1. Name the devices A, B, C, D and E using the words from the list.

   A: Microphone
   B: Light pen
   C: Remote control
   D: Memory stick
   E: Numeric keypad

2. Ring two items which are output devices.

   DVD ROM, Hard disc, Keyboard
   Plotter, Robot arm, Scanner

3. Complete each sentence below using one item from the list.

   a bank cheque, a CD RW, a floppy disc
   a keyboard, a magnetic stripe, a utility bill
   an OMR sheet, a dot matrix printer, a laser printer

   (a) Answers to multiple choice examination questions are recorded using an OMR sheet.
   (b) Magnetic ink characters are used to record information on a bank cheque.
   (c) A very large graphics file which needs to be moved from one computer to another is stored on a CD RW.
   (d) Information on multi-part stationery is output using a dot matrix printer.
4. Tick **true** or **false** next to each of these statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreadsheet software would be used to create a burglar alarm system.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>A measuring program would be used to record the temperature of a cooling liquid.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Control software is used to store information about workers in a factory.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>MICR is used for reading data from the bar code on a food item.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Use of an ergonomic keyboard will lead to RSI.</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

5. Complete the following sentences using the most suitable storage device or medium listed below.

   DVD R    fixed hard disk drive    memory stick

(a) A student taking his coursework home to develop would use a memory stick. [1]

(b) A company selling copies of games would use a DVD R [1]

(c) An office worker who never took her work home would store her work on a fixed hard disk drive [1]

6. A floor turtle can use the following instructions:

<table>
<thead>
<tr>
<th>INSTRUCTION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORWARD $n$</td>
<td>Move $n$ mm forward</td>
</tr>
<tr>
<td>BACKWARD $n$</td>
<td>Move $n$ mm backward</td>
</tr>
<tr>
<td>LEFT $t$</td>
<td>Turn left $t$ degrees</td>
</tr>
<tr>
<td>RIGHT $t$</td>
<td>Turn right $t$ degrees</td>
</tr>
<tr>
<td>PENDOWN</td>
<td>Lower the pen</td>
</tr>
<tr>
<td>PENUMUP</td>
<td>Lift the pen</td>
</tr>
</tbody>
</table>

Complete the set of instructions to draw these shapes by filling in the blank lines.

Prepared by Mrs. Magda M. Kamel & Eng. Gamal Orphy
M: 01001025852
7. A school in a cold country would like to grow tropical fruit. They want to use a computer controlled greenhouse for this purpose.

(a) Name three sensors that they would need to use to measure the soil and growing conditions.

1. Temperature sensor
2. Moisture sensor
3. Humidity sensor
4. Light sensor
5. pH sensor
6. Gas sensor (O2, CO2)

[3]
(b) Describe how three output devices would be used to control the growing conditions.

<table>
<thead>
<tr>
<th>Name</th>
<th>What variable is changed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>water sprinkler/humidifier</td>
<td>humidity</td>
</tr>
<tr>
<td>heater/cool/air con.</td>
<td>temperature</td>
</tr>
<tr>
<td>light bulb</td>
<td>light intensity/level</td>
</tr>
<tr>
<td>motor for opening/closing windows</td>
<td>temperature</td>
</tr>
<tr>
<td>fan</td>
<td>temperature</td>
</tr>
</tbody>
</table>

(c) Describe the computer processing which would be required to maintain the necessary growing conditions.

- temperature is compared with preset value
- if lower microprocessor switches on heater
- if lower microprocessor shuts windows
- if higher microprocessor switches heater off
- if higher microprocessor switches fan on
- if higher microprocessor opens windows

- moisture sensor constantly monitors moisture content of soil
- humidity is compared with preset value
- moisture level is compared with preset value
- if lower microprocessor switches on sprinkler
- if higher microprocessor switches off sprinkler

- light is compared with preset value
- if lower microprocessor switches on light bulb
- if higher microprocessor switches off light bulb

(d) Explain why computer control would be used rather than relying on humans.

- Computers are more accurate than human beings
- Computers can work continuously without taking a break
- Computers do not forget to take readings
- Computers can take readings more frequently
- Computers can respond quicker to changes than human beings
8 Give three reasons why some situations have to be modelled.

