



2007 Information Systems

Higher

Finalised Marking Instructions

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1. It may remove the only (**1 mark**) occurrence of information about a customer or hotel (**1 mark**).
(*Deletion anomaly could occur – 1 mark only*)
2. (a) This ensures that the licence number will be unique (**1 mark**) as people could have the same name and date of birth (**1 mark**).

(b) Licence number could change (**1 mark**) if someone changes their name (**1 mark**).
3. An attribute in a table which is a primary key (**1 mark**) in another table (**1 mark**).
4. Referential integrity states that foreign keys (**1 mark**) can only take values which already exist in another table (**1 mark**).
5. (a) Item or Price (**1 mark**) as there can be more than one for any one transaction or customer (**1 mark**).

(b) The set of permitted values OR a range of values (**2 marks**).

(c) Letters, text, number, not null, restricted choice, alphanumeric (**1 mark**).
6. Knowledge is derived from information (**1 mark**) by inferring new information or making decisions based upon it (**1 mark**).
(*Information that is processed or understood – 1 mark*)
7. Diagnosis or give advice on what to do if you are ill (**1 mark**)
 - To provide a second opinion to doctors or patients.
 - To provide advice when expert specialists are not available.
 - Expansion of how it is carried out.(*Any bullet for 1 mark*)
8. (a) Quantitative: percentage of each response (**1 mark**).
Qualitative: customer reactions or opinions/4 choices listed/1 listed with etc (eg excellent, etc) (**1 mark**).
(*Must be clear from the answer which is quantitative and which is qualitative*)
(*Do not accept text only*)

(b) Source/sample/range of sample population/time of day/different cook (**1 mark**).
9.
 - Provides highly graphical, summarised output.
 - Can access internal and external sources.
 - Allows drill-downs in detail to levels below.
 - Draws on summarised data from DPS, MIS and DSS.
 - Compares trends to determine plan of action for an organisation.(*Any bullet for 2 marks*)
(*Provides summarised output (1 mark)*)
10. Functionality, performance, usability, compatibility, data migration, reliability, resource requirements, portability, support (*Any 2 for 2 marks*). **Must have these terms.**

11.
 - Regular breaks
 - Regular eyesight tests
 - Training in the use of a workstation
 - Adjustable equipment
 - Ergonomic workstation
 - Adjustable seats
 - Air conditioning
 - Tidy cables
 - Appropriate lighting
 - Testing of electrical equipment
 - Carry out risk or health assessments
 - Participate in health and safety training*(Any 2 bullets for 2 marks)*
12. Allows employers, the Government, the security services (police, MI5) *(1 mark)* to monitor/ intercept electronic communications *(1 mark)*. *(Insist on electronic)*

13. (a) 1NF
(i)&(ii)

Member no
Member name
Member address
Member telephone
Trainer ID
Trainer name
Trainer address
Trainer telephone

Date
Exercise ID
Equipment
Duration
Level
Performance score
Member no*

Attributes

1 mark for including Member no in removed entity

2 marks for correct attributes

(Trainer attributes treated as one group)

Keys

2 marks for full concatenated key, 1 mark if 1 error in key (includes omissions or additions)

1 mark for Member no as foreign key

(b) 2NF
(i)&(ii)

Member no
Member name
Member address
Member telephone
Trainer ID
Trainer name
Trainer address
Trainer telephone

