

Definition of linear (1 mark) link to scenario (1 mark)

- (b)
 - Lack of consistency (***1 mark***) because of different approaches or any other exemplification (***1 mark***)

No mark for content

- (c) (i)
 - The spacing between the Y and e in Year improved by kerning (***2 marks***)
 - Need Y and e for 2 marks***(The spacing in the text (1 mark))***

- (ii)
 - The jagged edges of the bottom right graphic can be smoothed by anti-aliasing (***2 marks***)

21. (a) • Menu or direct manipulation (GUI)
 • User requires no prior knowledge
Easy to use = 0 marks
Must be software interface – not hardware, (1 mark for choice and 1 mark for reason)
- (b) Completeness
 • Not all stores are shown so not complete
 • Any reasonable answer relating to the scenario
(2 marks)
(Poor answer would be “Not all information is there so incomplete” = 1 mark)
- Availability
 • You can only use it when the store is open for poor availability
 • You can use it when the store is closed so good availability
 • Any reasonable answer relating to the scenario
(2 marks)
(Must make some assessment of availability and completeness for 2nd mark)
- (c) (Need for copyright – 1 mark)
 Breach of Copyright, Designs and Patents Act
2 points = 2 marks or full name of act = 2 marks
22. (a) • Car manufacturer requires large colour range ***(1 mark)*** so JPEG is better than GIF ***(1 mark)***
 OR
 • Photo requires large colour range ***(1 mark)*** so JPEG has larger colour range than GIF ***(1 mark)***
 • Files have to be sent over network ***(1 mark)*** so JPEG is better than TIFF as it is a smaller file size ***(1 mark)***
- (b) • Different hardware can show different shades of colour for the same graphic ***(1 mark)***
 • Gamma correction required ***(2 marks)***
- (c) (i) • http – protocol
 • www.eurcar.com – host name/domain name/server
 • customers/support – path name
 • faq.htm – file name/document/page
1 mark for each bullet (max 3)
- (ii) • Absolute ***(1 mark)***
 • The protocol and host name are specified or the complete path of URL
(1 mark)

EXPERT SYSTEMS

23. (a) A DSS
- Collates or summarises information
 - Available/from within the system
 - Presents these to the user (to make decisions)

Any 2 bullets for 2 marks

An ES

- Uses a knowledge base of facts and rules
- To infer new knowledge and draw conclusions or provide service
- As a result of interaction with the user

Any 2 bullets for 2 marks

- (b) Category: advice (1)
Domain: mineral geology (1)
Characteristics: used fuzzy logic (probability) to handle incomplete or uncertain information (1)
Produced results matching those of a human expert very closely (1)

24. (a) **1 mark each for any two of:**
Information is suitable for representation as facts and rules
Restricted domain
-uncertain or incomplete information
Problem is “difficult” and requires degree of expertise to solve
Other acceptable answers

- (b) **1 mark each for any two of:**
Whether there are experts available within budget and timescale
Whether the available budget is sufficient to cover the costs of development
Whether there is sufficient time available for development of the ES

- (c) (i) $\text{takes}(\text{fiona}, \text{tourism}) \wedge \text{takes}(\text{fiona}, \text{leisure_management})$
1 mark for 2 “takes” predicates, 1 mark for \wedge

- (ii) $\forall x: \text{takes}(x, \text{catering1}) \rightarrow \text{takes}(x, \text{food_hygiene}) \wedge \text{in_class}(1023, x)$
1 mark for quantifier ($\forall x$)
1 mark for correct use of variable throughout (x)
1 mark for correct LHS clause
1 mark for implication \rightarrow
2 marks for correct RHS (2 clauses with \wedge)

(d) ES:

Representation

- Data represented as facts and rules

Querying

- User is asked questions and gets advice
- Or consultation
- Or dialogue

Any 2 bullets for 2 marks

RDBMS

Representation

- Data represents tables (records, fields)

Querying

- User gives conditions/criteria matched against

0 marks for just searching the database

Any 2 bullets for 2 marks

(e) A database linked to an expert system (*1 mark*) so that rules can be applied to the records in the database to draw conclusions. (*1 mark*)

25. (a) 0.48 (*1 mark*)

Min (0.9, 0.6) x 0.8 = 0.48 (*1 mark*)

(b) The conditions are too draughty (*1 mark*)

This has the highest CF of all the rules which can be applied (*1 mark*)

With 0.49 (*1 mark*).

(c) (i) Because many rules may match (*1 mark*)
the conditions in the working memory (*1 mark*)

(ii) to identify the rules (*1 mark*)
whose conditions match the facts in the working memory (*1 mark*)

(iii) The rule with most conditions matching the facts in
working memory (*1 mark*) will fire first (*1 mark*)

26. (a) Soil IS acid IF
 Colour IS dark.
 Soil IS loam IF
 Colour IS brown.
 Soil IS clay IF
 Colour IS light.

OR

IF Colour IS dark.
 Then soil IS acid.
 IF colour IS brown
 Then soil IS loam.
 IF colour IS light
 Then soil IS clay

1 mark for each correct rule

- (b) usually (***1 mark***) often (***1 mark***)
- (c) The soil is suitable for growing azaleas IF
 Soil IS Acid/Dark (***1 mark***)
 CF X. (***1 mark***)
 CF should be ≥ 0.75 and < 1.0 .
 The soil is suitable for growing azaleas IF
 Soil IS Loam/Brown (***1 mark***)
 CF Y. (***1 mark***)
 In both rules CF should be > 0.5 and < 1.0 ; in rule 1, CF should be higher than in rule 2.
 Same variables must be used as in part (a)

Acid soils are most suitable for growing coniferous trees, rhododendrons and azaleas.