1. Real thing may be:
   - Too dangerous

2. Too expensive

3. Too large a time scale required

4. Wasteful of materials

5. Too vast a scale

9 The prolonged use of computers can lead to health and safety problems.

   (a) Describe two health problems and how they could be prevented.

   Problem – Headaches
   Prevention – Use anti-glare screen/Take regular breaks

   Problem – Eye strain
   Prevention – Use anti-glare screen/Take regular breaks

   Problem – RSI
   Prevention – Use ergonomic keyboard/wrist rests/Take regular breaks

   Problem – Back ache
   Prevention – Use straight backed chair/Take regular breaks

   Note: allowed to use Take regular breaks once only

   (b) Describe two safety problems and how they could be prevented.

   Problem – Electrocution
   Prevention – Power sockets should not be overloaded and power cables should be laid secured

   Problem – Trailing cables
   Prevention – Create ducts/cover cables with carpets etc.

   Problem – Heavy equipment falling
   Prevention – Sturdy tables

   Problem – Fire
   Prevention – Presence of fire extinguisher

Prepared by Mrs. Magda M. Kamel & Eng. Gamal Orphy
M: 01001025852
10 A systems analyst has been asked by a bookshop owner to computerise the records he keeps about his books. He will not be keeping records of customers.

(a) The systems analyst must first of all collect information about the existing system. Describe three methods which would be used to collect this information.

Any three descriptions from:

Observation: Watching people in their work practices

Questionnaires: recording of responses to questions to users about the system

Interviews: face to face questions to users about the system

Examining documents: looking at/through current paperwork

(b) Tick two reasons why he would want to computerise his record-keeping system.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>You can't have a well organised paper-based record system.</td>
<td></td>
</tr>
<tr>
<td>He would have more customers.</td>
<td></td>
</tr>
<tr>
<td>He could find details of books more quickly.</td>
<td>✔️</td>
</tr>
<tr>
<td>He would save space in his bookshop.</td>
<td>✔️</td>
</tr>
<tr>
<td>It would not cost him very much money to start with.</td>
<td></td>
</tr>
<tr>
<td>He could sell books at higher prices.</td>
<td></td>
</tr>
</tbody>
</table>

(c) The systems analyst must now produce a screen input form. Design a suitable screen input form which the owner could use to input the details of one book. Consider both the fields that you will include and the form layout.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISBN</td>
<td>[.........................]</td>
</tr>
<tr>
<td>Reference number</td>
<td>[..........................]</td>
</tr>
<tr>
<td>Book Title</td>
<td>[..........................................................................................]</td>
</tr>
<tr>
<td>Author's name</td>
<td>[.........................................................]</td>
</tr>
<tr>
<td>Publisher</td>
<td>[.........................................................]</td>
</tr>
<tr>
<td>Dewey number</td>
<td>[.......]</td>
</tr>
<tr>
<td>Genre</td>
<td>[.........................................................]</td>
</tr>
<tr>
<td>Target age group</td>
<td>[.........]</td>
</tr>
<tr>
<td>Date published</td>
<td>[../../.........]</td>
</tr>
<tr>
<td>Summary of contents</td>
<td>[..........................................................................................]</td>
</tr>
<tr>
<td>No. of copies</td>
<td>[..........]</td>
</tr>
<tr>
<td>Number of pages</td>
<td>[..........]</td>
</tr>
</tbody>
</table>

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M: 01001025852
(d) The data entered will need to be verified. Describe two methods of verifying data.

1. Double keying: typing in the data twice and comparing them by computer to record matching records and rejecting non matching
2. Visual Check: visually comparing the typed in data with the original source document

11 Most banks now allow their customers to manage their accounts on-line.

(a) When customers first want to use the system, they have to make sure that they have a computer with a modem. This is so that they can transfer data from the computer along telephone lines. Why is a modem needed?

- computer works in digital
- phone lines carry sound/analogue signal
- need to convert digital to analogue/analogue to digital

(b) When customers want to gain access to the system, they have to log on. What two pieces of information should be entered into the welcome screen?