0 marks for carry forward from above

Date
Performance score
Member no*
Exercise ID*

Attributes

4 marks for correct attributes

0 marks if not from concatenated key

Keys

1 mark for correct primary key

1 mark for correct foreign key

Exercise ID
Equipment
Duration
Level

15. (a)
 - Hardware compatibility with example eg system requirements or implication eg upgrade hardware.
 - Integration with existing software packages.
 - Compatibility with existing operating system.
 - Compatibility with existing data documents.
 - Others may not be able to open documents from this department.
 - His staff may require training and support in using the package.**(2 marks for each bullet, 1 mark for partial answer– max 8 marks)**
- (b) Software, Upgrade **(2 marks)**.
16. (a) =COUNT(C4:C13) **(2 marks)** (1 mark for Count) (=is optional)
- (b) =IF(C4>=70, “A”,IF(C4>=60, “B”,IF(C4>=50, “C”, “F”))) (=is optional)
OR
Any alternative syntax
3 or 4 IFs = **1 mark**.
1 mark for each correctly used IF statement involving a condition, a true value, a false value and appropriate nesting, **up to a maximum of 3 marks – max 4 marks**.
- (c) (i) LOOKUP **(2 mark)**
- (ii) B = C4 or the reference to the value **(1 mark)**
C = G2:H8 or G1:H8 or description of table references **(1 mark)**
Note: B and C are interchangeable. Column is not a necessary attribute.
(Mark out of 4)
17. (a)
 - Prevent employees wasting time
 - Ensure employees are using computers for work purposes
 - Prevent access to unsuitable material**(2 marks for any bullet point)**
- (b)
 - Log files may be examined
 - Screens may be viewed remotely**(Do not accept Internet history)**
(2 marks for any good answer, 1 mark for a fair answer)
- (c)
 - Ethics: may infringe employees’ rights to privacy/breach of privacy/preserve the integrity of the business.
 - Legality: Employers can monitor work usage **(1 mark)** as long as employees are aware of it (eg by signing an Acceptable Use Policy) **(1 mark)**.**(2 marks for a clear answer for each implication – max 4 marks)**
(Candidates must distinguish which answer relates to ethics and which relates to legality to obtain full marks)
- (d) No **(1 mark)**. The Freedom of Information Act only applies to public authorities and not companies **(1 mark)**.

Multimedia

18. (a)
 - Age (literacy) level of user
 - Budget
 - Timescale
 - Content
 - Delivery media/specification of computer**(1 mark for each valid point – max 3 marks)**
- (b)
 - The requirements specification provides the basis for a contract.
 - Head Teacher knows exactly what they are getting.
 - Simon knows what to do.
 - Contains the detail of exactly what the specification has to do.**(Any bullet for 1 mark – max 3 marks)**
- (c) Graphical User Interface (*not Wimp*) **(1 mark)**.
 - No need to memorise commands for young children
 - Fast interaction
 - Allows easy learning
 - Encourages user exploration
 - Easy interaction with the application**(Accept answers for menu driven)**
(Do not accept easier for young children to use)
(1 mark each for two valid reasons – max 3 marks)
- (d) Detailed storyboard would include text details for the heading and instructions (actual font, style, size, colour), actual colours for background, information about links, graphic or audio file name, type, size, position and duration (audio only).
(Do not accept a list of multimedia elements eg text, graphics, sound)
(1 mark each for three valid points – max 3 marks)
- (e) Linear, hierarchical or web
(1 mark each for two valid navigation structures from list)
 - Linear, screens followed one after the other, must progress in certain order.
 - Hierarchical structure would require user to go back a level and select a different option.
 - Web structure allows users to follow their own path, unique to each user.**(2 marks each for description of navigation structure which relates to scenario ie children using the product – max 6 marks)**
- (f)
 - Authoring software allows the user interface to be created so that each user can control a range of multimedia objects.
 - A timeline is used to state exactly when objects start or finish, objects can be dragged on to this line easily.
 - Set behaviour of each individual object.**(1 mark each for feature, 1 mark each for description – max 4 marks)**
- (g)
 - Assume a persona/avatar or adopt an identity **(2 marks)**.
 - Chat rooms/MSN/on-line games allow users to adopt a personality they may wish they had, eg brave knight or adopt an identity to remain anonymous.
 - E-mail address to project a cool or trendy image **(2 marks)**.**(1 mark for idea of where persona/avatars may be used, 1 mark for example – max 4 marks)**

19. (a)
 - Each screen is tested to ensure it matches the design and all functions work.
 - Does the screen layout match the design?
 - Buttons
 - Navigation/Links
 - Clarity of text
 - Resolution of images
 - Do all video clips run without problems?
 - Do all sound clips run without problems?