Loam soils are usually suitable for most types of garden plants.
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27. (a) 3, 4, 6 (***2 marks***)
 (***1 mark for 3 correct + 1 incorrect***)
 (***1 mark for 2 correct + up to 1 incorrect***)
- (b) 3 (***1 mark***)
- (c) 6 (***1 mark***)

THE INTERNET

28. (a) Class C *(1 mark)*
- (b) (i) 8 *(2 marks)* $2 \times 3 = 6$ *(1 mark)*
- (ii) 30 *(2 marks)* 32 *(1 mark)*
- (c) (i) Router *(1 mark)*
- (ii) A router sits on (has) 2 networks *(1 mark)* so has an address for each of these networks *(1 mark)*
- (d) (i) A server that sits between a client and another server (either internal or external)
OR
a server that acts as an intermediary between a workstation user and the Internet
(2 marks, 1 mark for poor or partial definition)
- (ii)
 - To share an internet connection
 - To provide filtering/caching
 - For firewall protection
 - To provide network address translation*(1 mark each for any 2 bullet points)*
- (e) A protocol *(1 mark)* used for remote communication *(1 mark)*
- A terminal emulation program used for remote access (1 mark)*
29. (a) The IANA is responsible for administering IP addresses
OR
responsible for the management of DNS allocations of top-level domain names *(1 mark)*
- (b) The W3C leads developments on the WWW dealing with technical developments
(1 mark)

30. (a) Domain Name Server (DNS) **(1 mark)**
- (b) Credibility
- No author's name
 - No adverts from trusted companies
 - Biggest and best claim – means of measuring best?
 - Copy of every CD published – is this possible?

(Any bullet for 1 marks)

Any bullet plus assessment of credibility (2 marks)

Legality

- CD – downloading music. Copyright Design and Patents Act
- Copies of unreleased films
- Registering details under Data Protection Act

(Any bullet for 1 mark)

Any bullet plus assessment of legality (2 marks)

- (c) Advantages

- Can be easier to use for beginner
- Creates web pages quickly
- Can add special effects

Disadvantages

- More powerful ones are not easy to use
- Do not always get exactly what you want
- Can be expensive
- Can give 'bloated' or extraneous code

(one advantage for 1 mark)

(one disadvantage for 1 mark)

- (d) (i) A short piece or file of text/code **(1 mark)** stored by a website on a client
OR
sent by a website to a client **(1 mark)**
- (ii)
- To keep a note of previous purchases/preferences
 - To personalise the site with name and/or other personal details
 - To provide targeted advertising using information gathered during previous visits
 - Access cookies from competitors
 - Other acceptable answers
- Any 2 points described with reference to Biggest and Best for 2 marks each**

31. (a) Public key *(1 mark)* Private key *(1 mark)* or Asymmetric encryption *(1 mark)*
- (b) She would find which PGP server held Sean’s public key and download a copy of this *(1 mark)*. She would run the PGP client program on her computer *(1 mark)*, enter Sean’s public key to encrypt the file *(1 mark)* and then email the encrypted file to Sean *(1 mark)*

OR

Get public key *(1 mark)*
 Encrypt file (using public key) *(1 mark)*
Email encrypted message *(1 mark)*
 Sean decrypts using private or different key *(1 mark)*

32. (a) <H3> Strathmore IT solutions Picture Gallery Template </H3>
 OR
 <H4> Strathmore IT Solutions Picture gallery Template </H4>
 OR
 <H5> Strathmore IT Solutions Picture gallery Template </H5>
(1 mark for each tag)
- (b) The browser knows the size of space to leave for the graphic *(1 mark)* and can continue to download the remainder of the page with the correct format *(1 mark)* thus saving time for the user *(1 mark)*
 OR
 If the graphic is not available *(1 mark)* the browser can indicate the position of the graphic with a frame of the correct size *(1 mark)* preserving the format of the rest of the page for the user *(1 mark)*
 OR
 Consistency in size of image/size of image is known *(1 mark)* user can set browser window *(1 mark)* and always see all of image *(1 mark)*
- (c) the <BR tag> is used to break the lines of text – to take a new line *(1 mark)* whereas the <p> tag is used to insert a (line) space between paragraphs. *(1 mark)*
- (d) Contact us at pics@StrathmoreITSolutions.co.uk
 .

The following must be part of a line of code

<A HREF=	<i>(1 mark)</i>
“mailto:pics@StrathmoreITSolutions.com.uk”>	<i>(1 mark)</i>
pics@StrathmoreITSolutions.co.uk	<i>(1 mark)</i>
	<i>(1 mark)</i>

(e) Download efficiency **(1 mark)**

- The picture is not appearing in the web page as the user may have selected the option not to show the graphics in the browser to increase download efficiency.
- The graphic is a JPEG which is a compressed file format. This will increase download efficiency.
- As the size of the graphic is unknown it could be very large hence the reason why the picture has not been downloaded to the web page.

(any bullet 1 mark)

Browser compatibility **(1 mark)**

- The graphic is a JPEG which is compatible with all browsers.
- Most graphic file types are now compatible with all browsers.

(any bullet 1 mark)

Page structure/layout **(1 mark)**

- Page width/line length too short so template overflows to next line.
- Visual balance is quite pleasing with no overload of graphics or text.

(any bullet 1 mark)

[END OF MARKING INSTRUCTIONS]