1. user id/account number
2. password

(c) This information will need to be encrypted so that hackers will not be able to gain access to your account. What is meant by encryption?

- Encryption makes data in unreadable/not understandable form when hackers get hold of it
- Causes data to be scrambled/encoded
- Requires an encryption key/software to encrypt
- Requires a decryption key/encryption software to decrypt
- Results in data which is not understandable/readable
- protects sensitive data from being understood if falls in to the wrong hands.
(d) Describe two disadvantages to the bank of having such a system rather than several branches.

- Lose older customers who don’t like change
- Initial set up costs of equipment/ initial outlay on computers expensive...
- Need to employ highly paid technical experts to maintain system
- Initial large redundancy payments
- Upset/Lose customers due to lack of personal touch
- Greater risk of fraud so lose money/ description of effects of Phishing
- Need to retrain staff

(e) Describe two disadvantages to the customer of having such a system.

- Lack of socialising/ social contacts
- Open Chance/Identity theft/misuse of personal data
- Customers must have a computer/Internet access/ (basic) computer skills
- Hackers may intercept data and defraud customer
- Deprived of personal touch
- Easier for customers to mismanage accounts
- Phone bills can increase/ cost of communication bill will rise
- Without broadband other family members cannot use the phone
- Cannot deposit/ withdraw cash/ money
- More vulnerable/viable to phishing

(f) As well as on-line processing the bank also uses batch processing to process cheques. Describe what is meant by batch processing.

- Cheques are collected together
- During the course of the day
- Cheques are then processed all at once
- Cheques are processed overnight
- Bank accounts will be updated after process/ following morning

Prepared by Mrs. Magda M. Kamel & Eng. Gamal Orphy
M: 01001025852
12. Tick whether the following uses are more suitable for ROM or RAM.

<table>
<thead>
<tr>
<th>Use</th>
<th>ROM</th>
<th>RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storing data that the user is currently working on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storing the system BIOS <strong>Basic Input Output System</strong></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Storing program instructions for computer games</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

13. The manageress of a supermarket uses a database to store data about the food she sells. This is part of the database.

<table>
<thead>
<tr>
<th>Bar code</th>
<th>Producer</th>
<th>Food type</th>
<th>Number in stock</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5049179000794</td>
<td>Logekks</td>
<td>Potato flakes</td>
<td>123</td>
<td>2.90</td>
</tr>
<tr>
<td>5027200190653</td>
<td>Squarebranch</td>
<td>Chocolate bar</td>
<td>158</td>
<td>0.95</td>
</tr>
<tr>
<td>5010029000016</td>
<td>Roofs</td>
<td>Beefburgers</td>
<td>135</td>
<td>1.55</td>
</tr>
<tr>
<td>5014569021017</td>
<td>Kapats</td>
<td>Gravy</td>
<td>89</td>
<td>3.95</td>
</tr>
<tr>
<td>5010479001213</td>
<td>Startle</td>
<td>Yogurt cream</td>
<td>119</td>
<td>1.85</td>
</tr>
</tbody>
</table>

(a) How many records in this part of the database have more than 100 items in stock?  
4

(b) Which is the key field in this database?  
Bar code

(c) The records shown are to be sorted in ascending order of price. What will be the bar code of the first record in the database after it has been sorted?  
5027200190653

(d) Give the name of a field that contains text.  
Producer/food type

(e) Name and briefly describe the most appropriate validation check which would be carried out on the bar code number.

- Check digit
- It is a single digit calculated using the other digits and added on to the end of the number
- Recalculated at a later stage to ensure validity of data entry
(f) The bar code number is scanned into the computer system when the item is sold. Describe the computer processing that would then take place in order for the number in stock to be updated.

The bar code field in the data file is read
Record by record
Until a match is found with the bar code entered
The corresponding number in stock is read
One is subtracted from this number
Update/Written back to file.

(g) The checkout is an EFTPOS terminal. When all the items have been checked through the terminal, the customer presents a chip and PIN card for payment. After the card is checked to see if it is valid, another check on the card is now carried out. Describe this check.

PIN is entered
PIN is read from chip
Numbers compared
If identical, transaction is authorised
If not identical transaction refused

(h) If the card is accepted, the customer’s bank account is now charged. Describe the computer processing that takes place to enable this transaction to be carried out.

