Surname	Centre Number	Candidate Number
Other Names		2



### GCE AS/A Level

2500U10-1 **– NEW AS** 



# **COMPUTER SCIENCE – Unit 1**Fundamentals of Computer Science

A.M. MONDAY, 6 June 2016

2 hours

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

#### **ADDITIONAL MATERIALS**

The use of a calculator is permitted in this examination.

#### **INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen.

Answer all questions.

Write your name, centre number and candidate number in the spaces at the top of this page.

Write your answers in the spaces provided in this booklet. If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

#### **INFORMATION FOR CANDIDATES**

The number of marks is given in brackets at the end of each question or part-question.

The total number of marks available is 100.

Assessment will take into account the quality of written communication used in your answers.

#### Answer all questions.

**1.** The following algorithm checks if the numbers entered are even or odd numbers.

```
1 Start Procedure EvenOdd
2 numberstocheck is integer
3 num is integer
5 input numberstocheck
7 for i = 1 To numberstocheck
     input num
8
9
10
     if num MOD 2 = 0 Then
11
          output num & " is an even number"
12
     else
          output num & " is an odd number"
13
14
     end if
15 next i
16
17 End Procedure
```

(a)	Explain the role of MOD in the algorithm above.	[3]
(b)	Using an example from the algorithm, describe the purpose of selection.	[2]
(c)	Using an example from the algorithm, describe the purpose of repetition.	[2]

[4]

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# 2. Complete the following truth table:

Α	В	С	Ā	B.C	Ā + B.C	$\bar{A}$ .(A + B.C)
1	1	1				
1	0	1				
0	1	1				
0	0	1				

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escribe the function of the main components of the Von Neumann CPU architect	ture. [8]

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debugging of programs. [6]

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d full [3]	Examiner only
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sions	
[2]	
[4]	

(a)	Data can be transmitted using different methods. Describe simplex, half-duplex and duplex transmission methods.
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•••••	
• • • • • • • • • • • • • • • • • • • •	
(b)	Describe what is meant by a data collision on a bus network and how such collis should be dealt with.
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[′	1	]	
[4	1		

(a)	State the meaning of the following terms:	
	(i) Byte.	[1]
	(ii) Word.	[1]
(b)	Convert the hexadecimal numbers $2A_{16}$ and $BB_{16}$ into two binary numbers and, using binary addition, calculate the binary number that would result from adding them.	
	You must show <b>all</b> of your working.	[4]
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•••••		•••••
		· · · · · ·
•••••		•••••

(c)	Usi	ng	an e	xa	ample	e, desc	cribe t	wo's c	omple	ementa	ation ir	n an 8	bit reç	gister.			[2]
)						utor e	vetem	roal	b	ore ar	e store	ad in fl	oating		t form	using to	
,	cor	npl	eme	nt	ation,	an 8	bit ma	ıntissa	and a	a 4 bit	expor	ent.		y poin	t iOiiii	using to	WOS
						Man	tissa						Expo	onent			
	(	)	1		1	0	1	0	0	0		0	0	1	1		

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(e)	Using the number 20 effect upon accuracy	6.8 <sub>10</sub> as an examp	le, describe trunca	tion and rounding,	and their [6]
•••••					
•••••					
•••••					

Describe direction need for files to	t (random) access files in be re-organised on occ	n terms of hashing asions.	algorithms, overflow	areas and the [6]

xar	nine
or	ılv

8. Write a binary search algorithm, using pseudo-code, for the following array.

 myArray

 23
 34
 39
 42
 47
 56
 61

 (0)
 (1)
 (2)
 (3)
 (4)
 (5)
 (6)

Your algorithm should output the position of the SearchValue if it is found or a suitable message if the SearchValue is not present in the array.

Your algorithm should be written using self-documenting identifiers.	[8]

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9.	Giving an example, describe standard modules and their benefits. [4]	Examiner only
		•
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Examiner only

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**11.** A university consists of a number of departments. Each department offers several courses. A number of modules make up each course. Students enrol on a particular course and take modules for that course.

Draw an entity relationship diagram to represent this situation.

[4]

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(a)	Compar organisa	ation.				•		,	,		[10]
				•••••	 	 	•••••		•••••	••••••	 
•••••			••••••	••••••	 	 •••••	•••••		•••••	••••••	 
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(b)	A systems analyst produces maintenance documentation.     Describe the typical contents of this documentation.					

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-	A large organisation wishes to back up the data stored on its network on a daily basis.
	Explain a suitable back up procedure that the organisation could use and compare <b>three</b> different types of secondary storage devices on which the data can be stored.
	You should draw on your knowledge, skills and understanding from a number of areas across your Computer Science course when answering this question. [10]

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## **END OF PAPER**

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