Surname		Centre Number	Candidate Number
Other Names			2
	GCE AS - NEW AS		
wjec cbac	B500U10-1		eduqas Part of WJEC
	COMPUTER SCIENCE – Comp Fundamentals of Computer Science		
	A.M. MONDAY, 6 June 2016		

For Ex	aminer's us	e only
	Maximum Mark	Mark Awarded
Total	100	

ADDITIONAL MATERIALS

The use of a calculator is permitted in this examination.

2 hours

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball point pen. Write your name, centre number and candidate number in the space at the top of this page. Answer **all** questions. Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question. You are reminded of the need for good English and orderly, clear presentation in your answers. The total number of marks available is 100.

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[4]

2

Answer all questions.

1. (a) Complete the truth table below.

А	В	A OR B	A AND B	A XOR B	A OR (NOT B)
0	0				
0	1				
1	0				
1	1				

(b) Using the following number:

10101111_2

.....

.....

Show how a logical operation can be used to discover the state of the most significant (leftmost) bit. [3]

B500U101 03

Describe cache memory memory.	y in a Central Processing Unit (CPU	l), giving advantages of using cache [5]	Exa c
			1

3

Discuss the benefits of solid-state drives compared with magnetic hard disc drives.	[6]	Examine only
	•••••	
	•••••	

4.	(a)	State what is meant by the term handshaking. [1	Examiner only
	(b)	Name a standard networking protocol, describing its function and importance. [3]]
	••••••		B500U101

(a)	(i)	Using the example 131 ₁₀ , calculate the storage requirements for an integer data
		type within an unsigned range of 0_{10} to 255_{10} . [2]
	······	
	······	
	(ii)	In a certain computer system, numbers are represented using sign and magnitude.
		Give the range for a signed integer data type with the same storage requirements as question 5 (<i>a</i>)(i). [1]
	.	
Ъ)	Char	racter and string are also primitive data types.
	(i)	Describe the use of standardised character sets, such as ASCII. [1]
	(ii) 	Giving suitable examples, compare the storage requirements for a character and a string data type which uses a standard character set. [2]

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Discuss the benefits and systems analyst.	drawbacks of two different n	nethods of investigation ava	ailable to a [6]
			••••••

Giving su security.	itable examples	, explain how	the Computer	Misuse Act 1	990 aims to impro	ove data [3]
•••••						
						••••••
•••••						

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(a)	Convert the hexadecimal numbers $3E_{16}$ and 27_{16} into two binary numbers and, us binary addition, calculate the number that would result from adding them.	ing
	Convert your answer into a denary number.	
	You must show all of your workings.	[5]
(b)	Using the number –27 ₁₀ as an example, describe two's complement and sign a magnitude representation in an 8-bit register.	ind [5]
		•••••

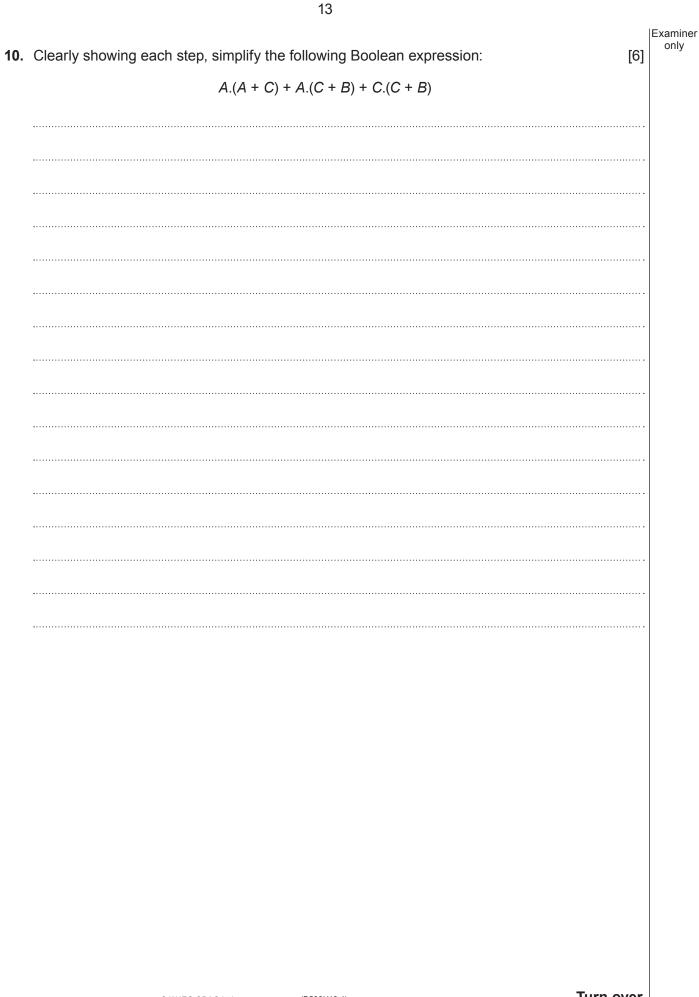
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(c) (i) In a certain computer system, real numbers are stored in floating point form using two's complementation, an 8 bit mantissa and a 4 bit exponent.