(Do not accept one word answers for media objects such as video, sound, etc)
(1 mark for each valid point, maximum of 4)
- (b) Usability testing evaluates how easy the product is to use.
It involves a selected user or group of actual users working through the product.
(1 mark for 'ease of use', 1 mark for 'testing with actual users')
20. (a)
 - Media/Graphic/Audio/Video specialist – experts in one individual media type who create multimedia objects or files.
 - Multimedia programmers – creating the product from the overall design provided by the designer, expert in the authoring tool chosen, incorporates objects from the media specialists.
 - Subject Expert – advise on factual content relating to vets.

(1 mark for each job stated, maximum of 2, 2 marks for each description – any two valid points – max 6 marks)
- (b)
 - Use of multimedia elements to create virtual animal bodies for training.
 - Use of audio to create commentary of steps in operation.
 - Use of video to produce sequence of an operation being performed.
 - Use of graphics/photographs for symptoms, wounds, injuries.
 - Use of graphics to produce animated diagrams of body functions/interaction.

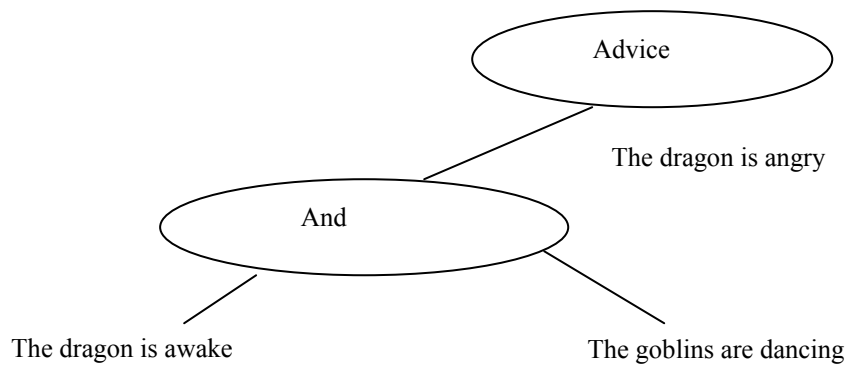
(1 mark for a vague description, 2 marks for each valid use – but must link in to the scenario – max 6 marks)
21. (a) A web palette **(1 mark)** with fewer colours will ensure the image is displayed consistently on all platforms **(1 mark)**.
(Do not accept answers relating to file size ie quicker to download)
- (b) Problem
 - Colours do not match the original **(1 mark)**
 - Gradual changes in shade are replaced by blocks of colour with a clear border **(2 marks)**Solution
 - Dithering **(1 mark)**
 - Mixing two colours to produce another **(1 mark)**

(Max 4 marks)

Expert Systems

22. (a) (i) $CF(\text{conc}) = \min(CF(\text{conditions})) \times CF(\text{rule})$
 $= 0.4 \times 0.9 = .36$ (36%)
(1 mark for correct application of formula)
(1 mark for correct answer)
- (ii) CF of rule 2: $0.4 \times 0.8 = 0.32$ (32%) **(1 mark)**
CF of rule 3: $0.6 \times 0.7 = 0.42$ (42%) **(1 mark)**
Advice is Attack with lance **(1 mark)**
Because the CF of this advice is the highest **(1 mark)**
Do not penalise if incorrect formula in (i) is applied correctly

(b)



Must have 3 statements and NOT questions (which makes it distinct from a decision tree)

(1 mark for the clear Advice or structure and 2 marks for the two conditions with AND)

