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

- **A** - Microphone
- **B** - Webcam
- **C** - Remote control
- **D** - Number pad

2. Ring two items which are used for storing data.

- buzzer
- DVD R
- joystick
- magnetic tape
- plotter
- touch pad

3. 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>A scanner is used to enter a PIN</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Word processing software is used to write letters</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Database software is used to create newspapers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>A command line interface uses icons to represent applications</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sensors are used to monitor physical variables</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

4. A test is marked out of 20 and recorded as an integer. Tick whether each of the following marks is an example of abnormal data or extreme data.

<table>
<thead>
<tr>
<th>Marks</th>
<th>Abnormal</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>21</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>twenty</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

5. Name three network devices and for each one describe what it does. **Three pairs from:**

- **Hub**
  - Broadcasts data packets to computers in a LAN
- **Router**
  - Connects LANs to a WAN/Internet
- **Switch**
  - Directs data packets to specific computers
- **NIC**
  - Enables computers to be connected to a network
- **Bridge**
  - Connects networks/LANs together/Directs data packets to specific networks
- **Proxy server**
  - Stores web pages for faster re-use by computers/can act as a firewall
- **Modem**
  - Modulates data and demodulates phone signals

Prepared by Mrs. Magda M. Kamel & Eng. Gamal Orphy
M: 01001025852
6. Tick which of the following statements apply to traditional LANs and which apply to WLANs.

<table>
<thead>
<tr>
<th>Statement</th>
<th>LAN</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses wireless technology to transmit data</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Faster transmission of data</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Greater security</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Is cheaper as there is less cabling</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

7. 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>PENUP</td>
<td>Lift the pen</td>
</tr>
<tr>
<td>PENDOWN</td>
<td>Lower the pen</td>
</tr>
<tr>
<td>REPEAT n</td>
<td>Repeat the following instructions n times</td>
</tr>
<tr>
<td>END REPEAT</td>
<td>Finish the REPEAT loop</td>
</tr>
</tbody>
</table>

Complete the set of instructions to draw this shape by filling in the blank lines.

```
PEN DOWN
RIGHT 90 PEN DOWN
REPEAT 8 REPEAT 6
FORWARD 100 FORWARD 80
LEFT 45 LEFT 60
END REPEAT
END REPEAT
PENUP
```
8. Use the most appropriate phrase from the list below to complete the sentences.

- retouch photographs.
- print out photographs.
- input candidate examination answers.
- input data from a magnetic stripe.
- store high definition copies of movies.
- open windows in a greenhouse.
- input data from a chip.

input temperature in a microprocessor controlled greenhouse.

(i) A blu ray disc is used to ____________________________

(ii) A graphics tablet is used to ____________________________

(iii) An inkjet printer is used to ____________________________

(iv) A motor is used to ____________________________

(v) An Optical Mark Reader is used to ____________________________

9. Explain why computer systems have both backing storage and RAM.

Three from:

- If computer is switched off work in RAM goes but backing storage stores data for future use
- More likely that data is accidentally deleted in RAM
- RAM is more expensive than backing storage per unit of memory
- RAM is bulkier than backing storage per unit of memory
- RAM provides faster access than backing storage
- Software package may be so large that it is physically impossible for RAM to store it.
- Data may need to be transferred from one computer to another and can’t do that with RAM
10 Below is a diagram of a river running past a chemical factory. The same types of sensor, connected to a computer in the factory are placed at A and B to monitor pollution of the river by the factory.

(a) Name three sensors which would need to be placed at both A and B.

Three from:
Temperature sensor
Light sensor
pH sensor
O2 sensor
CO2 sensor

(b) Describe how the computer would monitor the level of pollution in the river.

Five from:
- The sensors feedback data to microprocessor/computer
- Data is converted from Analogue to Digital by ADC (Analogue to Digital Converter)
- Readings from A are compared with those from B by the computer/microprocessor
- Differences are printed out
- Graphs are automatically produced by computer showing values from A and B plotted against time
- Process is continuous.

11 (a) Doctors often use expert systems to help them to diagnose illnesses. Name four components of a typical expert system.

1. User interface
2. Rules base
3. Knowledge base
4. Inference engine

(b) Name two other applications which involve the use of expert systems.

Two from:
- Engine car fault diagnosis
- Prospecting
- Tax
- Careers
- Chess games
- Animal/plant classification
12 Name and describe three validation checks which could be carried out on a 16-digit credit card number when it is typed into a computer.

Three pairs from:

Length check
- Checks there are exactly 16 characters

Invalid character/type check
- Checks all characters entered are digits

Check digit
- Single digit calculated from other digits appended to these, computer carries out fresh calculation on digit and compares answer with original check digit.

Existence check
- Check is the card number on the database

13 Describe how the following health problems can arise due to the use of computers. Give a different cause for each.
- RSI in the wrists – caused by repetitive typing/prolonged gripping of mouse
- RSI in the fingers – caused by repetitive clicking of mouse
- Headaches – staring at the screen for too long
- Back pain – sitting in the same position for long periods

14 A bank is looking into a variety of security measures to protect its customers’ data. Describe three types of authentication technique they could use and for each give a benefit and a drawback.

