

5.1.4 PROBLEM SOLVING

1. John wants to use desktop publishing (DTP) software to produce his birthday invitations.

His first attempt is shown in Figure 1

Figure 1



He uses some of the facilities of his DTP software to improve the invitation and his final design is shown in Figure 2.

Figure 2



- a) Give **FOUR** facilities of his DTP software used to produce the invitation in Figure 2.

Clipart

Scanned pictures

Pictures from the Internet

Pictures from a digital camera

Border art

Wordart

Different font styles (*Not word 'font' by itself*)

Different font sizes (*Not word 'size' by itself*)

Centre text (*Not word 'centre' by itself*)

- b) John wishes to use the mailmerging facility of his DTP software to create personalised party invitations.

What is meant by mailmerging?

-Inserts fields from a separate database

-into predefined positions

-in a prepared WP document

2.A School Club is organising a summer concert and has produced a poster using desktop publishing (DTP) software to advertise the event.

- b) Give **two other** documents which could be produced to help in the organising and administration of the concert.

Ticket; programme; seating plan; letters to sponsors; cast lists; etc.

- c) The School Club secretary wishes to use presentation software to advertise the concert on the school's intranet.

Give **one** advantage of using presentation software over DTP software.

Animation; video clips; sound clips.

3. The section of a spreadsheet shown in Figure 3 holds a table of pupil's marks. Each mark is out of 50.

The teacher has used the spreadsheet to work out the total number of marks out of 200.

She has also worked out the percentage total.

Figure 3

	A	B	C	D	E	F	G
1	Name	Mark1	Mark2	Mark3	Mark4	Total out of 200	% out of 100
2	J. Evans	23	45	38	36	142	71
3	R. Adams	42	42	39	43	166	83
4	T. Jones	22	19	21	33	95	47.5
5	S. Smith	31	29	35	46	141	70.5
6	A. Khalid	39	40	36	45	160	80
7	H. Kelly	17	22	29	29	97	48.5

a) Which of the following formulas could be used to give the Total number of marks out of 200 in CELL F2?

- A** **B2+C2+D2+E2**
B F2+F3+F4+F5+F6+F7
C **SUM(B2:E2)**
D B3+C3+D3+E3
E E2 * 4

b) The pupil H Kelly improves his mark for Mark1 and the teacher changes the mark in Cell B7.

What other two cells would also change? **F7** ; **G7**

c) What formula could the teacher have typed in to give the % total in Cell G2?

F2 / 2

d) The teacher wants to put the % marks into rank order.

Describe how they might do this.

Select whole spreadsheet

Sort on column G

Or similar

e) Give two *other* examples of the use of a spreadsheet in the school

School accounts ; Payroll; Stock records ; Working out nutritional values of meals

f) One advantage of using a spreadsheet is the automatic recalculation of other cells and columns when data changes.

Give **two other** advantages of using spreadsheets.

***Stores formulas and data**

***Allows ‘what if’ type investigations**

***More accurate than calculators or mental maths**

***Variety of output formats e.g. graphs**

4. A spreadsheet could be used to produce a simulation model of traffic queues on a main road.

- a) Give a definition of a simulation model.
 ‘ **Software that represents a real life situation.**’

(Not anything that could be interpreted as CAD)

b) Give two reasons why *spreadsheets* are useful in producing simulation models.

Save formulas with data
Do ‘what if ‘type investigations
Can be displayed graphically

5. The school Geography department uses sensors to collect weather data.

a) Give **THREE** sensors used in collecting weather data.

Temperature
Rainfall
Humidity / moisture
Wind speed
Pressure
Wind direction
Any reasonable answer

b) Give **two** ways of displaying weather data on computer screen.

Tables
Graphs
Spreadsheet

c) Give **two** methods of *permanently storing* the weather data collected.

Printout ;
Magnetic medium (Disc or tape but not both) ;
Optical medium CDRW

d) Give **two** statistical methods of *analysing* the weather data collected.

Max Min Mean/ Average Total

e) Give **two** advantages of using the computerised weather station to collect data rather than using traditional methods of collecting weather data.

Datalogging 24 hours/7 days a week / humans not present
Accuracy or readings
Accuracy of time intervals
Accuracy of recording

g) Name **two other** applications that use simulations, explaining the reasons in each case for the use of the simulation.