- (c) (i) The set of facts which are all current or in the knowledge base or created during a consultation **(2 marks)**.
(Mention of facts – 1 mark)
- (ii) Rules **(1 mark)** which may be fired or can be asked **(1 mark)**.
- (iii) The RETE algorithm **(1 mark)** maintains a list of rules whose conditions match the facts in the working memory **(1 mark)**.
- (iv) The rule with the most conditions **(1 mark)** satisfied/matched **(1 mark)**.
(The rule with the most matches – 1 mark)

23. (a)

| Pattern type | No of colours | Stitch |
|--------------|---------------|--------|
| Simple | One | One |
| Complex | Many | One |
| Complex | One | Many |
| Complex | Many | Many |

(1 mark for headings plus any correct row)

(1 mark for each other correct row – max 4 marks)

Row must not include the word “or”

Can be alternative words for “many” eg “multiple” or “mix” but only in separate columns

(b) IF garment is scarf
AND pattern is simple
[AND grading ≥ 1] – superfluous
THEN member can knit pattern/garment
(1 mark)

IF garment is jumper *(IF garment is jumper or socks – 2 marks)*
AND pattern is simple *(IF garment is jumper and socks – 1 mark)*
AND grading > 1
THEN member can knit pattern/garment
(1 mark)

IF garment is socks
AND pattern is simple
AND grading > 1
THEN member can knit pattern/garment
(1 mark)

IF grading = 3 *(No marks if pattern is mentioned before last line)*
THEN member can knit pattern/garment
(1 mark)

(c) (i) $\text{grade}(\text{ailsa}, \text{grade_3}) \wedge \text{has_knitted}(\text{ailsa}, \text{jumper}, \text{complex})$
(1 mark for 2 correct conditions, 1 mark for correct use of \wedge)
(Accept capital A on Ailsa)

(ii) $\forall x: \text{has_knitted}(x, \text{socks}, \text{simple}) \rightarrow \text{grade}(x, \text{grade_2})$
(1 mark for predicates in correct order with implication)
(1 mark for use of variable – any variable name acceptable)
(1 mark for all other details correct – predicate arguments, use of \forall)

24. Domain: molecules/chemistry/chemicals *(1 mark)*

Category: classification *(1 mark)*

Main characteristics: Any 1 of:

- first expert system to be developed
- proved that an expert system could produce results with same degree of accuracy as human expert
- natural constraints were applied to reduce the number of possible results.

(2 marks for any bullet)

25. (a) The database stores a list of postcodes and street addresses (*1 mark*).
The database looks up the given postcodes and returns the street addresses (*1 mark*).
- (b) Any two of:
- the domain is complex: there are many possible alternative routes
 - the domain will rarely change as roads are fairly constant
 - the knowledge exists eg from digital maps
 - restricted domain of knowledge to code (restricted set of possible options).
- (2 marks for each clear reason given, 1 mark for a fair response – max 4 marks)*
- (c) (i)
- She may have entered different or incorrect information (*2 marks*).
 - The knowledge base or facts and rules may be different because
 - one may be more up to date (*2 marks*)
 - one has incorrect information (*2 marks*).
 - The rules used to determine the route may be applied differently due to
 - different methods of chaining (*2 marks*)
 - different conflict resolution strategies (*2 marks*).
- (Any combination of the above to a maximum of 6 marks)*
- (ii) Any 2 of:
- the information must be kept up to date to be useful. This is very time consuming, as there are many changes to the road network to take account of, eg roadworks
 - the expert system is unlikely to be able to take account of weather or traffic conditions which may affect the journey time
 - the expert system does not have common sense knowledge, and, therefore may not include elements such as rest breaks or refuelling stops
 - the expert system does not take account of driver/car speed.
- (2 marks for each clear description, 1 mark for a fair response – max 4 marks)*