Three matched triples from:

User ID and password
- Benefit – each user ID could be unique/only user will know the password/data can only be accessed by person who knows the password/Password can be changed frequently to avoid hackers guessing them/Unsuccessful logins can throw you out of the system
- Drawback – user might forget password/keylogging software can be used to intercept it

Biometrics
- Benefit – each user has unique biometrics
- Drawback – equipment is expensive to buy/may be difficult or expensive to get equipment to user

Magnetic/chip card with PIN
- Benefit – Hacker needs to have the card and know the PIN
- Drawback – can lose the card/can forget PIN

TAN
- Benefit – Always changing so a hacker would not be able to use it even if they intercepted it when user typed it in.
- Drawback – need to have card and remember PIN and use it within a short period of time
15 Gita has employed Johann, a systems analyst, to create a new database system for her car sales business. She only sells cars made by Rock and only the models Feisty, Mendo and Galactica in red, blue or gold. Most of the cars have air conditioning but some do not. She sells 3, 4 and 5 door cars.

(a) Give a reason why would it not be sensible to have a Make field in the database.

Would always be the same contents/waste space putting in duplicated field

(b) Complete the design table below giving the field names which would be used in the database and describing the most appropriate validation check which could be carried out on each field.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Validation check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Must be Feisty or Mendo or Galactica</td>
</tr>
<tr>
<td>Colour</td>
<td>Must be red, blue or gold</td>
</tr>
<tr>
<td>Air conditioning</td>
<td>Boolean check - Must be yes or no</td>
</tr>
<tr>
<td>Number of doors</td>
<td>Range check &gt;2 AND &lt;6 / &gt;=3 AND &lt;=5</td>
</tr>
</tbody>
</table>

(c) Discuss verification and validation.

Six from:
- **Validation** is the checking that data is reasonable or acceptable
- Verification is checking that data has been accurately copied from one medium to another.
- Verification does not check that data is correct
- If original data is incorrect it will still be incorrect after it has been copied accurately
- Validation does not check that data is correct. If, for example, data is incorrect but within a given range, a range check won’t reject it
- Validation will pick up errors that verification does not
- Verification will pick up errors that validation does not
- Verification can sometimes be carried out by the user
- Validation is always carried out by the computer
16 A travel agent keeps a spreadsheet record of his customers’ holiday bookings to various destinations. This is split into two sheets. Sheet 1 contains the Code for each destination. Sheet 2 contains a list of his customer bookings so far.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Code</td>
<td>Destination</td>
</tr>
<tr>
<td>2</td>
<td>BAH</td>
<td>Bahamas</td>
</tr>
<tr>
<td>3</td>
<td>COZ</td>
<td>Cuzamel</td>
</tr>
<tr>
<td>4</td>
<td>EGY</td>
<td>Egypt</td>
</tr>
<tr>
<td>5</td>
<td>IND</td>
<td>India</td>
</tr>
<tr>
<td>6</td>
<td>MAL</td>
<td>Maldives</td>
</tr>
<tr>
<td>7</td>
<td>MEX</td>
<td>Mexico</td>
</tr>
</tbody>
</table>

Sheet 1

(Commas are used as delimiters in the functions shown below.)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Destination</td>
<td>Code</td>
<td>Trips</td>
</tr>
<tr>
<td>2</td>
<td>=VLOOKUP(B2,Sheet1!$A$2:$B$7,2,0)</td>
<td>BAH</td>
<td>=COUNTIF($A$8:$A$18,B2)</td>
</tr>
<tr>
<td>3</td>
<td>=VLOOKUP(B3,Sheet1!$A$2:$B$7,2,0)</td>
<td>EGY</td>
<td>=COUNTIF($A$8:$A$18,B3)</td>
</tr>
<tr>
<td>4</td>
<td>=VLOOKUP(B4,Sheet1!$A$2:$B$7,2,0)</td>
<td>MAL</td>
<td>=COUNTIF($A$8:$A$18,B4)</td>
</tr>
<tr>
<td>5</td>
<td>=VLOOKUP(B5,Sheet1!$A$2:$B$7,2,0)</td>
<td>MEX</td>
<td>=COUNTIF($A$8:$A$18,B5)</td>
</tr>
</tbody>
</table>

Destination code of holidays booked so far this year

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>EGY</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>MAL</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>BAH</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>MEX</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>MAL</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>BAH</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>EGY</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>EGY</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>MAL</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>EGY</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>BAH</td>
<td></td>
</tr>
</tbody>
</table>

Sheet 2

(a) Explain what the function in cell A2 in Sheet 2 does.

Three from:
- It looks through the cells A2 to B7 in Sheet 1
- Until it finds the value equal to the contents B2 (BAH) in sheet 2
- B2 in sheet 2 contains BAH
- It records the corresponding value from column 2 of sheet 1
- Produces Bahamas

(b) What destination would you expect to see in cell A4 in Sheet 2?

Maldives

(c) Explain what the function in cell C2 in Sheet 2 does.

Three from:
- It looks through A8 to A18
- Cell B2 contains the code BAH
- Checks whether A8 to A18 contains the code BAH/contents of B2
- Counts all the cells where there is a match
- Produces the answer 3.

(d) What value would you expect to see in cell C3 in Sheet 2?

Number 4
(e) Spreadsheets are often used to produce computer models. Discuss the benefits and drawbacks of computer modelling.

Four from:

Benefits
- Real thing may be too expensive to build
- Real thing requires too large a time scale
- Real thing would be too wasteful of materials
- Real thing is too vast a scale
- Easier to change data/variables
- Costs less to change data/variables
- The real thing may be impossible to access/create
- Real thing may be too dangerous
- You can test predictions more easily/model can make predictions more accurately
- You can ask many WHATIF questions which would be impractical in real life

Drawbacks
- Can never allow for all eventualities
- Difficult to exactly recreate a lifelike situation
- Hardware and software may be expensive
- Workers will need to be trained to use the system

Max. 3 drawbacks or benefits