Training pilots - dangerous to do so in real life
Economic forecasting -too expensive to do so in real life

6. A computer uses the following control port to monitor and control a house hold security system

0	1	2	3	4	5
0	0	0	0	0	0

Output bits

- 0 - alarm light
- 1 - motor to close shutters
- 2 - siren

Input bit

- 3 - sensor on front door
- 4 - pressure mat

1. If the burglar stands on the pressure mat an alarm light would come on.
2. If a burglar opens the front door the siren would come on
3. If the burglar stands on the pressure mat and opens the front door the alarm light would come on, the siren would come on and the window shutters would close.

All the bits are set to zero but if the input bits are set to one the corresponding output bits would also be set to 1

Write down the display of bits in the following situations

a) A burglar has stepped onto the pressure mat

0	1	2	3	4
1	0	0	0	1

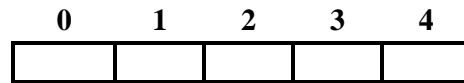
b) A burglar has opened the front door

0	1	2	3	4
0	0	1	1	0

c) If the burglar stands on the pressure mat and opens the front door, the alarm light would come on and the siren would come on and the window shutters would close.

0	1	2	3	4
1	1	1	1	1

7. A computerised greenhouse uses a thermostat and the following control port to monitor and control the environment in the greenhouse.

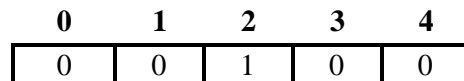
**Output bits**

- 0 - heater (1=on, 0=off)
- 1 - motor to open or close the greenhouse window (1=open, 0=close)
- 2 - sprinkler (1=on, 0=off)
- 3 - fan (1=on, 0=off)

Input bit

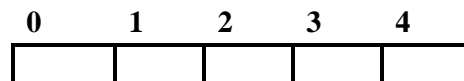
- 4 - temperature (0 if temperature below temperature level required, 1 if = or above the required temperature)

e.g. if only the sprinkler is on then the control port would look like that shown below;

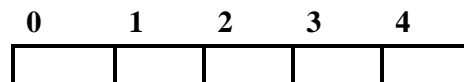


a) Write down the display of bits in the following situations following.

- (i) Switch on the heater only.



- (ii) Open the greenhouse window if it gets too hot and turn on the fan



b) Write a sequence of steps needed to keep the temperature of the greenhouse between 20⁰ C and 22⁰ C, and keep it there, using only the heater and thermostat.

If temp on thermostat > 22⁰ C turn off heater
If temp on thermostat < 20⁰ C turn on heater
If temp between 20⁰ C and 22⁰ C do nothing / leave alone

c) The computerised greenhouse system will use *feedback*.

In this system explain what is meant by *feedback* in this context.

The sense of;

Inputs from sensors are used to control devices which will then effect the input readings from sensors

8. The table below shows part of a membership database for a leisure centre.

Membership No	Name	Telephone Number	Gender	Club
9385	A. Ap Dylan	01564 968473	F	Gym
9283	R Peters	01523 987543	F	Badminton
9110	K. Lewerson	01537 748234	M	Gym
9223	D. Davies	01572 987639	F	Badminton
8923	L. Jones	01567 928572	F	Gym
8769	H. Allen	01537 898222	M	Soccer
9200	B. Jones	01571 342111	F	Gym
9612	W. Harris	01532 888326	M	Soccer

a) Which field is the '*keyfield*' **Membership No**

b) What data type is the key field? **Integer**

c) What is the purpose of the *keyfield*? **Unique identifier**

d) The manager has used coded data the gender field. e.g. F instead of writing female.

Give **two** advantages of using coded data when storing data in files.

- **it takes up less memory on disc**
- **it is faster to type in**
- **it is easier to do searches on standardised data.**

e) The manager of the leisure centre wants to search for all members of the soccer club and display their details on screen.

Describe how he could select only these members.

Club + Soccer

f) The manager is organising a female gymnastics competition and wants to search for all female members of the Gym club and display their details on screen.

Describe how he could select only these members.

Gender = F and Club = Gym

9 A school stores their pupil records on a computer system.

Design a form that could be used to collect information about a new pupil entering the school. The secretary could then use this form to update her pupil records file. (4)

Admission No	KEYFIELD
Name	GENERAL FIELD
Address	GENERAL FIELD
Form	SPECIFIC TASK RELATED FIELD