The Internet

26. (a) (i) A cascading style sheet is a set of rules for a number of text formatting controls **(1 mark)** that can be linked to a number of web pages **(1 mark)**.
OR
A language **(1 mark)** used to describe how an HTML document should be formatted **(1 mark)**.
(1 mark for rules/language, 1 mark for formatted or displayed or description of these)
- (ii) Once the css has been set up it can be applied to all the web pages in a site **(1 mark)** giving them all the same appearance. **(1 mark)**.
- (iii) 3. color : red or color : FF0000 **(1 mark)**
4. font-family : Arial *(hyphen not necessary)*
or font : Arial **(1 mark)**
if { is used only award 1 mark
- (iv)
 - The internal style sheet has over-ridden the external style sheet.
 - The page was not linked to the external style sheet.
 - In-line style in the document has over-ridden the external style sheet.**(Any 2 bullets for 2 marks each – maximum of 4)**
- (v) The World Wide Web Consortium (W3C) leads developments on the World Wide Web or an example of a development eg HTML **(2 marks)**. It differs from the role of the IETF as the IETF carries out research into all aspects **(1 mark)** of Internet development **(1 mark)**.
- (b) Server-side scripting **(1 mark)** would be used to create the HTML code **(1 mark)** which is used to display ever-changing information stored in a database **(1 mark)**.
27. (a) (i) No **(1 mark)**
- (ii) Because Nominet does not manage .ac.uk domain names **(1 mark)** and Gradewhackers is not an academic institution and you have to be an academic institution to be able to register a .ac.uk domain name OR apply for a relevant top level domain name as they are a company eg .co.uk/.com/.org/.net **(1 mark)**
- (b) A domain name server **resolves** the web address into the correct IP address **(1 mark)**. The operating system compares the domain name with the domain name that is currently being referenced **(1 mark)**. If the names match then the web page is displayed **(1 mark)**. If no match found then it is passed on to another DNS **(1 mark)**. If not resolved then timeout error (404) is returned **(1 mark)**.
(Any three of these points for 3 marks)

- (c) A router is a device that joins multiple networks **(1 mark)**. It determines the next network point **(1 mark)** for a packet of data **(1 mark)** to be forwarded towards destination **(1 mark)** by best possible route **(1 mark)**. It checks IP address to see if it knows the destination **(1 mark)**. It references a routing table **(1 mark)**. **(No credit for answers relating to packet switching)**

A routing table is a database **(1 mark)**. It stores information about routes to destinations **(1 mark)**. It stores information regarding traffic load, distance, number of points or jumps **(1 mark)**. It is used to make decisions where to send traffic **(1 mark)**. If router does not know destination, it forwards packet to another router **(1 mark)**.

(Any eight of these points for 8 marks)

- (d)
- Most of the information on the web page is not credible **(1 mark)**.
 - Because it states that the study guides will cover ALL courses **(1 mark)** at ANY university **(1 mark)**.
 - Claim that 95% of their customers pass with merit does not seem credible. How would they obtain this information **(1 mark)**.
 - Author's name not included **(1 mark)**.

(any combination from above – max 4 marks)

OR

Could also accept aspects of the information are credible (available subjects, etc).

OR

Any other point which relates to information being credible.

Do not accept any answers relating to Reliability

- (e) PGP **(1 mark)**

This method involves the use of keys, a public key and a private key **(1 mark)**. A public key is freely available to everyone on the Internet and is used to encrypt the message **(1 mark)**. A private key is secure and is used to decipher the message **(1 mark)**.

28. (a) <title> **(1 mark)** Hotel Paradiso </title> **(1 mark)**

- (b) To define a section of HTML code **(1 mark)** where the same formatting will be applied **(1 mark)** thus saving time or until the div tag is closed **(1 mark)**

- (c) <td></td>

<td><a href= **(1 mark)**

"Images/Room1.jpg">
(2 marks if all correct, 1 mark if trivial error in either part)

</td> **(1 mark)**

omission of "" is acceptable

- (d) line 11: <tr> **(1 mark)**
line 15: </table> **(1 mark)**

[END OF MARKING INSTRUCTIONS]