Surname		Other Names	
Centre Number			Candidate Number	
Candidate Signature			

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General Certificate of Education
June 2006
Advanced Subsidiary Examination

ASSESSMENT and QUALIFICATIONS ALLIANCE

COMPUTING **CPT1**

Unit 1 Computer Systems, Programming and Networking Concepts

Thursday 8 June 2006 1.30 pm to 3.00 pm

You will need no other materials.
You may use a calculator.

Time allowed: 1 hour 30 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Show all your working.
- Do all rough work in this book. Cross through any work you do not want marked.

Information
- The maximum mark for this paper is 65.
- The marks for questions are shown in brackets.
- The use of brand names in your answers will **not** gain credit.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in all answers.

For Examiner's Use			
Number	Mark	Number	Mark
1		5	
2		6	
3		7	
4			
Total (Column 1)			
Total (Column 2)			
TOTAL			
Examiner's Initials			

LEAVE MARGIN BLANK

Answer **all** questions in the spaces provided.

1 Additional main (internal) memory is fitted to a stand-alone PC.

(a) Describe **one** resulting improvement in the performance of the PC.

.....

.....

.....

(1 mark)

(b) Consider the list below. Circle the **one** which could be a typical value for the PC's main (internal) memory.

100 bits/sec 10 GB 128 kbps 3.0 MHz 512 MB

(1 mark)

(c) Explain what is meant by the stored program concept.

.....

.....

.....

(3 marks)

5

2 A retail store employs ten sales staff. Staff try to persuade customers to take out a store card with the company when they make a purchase. The store keeps a record of the number of new store cards issued by its sales staff over the first six months of the year.

Table 1

StoreCards

	[1]	[2]	[3]	[4]	[5]	[6]
[1]	12	12	6	8	3	2
[2]	12	17	7	4	5	6
[3]	2	12	0	12		
[4]	4	10	7	4		
[5]	5	0	0	0	0	0
[6]	6	1	4	6	7	8
[7]	12	19	12	**16**	17	6
[8]	13	9	7	3	4	5
[9]	12	8	4	4	5	4
[10]	14	11	12	4	5	6

The data is to be stored in a 2-dimensional array with identifier StoreCards as shown in **Table 1**. The first subscript of the array represents the row number (the salesperson number), and the second subscript the column number (the month).

(a) In **Table 1** the value 16 has been **emboldened**. Explain what this value represents.

.....

(2 marks)

(b) Write a declaration statement for the array StoreCards.

.....

(2 marks)

(c) Using the data given in **Table 1**, write an assignment statement for the January sales for salesperson 8.

.....

(2 marks)

(d) Study the pseudo-code below.

```
Input SalesPersonNumber
PersonTotal ← 0
For Month ← 1 to 6 Do
  PersonTotal ← PersonTotal + StoreCards[SalesPersonNumber, Month]
End For
Print PersonTotal
```

Explain what this algorithm is designed to do.

.....

.....

.....

.....

(2 marks)

(e) A number of programs are to be written for the store card application, and the following are some of the data values which will need to be stored and/or calculated.

State what data type the programmer would use for each data item below.

(i) Average overtime hours worked by each member of staff.

.....

(1 mark)

(ii) Whether or not the staff are willing to work on Boxing Day.

.....

(1 mark)

(iii) The number of customer complaints made about each member of staff.

.....

(1 mark)

3 A company sets up a server-based network with ten terminals. Each terminal is a PC with its own secondary storage.

(a) The network was recently created from an existing set of stand-alone computers, and is used by a team of programmers. Describe **two** advantages that networking the computers has brought to the programming team.

1 .....

.....

2 .....

.....

(2 marks)

(b) The network manager has the choice of:

Option 1: Installing all the applications software on the server.

Option 2: Installing the applications software on the hard drive of each PC.

(i) Describe **one** advantage to the network manager of Option 1.

.....

.....

(1 mark)

(ii) Describe **one** advantage to a terminal user of Option 2.

.....

.....

(1 mark)

(c) The terminals can access the Internet using *dial-up networking* and a *modem*.

(i) What is dial-up networking?

.....

.....

(1 mark)

(ii) Explain the function of a modem.

.....

.....

(2 marks)

(d) Each terminal communicates with a printer using a *handshaking protocol*.

(i) Explain the term protocol.

.....

.....

(1 mark)

(ii) Explain the term handshaking.

.....

.....

(2 marks)

(e) Clients who use the company's website input

http://www.smk-solutions.co.uk/index.htm

into the address bar of their browser.

What is the domain name for the company?

.....

.....

(1 mark)

11

Turn over for the next question

4 **Table 2** shows an ASCII table.