Details from customer’s card read
Bank code allows shop computer to contact bank’s computer
Card details checked for not stolen
Account checked for sufficient funds
If card stolen or insufficient funds then transaction is rejected
If card not stolen and sufficient funds then transaction is authorised
Amount deducted from customer’s bank account
Amount credited to shop’s bank account
14. A school has a number of computer classrooms which are networked together to form a LAN. The head teacher is planning to let some pupils have a video conference with another school in the same country but quite far away. They have bought a modem.

(a) Each of the school's computers already have speakers. What extra hardware would the school need to buy so that it can take part in a video conference?

- webcams/small video cameras
- microphones
- Speakers

(b) Describe the advantages of having a video-conference rather than a conference in one of the schools.

- saves travelling time
- Do not have to pay for conference room.
- Do not have to hire transport.
- Conferences can be called at short notice.
- Don't have to carry bulky documents to conference
- Disabled students do not have to travel
A large company is going to replace its current computer system with a new one. The system has been created and is now going to be implemented.

(a) The company is considering two methods of implementation, parallel running and direct changeover. Describe these methods giving one advantage and one disadvantage for each method.

(i) Parallel running
   Advantage: If the new system breaks down you still have the old system as a backup.
   Disadvantage: It can be a slow process, all tasks have to be performed twice, and there have to be paid two sets of salaries/wages.

(ii) Direct changeover
   Advantage: Cost effective/saves money in salaries/wages, very fast method of implementation.
   Disadvantage: If anything goes wrong you don’t have the old system to fall back on.
(b) After the system is implemented, the company will be given documentation to go with the system. This will consist of technical documentation and user documentation. Name three different items that each type of documentation will contain.

<table>
<thead>
<tr>
<th>Technical</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program listing</td>
<td>How to load software/ run software.</td>
</tr>
<tr>
<td>Programming language</td>
<td>How to save a file.</td>
</tr>
<tr>
<td>Flowchart/algorithm</td>
<td>How to search</td>
</tr>
<tr>
<td>List of variables</td>
<td>How to sort</td>
</tr>
<tr>
<td>File structure</td>
<td>How to print</td>
</tr>
<tr>
<td>Purpose of the system/program</td>
<td>Purpose of the system/program (only if not mentioned in technical documentation)</td>
</tr>
<tr>
<td>Input format or example</td>
<td>How to add records</td>
</tr>
<tr>
<td>Output format or example</td>
<td>How to delete/edit records</td>
</tr>
<tr>
<td>Hardware requirements</td>
<td>Input format or example (only if not mentioned in technical documentation)</td>
</tr>
<tr>
<td>Software requirements</td>
<td>Output format or example (only if not mentioned in technical documentation)</td>
</tr>
<tr>
<td>Sample runs</td>
<td>Hardware requirements (only if not mentioned in technical documentation)</td>
</tr>
<tr>
<td>Known bugs</td>
<td>Software requirements (only if not mentioned in technical documentation)</td>
</tr>
<tr>
<td>Validation rules</td>
<td>Sample runs (only if not mentioned in technical documentation)</td>
</tr>
<tr>
<td></td>
<td>Error handling</td>
</tr>
<tr>
<td></td>
<td>Troubleshooting guide/Contact details/help line/FAQ</td>
</tr>
</tbody>
</table>
(c) After a system is implemented, it is evaluated. Describe how a new system is evaluated.

- Comparing the solution with the original task requirements;
- Identifying any limitations to the system;
- Identifying any necessary improvements;
- Evaluating the users’ responses to using the system;
- Comparing test results of new system with old system results;
- Comparing the performance of the new system with performance of the old.

15 An oil company is investigating whether they will find oil at a certain site. They will use an expert system. Describe the inputs, outputs and processing of this system.

- Interactive user screen appears
- Questions about geological profile are asked
- Answers to questions/geological profile are typed in
- Inference engine searches
- Searches the knowledge base
- Using the Rules (base)
- Suggested probabilities of finding oil are output using
- Probable depth of likely deposit
- Predictions of geological deposits above oil
- Detailed Output format