i) In the number 8.75 ₁₀ into this floating point form. ii) In the same computer system, the following is a floating point representation real number: Mantissa Exponent 0 1 1 0 0 1 1 Calculate the denary value of the mantissa and exponent, and convert this float point number into a denary number. Image: Calculate the denary number. Image: Calculate the denary number.	_							Μ	an	tiss	sa						_				E	xp	one	nt		_
In the same computer system, the following is a floating point representation real number: Mantissa Exponent 0 + 1 0 1 1 0 0 1 1 Calculate the denary value of the mantissa and exponent, and convert this floating the second s			•					1																		
real number: $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	 Сс	onv	er	t tr	ie r	hun	nbe	ər 8	3.7	5 ₁₀	into	o thi	is 1	float	ting	g poi	nt fo	orm.]
real number: $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	 																									
0 1 0 0 0 0 1 1 Calculate the denary value of the mantissa and exponent, and convert this float	 In rea	the al r	e e Iui	san mb	ne er:	cor	np					, the	e f	ollo	wir	ng is	a fl	oati	ng	poi					ation	o
Calculate the denary value of the mantissa and exponent, and convert this floa				- 1		0						0		0		0				0					1	
	 Ca	int	ıla nı	ite Jm	the	e de int	ena to a	iry a d	val	lue ary	of	the mbe	ma er.	antis	ssa	i anc	l ex	noc	ent	, an	nd o	CON	/ert	thi	s floa	ati I
	 		••••																							
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	(0)	(1)	(2)	(3)	(4)	(5)	(6)	
	2	7	3	5	8	9	1	
L		<u> </u>		myArray	1	I	1	
our algo	prithm sho	uld output ti	he positior	n of the Se	archValu	e if it is fou	nd or a suit	able message
		e is not pre uld be writt			nentina ide	ntifiers		[7]
			ch doing (sen-docun		nuners.		[,]



11.	Explain the concept of open source software. [4]	Examiner only

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	15		
12.	Describe syntax analysis in the compilation process.	[3]	Examiner only
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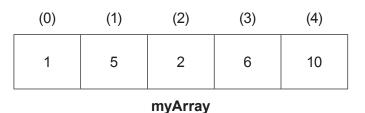
[2]

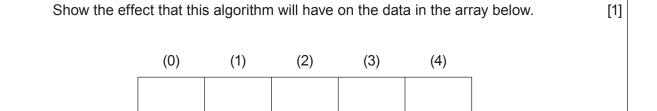
13. The following algorithm sorts integers stored in myArray. It will not work correctly under certain circumstances.

```
1
      Start Procedure SortMyArray
2
     n is integer
3
      temp is integer
4
      swapped is boolean
5
                                 {returns the length of myArray}
б
      set n = length(myArray)
7
      repeat
8
            set swapped = FALSE
            for i = 0 to (n - 1)
9
10
                  if myArray[i] <= myArray[i + 1] then
11
                    temp = myArray[i + 1]
12
                    myArray[i + 1] = myArray[i]
13
                    myArray[i] = temp
14
                    swapped = TRUE
15
                  end if
16
            end for
17
      until (swapped = FALSE)
18
19
      End Procedure
```

(a) State the name given to this type of sort and describe its function.

(b) The following data is stored in myArray:





myArray

	(0)	(1)	(2)	(3)	(4)		
	131	4	0	-6	4		
	<u> </u>		myArray				
(i) Exp	plain why the a	lgorithm v	will fail in th	nis case.			[3]
	ggest a suitabl	e change	that could	l be made	to the al	gorithm to overcome	e this
(II) Sug	blem.						[1]
(ii) Sug pro							
n) Sug pro			••••••				
pro							
pro							

(a)	Describe the distinguishing features of a procedural language programming paradigm. [4	E]
		•••
(b)	Describe the object-oriented approach to programming. [4	 ŀ]
(b)	Describe the object-oriented approach to programming. [4	··· ··· ···
(b)	Describe the object-oriented approach to programming. [4	··· ··· ···
	Describe the object-oriented approach to programming. [4	

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15. Different modes of operation are used for processing data in different operating systems.

Giving a suitable application for each, describe the main features of two different modes of operation.

In each case, discuss suitable input and output methods that could be used in the applications you have described.

You should draw on your knowledge, skills and understanding from a number of areas across your Computer Science course when answering this question. [12]

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