Table 2

ASCII Code Table

Character	Decimal	Character	Decimal	Character	Decimal
<Space>	32	I	73	R	82
A	65	J	74	S	83
B	66	K	75	T	84
C	67	L	76	U	85
D	68	M	77	V	86
E	69	N	78	W	87
F	70	O	79	X	88
G	71	P	80	Y	89
H	72	Q	81	Z	90

(a) Use the ASCII code table given in **Table 2** to look up the ASCII code for character 'V'.

(i) What is its representation when written in 7-bit binary?

(1 mark)

(ii) What is its value when expressed in 8 bits with the 8th bit an odd parity bit?

(1 mark)

(b) A programming language help file describes the Chr( ) function as follows.

> Chr( ) takes a single integer value as its parameter.
>
> The function returns the ASCII character represented by the parameter.
>
> Example: Chr(65) will return value 'A'.

(i) What is returned by Chr(68)?

.....

(1 mark)

(ii) What value is assigned to variable MyChar when the following two statements are executed?

```
Value ← 9
MyChar ← Chr(65 + Value)
```

MyChar = ...

(1 mark)

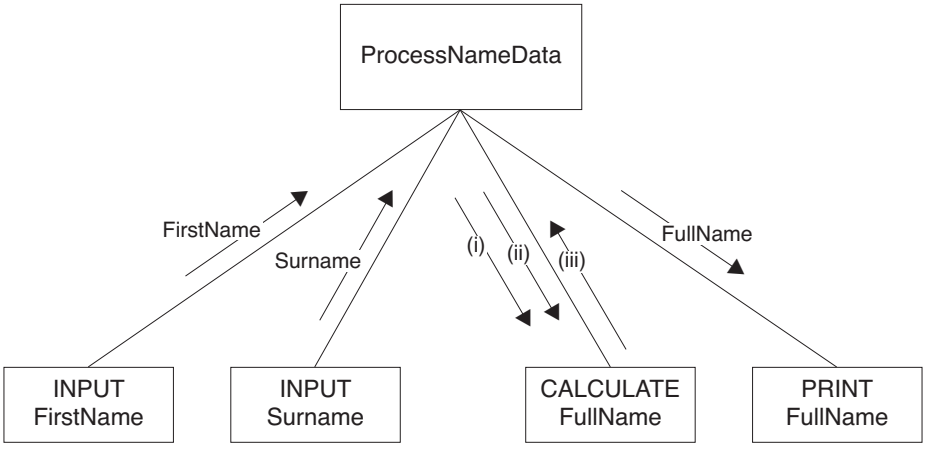
(c) The algorithm which follows uses a function ConCat.

> The ConCat function takes two strings as its parameters, and returns the concatenated string.
>
> Example: ConCat('Fred', 'Smith') would return 'FredSmith'.

```
Procedure ProcessNameData
  INPUT  FirstName
  INPUT  Surname
  FullName ← ConCat (FirstName, Surname)
  PRINT  FullName
End Proc
```

The stages of this procedure `ProcessNameData` are shown as a structure chart in **Figure 1**.

Figure 1



What are the missing labels in **Figure 1**?

(i) .....

(1 mark)

(ii) .....

(1 mark)

(iii) .....

(1 mark)

(d) **Table 3** shows an array of integers with identifier Index, to which values have been assigned.

Table 3

Index

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
0	13	-33	4	17	17	14	17

Study the following algorithm and trace its execution by completing the trace table **Table 4**, using the ASCII code table given in **Table 2**.

```
Final String ← ''
For Position ← 1 To 8 Do
  NextNumber ← 65 + Index[Position]
  NextChar ← Chr(NextNumber)
  FinalString ← ConCat(FinalString, NextChar)
End For
Print FinalString
```

Table 4

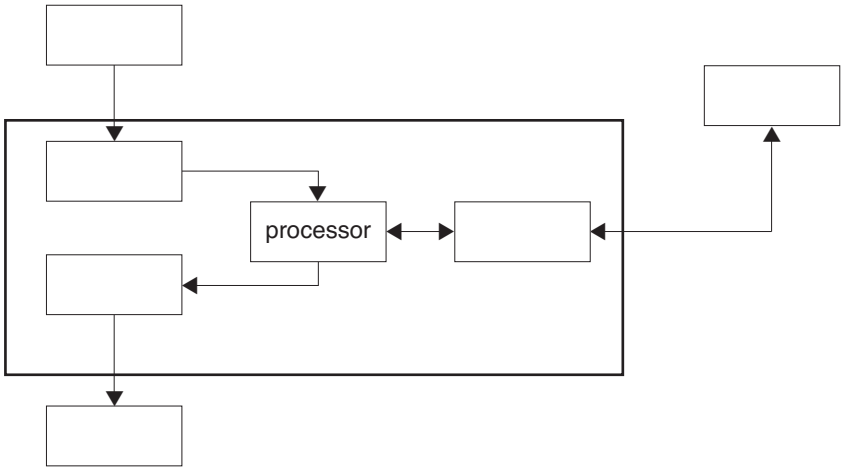
Position	NextNumber	NextChar	FinalString
			''
1	65	'A'	'A'
2			

(6 marks)

13

5 (a) The diagram represents a computer system which is used to both record and playback sound files.

