

1 SEC'95-PAPER 1-Q5

	-			_
b) Give the value to	base 10 of the	binary number	you wrote above:	I

2 SEC'96-PAPER 1-Q2c (CONSULT CH 4)

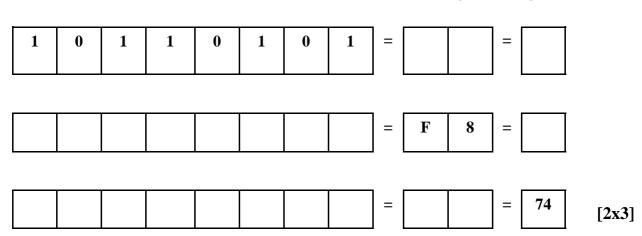
How much stora 256 colours?	ge is required	for a single	pixel in a	display	supporting	up to
230 colours.						
						[:

3 **SEC '96-PAPER 1-Q5**

(a) Complete each row of the table to show the same number in binary, hexadecimal and decimal.

BINARY

HEXADECIMAL DECIMAL



(b) In a particular computer, positive numbers are represented as 8-bit quantities. i. What is the biggest number that can be stored in this way?

ii. Give an example of an arithmetic operation which would cause a NU-MERIC OVERFLOW error in your computer [1]

[1]

4 SEC'97-PAPER 1-Q7

Complete each row of the table to show the same number in binary, hexadecimal and decimal:

 BINARY
 HEXADECIMAL DECIMAL

 0
 1
 1
 0
 1
 1
 =
 =
 [2]

 =

Working for question:

SEC'97-PAPER 2A-Q2 (a) Show how the following numbers would be stored in an 8-bit register using 2's complement binary representation: [1] (i) +47[1] (ii) -15(b) Using two's complement arithmetic, show how the subtraction 47–15 is per-[2] formed. (c) Can +130 be represented in two's complement using the 8-bit register? [2] Explain why.

5

Writing Space for Previous Question

6 SEC '98-PAPER 1-Q7

Complete each row of the table to show the same number in binary, hexadecimal and decimal.

BINARY

HEXADECIMAL DECIMAL

			•				•	-		-	[2]
0	1	0	1	0	0	1	0	=		=	[-]

								. [2]
				_	C	A	_	[4]
				=	C	A	=	

-	1	1	1	1	ı	i	I	ı		[2]
						=		=	100	

7	SEC '98-PAI		
	_	iter system uses an 8-bit character code. How many different character represented on this system?	[1]
	(b) Suppose	C1 and C2 are two characters. When is C1 <c2?< td=""><td>[2]</td></c2?<>	[2]
		nputer system also has a 16-bit word size. How many words are to store the string 'HELLO'?	[2]
	(d) Suppose	S1 and S2 are two strings. When is S1 <s2?< td=""><td>[4]</td></s2?<>	[4]
	(e) Briefly d	escribe how negative integer numbers can be stored using	
	(i)	sign-and-magnitude; and	[2]
	(ii)	2s-complement numeric representation	[2]
	(f) Using an	8-bit number format, show how the number –100 is stored using	
	(i)	sign-and-magnitude; and	[2]
	(iii)	2s-complement numeric representation.	[2]

Writing Space for Previous Question

8 SEC '99-PAPER 1-Q8

Complete each row of the table to show the same number in binary, hexadecimal and decimal.

BINARY

HEXADECIMAL DECIMAL

0	0	1	1	0	1	1	1	=			=		[2]
---	---	---	---	---	---	---	---	---	--	--	---	--	-----

				=	E	В	=	[2]
								L—J

				=		=	93	[2]

9 SEC '00-PAPER 1-Q6

Complete each row of the table to show the same unsigned number in binary, hexadecimal and decimal.

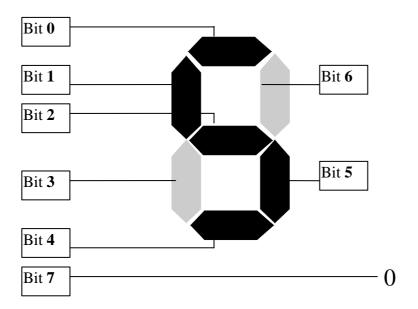
Working for question:

10 SEC '00-PAPER 2A-Q4C Part A (CONSULT CH 2) A computer uses two's complement code to store integer numbers.

71 compac	er uses two is complement code to store integer numbers.	
(a) Explai	n why internal code representations are binary-based.	[1]
A storage	location within this computer has the following binary bit pattern in it:	
	01011010	
i.	What signed decimal number does this binary bit pattern represent?	[1]
ii.	Use two's complement arithmetic to subtract the number 11100110 from 01011010.	[2]
iii.	What would be the outcome if 10000110 when subtracted from 01011010?	[3]
iv.	Name two other possible things a binary bit pattern may represent.	[2]

11 SEC '01-PAPER 1-Q7

An LCD display is made of seven segments as shown below. To display digits, the correct segments have to be switched on. A byte of data is sent to the LCD such that each bit controls one segment with the exception of bit 7 (the most significant each byte). If a bit is 1, the segment is switched on. If a bit is 0, the segment is switched off. Assume bit 7 is always set to zero. To display the digit 5 shown below the following byte of data 00110111 is sent to the LCD.