Figure 2



The components in **Figure 2** are:

1 Loudspeaker
2 Digital to analogue converter
3 Secondary storage
4 Microphone
5 Main memory
6 Analogue to digital converter

Label the components in **Figure 2**, using the numbers 1 to 6.

(6 marks)

(b) (i) Explain what is meant by synthesised sound.

.....

.....

(1 mark)

(ii) Give an example where synthesised sound would be produced and used.

.....

.....

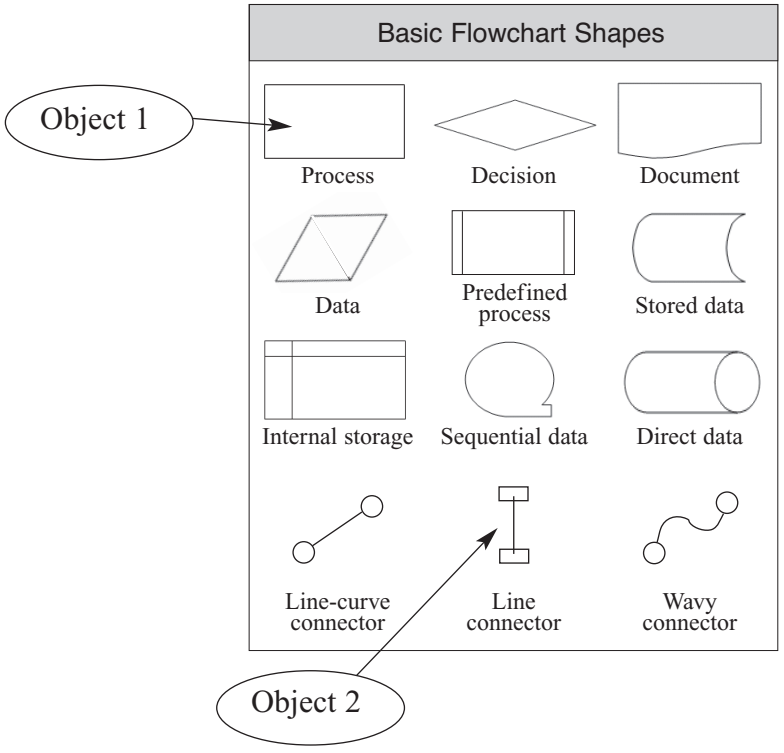
(1 mark)

8

Turn over ▶

6 (a) **Figure 3** shows a number of drawing objects from the toolbox of a vector graphics drawing program.

Figure 3



(i) For object 1 and object 2, state **two** properties common to both types of object, which would be recorded when used in a drawing.

1 .....

2 .....

(2 marks)

(ii) State **one** other property for object 1 which would be recorded when used in a drawing.

.....

(1 mark)

(iii) Graphics can be created with either vector graphics software or bit-mapped software. If the graphic is enlarged it may become distorted if created with bit-mapped software but show no distortion if created with vector graphics software.

Explain this statement.

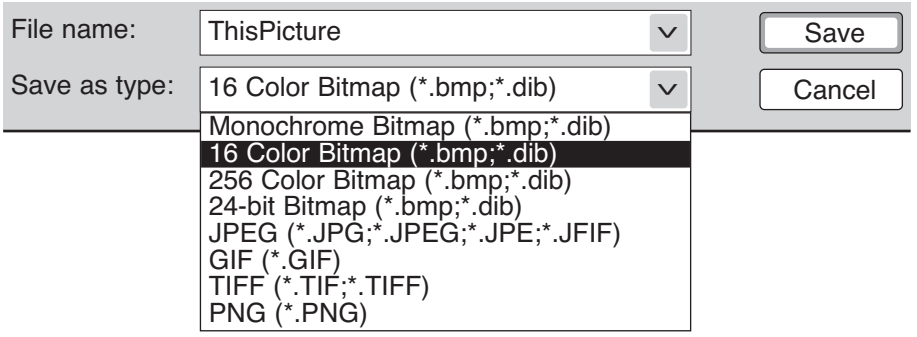
.....

.....

(2 marks)

(b) **Figure 4** below shows the file type options available when saving a file with bit-mapped graphics software.

Figure 4



(i) How many bits are used to store each pixel if the resolution selected is as shown ('16 color bitmap')?

.....

(1 mark)

(ii) '256 color' images are stored with 1 byte per pixel.

Explain this statement.

.....

.....

(1 mark)

(iii) Read again the statement in part (ii).

A picture with size 1024 by 768 pixels is saved as a '256 color' image. Calculate the picture size in Kilobytes.

.....

.....

(1 mark)

(iv) Black and white (monochrome) bit-mapped files store each pixel with a single bit.

A black and white image of size 512 by 256 pixels has a calculated file size of 16 Kilobytes. The actual file size is larger than this calculated size as the bitmap file contains other data.

What is this other data?

.....

.....

(1 mark)

9

Turn over ▶

7 (a) Define the term software.

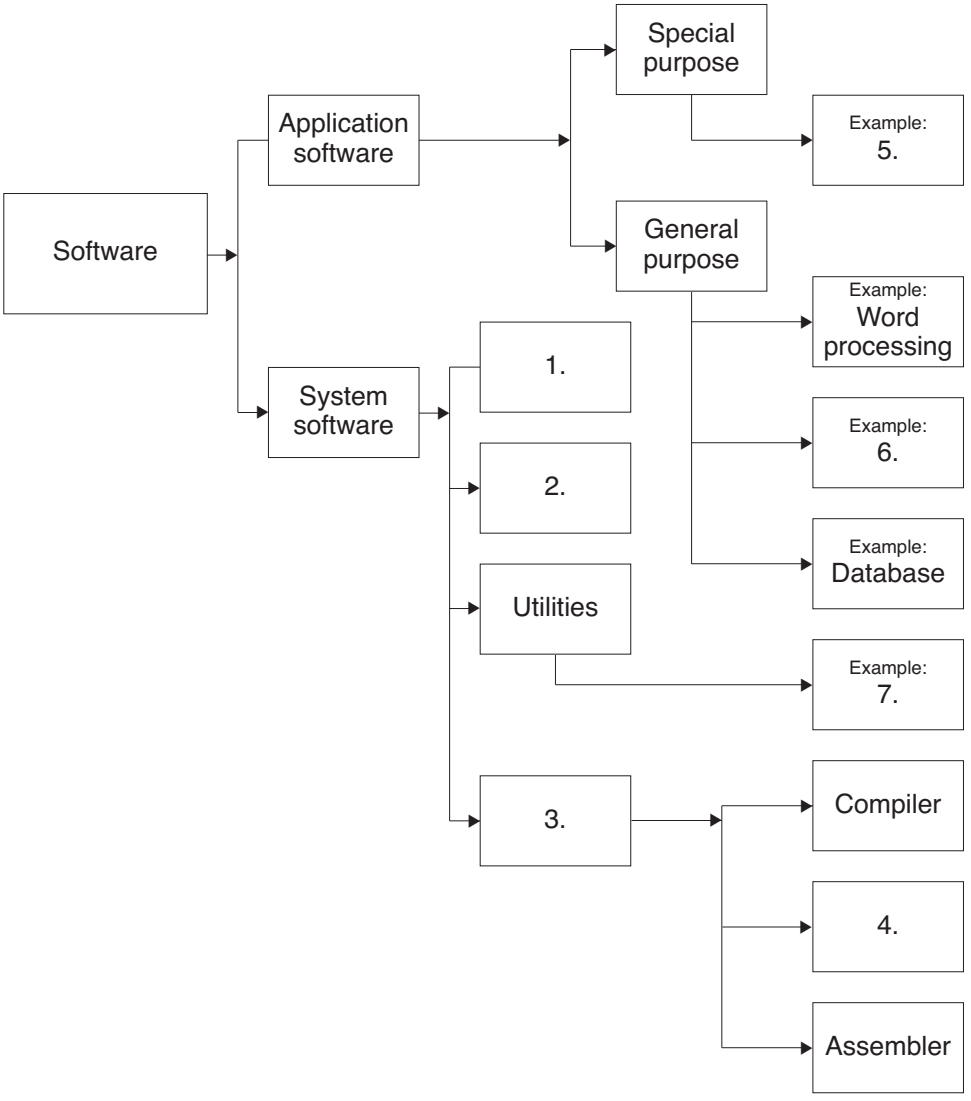
.....

.....

(1 mark)

(b) The diagram in **Figure 5** shows the classification of various types of software used on a computer system.

Figure 5



Complete the labelling of **Figure 5** by suggesting labels for 1 to 7 in the diagram.

Software category:

1. .....

2. .....

3. .....

4. .....

Software example:

5. .....

6. .....

7. .....

(7 marks)

8

END OF QUESTIONS

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