(a) Convert the following numbers into binary ACCORDING TO THEIR BASE and state which digits are displayed on the LCD by writing the corresponding values in the table below. The first one is worked out for you. Show your working.

[4]

Number	Base	Binary	Display
55	Decimal	00110111	5
127	Decimal		
96	Decimal		
66	Hexadecimal		
75	Hexadecimal		

(b)	Why	are	memory	locations	often	represented	in	hexadecimal	rather	than
bina	ary in	prin	touts of so	ections of	memo	ry?				

Writing Space for Previous Question

12 SEC '02-PAPER 1-Q7

Complete each row of the table to show the same unsigned number in binary, hexadecimal and decimal.

B	INARY	•						Н	EXADE	ECIMAL	DE	ECIMAL	
1	1	0	0	1	0	1	1	=			=		
		<u>I</u>	<u>I</u>	<u>I</u>	<u>I</u>	l	<u>I</u>	J		<u>I</u>			
								=	5	F	=		
										_			
								_			_		
								=			=	99	[6]

13 SEC '02—PAPER 2A Q3 (CONSULT CH 2)

In a standard character code, both uppercase and lowercase letters are alphabetically ordered. Numeric symbols are also ordered according to their value. This attribute is called **collating sequence**.

a. Why is it necessary to use a STANDARD charac-		
ter code for representing characters inside a computer?	Character Symbol	Character Code
b. For what reason is the collating sequence property important for text data?		
c. A certain computer uses a character code specified in the given table to store character data.		32(00100000)
How is the STRING '1234' represented in a 32-		
bit word in this computer's memory? d. How is the unsigned number 1234 represented in		49(00110001)
this 32-bit register?	'1'	50(00110010)
	'2'	51(00110011)
Assuming an 8-bit register and twos compliment code,		
e. What is the largest negative integer number that can be represented using this 8-bit register?	'A'	65(01000001)
f. Represent the signed numbers –95 and 45 using the above system.		
g. Using twos compliment arithmetic to subtract 45 from –95. Comment on the result.		

Writing Space for Previous Question

14 SEC '03-PAPER 1 Q6

These questions relate to an 8-bit unsigned register.	
a. Represent the decimal number 81 as an unsigned binary number.	
	[2]
b. How is the hexadecimal number A1 represented in this register?	
	[2]
c. What is the biggest number which can be stored in this register?	
	[2]

15 SEC '03-PAPER 2A Q5 (CONSULT CH 2)

(a) Assuming a 10-bit register, find the range of:

i. Unsigned numbersii. 2's complement numbers	
Which can be stored in such a register.	[2,4]
(b) How many bits are required to represent 256 different characters?	[1]
(c) Mention a character coding system with which you are familiar.	[1]

16 SEC '04-PAPER 1 Q10

10. Below is a diagram of an output port on a washing machine, e.g. when the number 24 (00011000) is output the machine is instructed to spin and to pump out water.

128	64	32	16	8	4	2	1
			Spin on	Pump out	Heater on	Motor on	Water in
a. Wha	t happens	s when 7	is outpu	t ?			
b. Wha	t happen	s when 3	is outpu	t?			
		in decim		be output	to have b	oth the sp	in and heat

[6]

17 SEC '05-PAPER 1 Q6

(a) Fill in the following table:

Decimal number	8-bit unsigned binary number	Hexadecimal number
105		
	11011110	
		C0

(b) Why are hexadecimal numbers used in Computing?	
	_
	[2]

[6]

18 SEC '06-PAPER 1 Q4 (CONSULT CH 2)

Answer the following questions on data representation.

presented by each of the following unsigned
(ii) B4 ₁₆
Ans:
gned number that may be represented in an 8-
stores the bit pattern 01101001, what bit patght shifts?
eoding system codes the (capital) letter A with at decimal number is used to code the
standard character coding systems?

19 SEC '07-PAPER 1 Q6

Given an 8-bit register used to store unsigned numerical data in binary equivalent code:

Write d	lown the bit pattern of the register after a shift one right operation is
perforn	ned on this register (which stores the unsigned number 12).
T 71	
	ffect does this shift one right operation have on the unsigned num-
oer sto	red in the register.