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Computer science
Standard level
Paper 1

Monday 20 May 2019 (afternoon)

1 hour 30 minutes

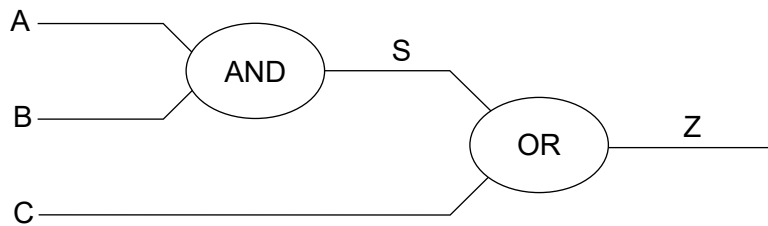
Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer all questions.
- The maximum mark for this examination paper is **[70 marks]**.

Section A

Answer **all** questions.

- 1. Define the term *peripheral*. [1]
- 2. Identify **two** features of a graphical user interface (GUI). [2]
- 3. Outline **one** method of collecting information from stakeholders concerning the requirements for a new system. [2]
- 4. Outline why a prototype would be used to demonstrate the proposed system to the client. [2]
- 5. State the hexadecimal equivalent of the following binary number:
11011111 [1]
- 6. Construct the truth table from the following logic circuit. [3]



- 7. Outline the purpose of the memory address register (MAR) in the central processing unit (CPU). [2]
- 8. State the part of the central processing unit (CPU) that is responsible for carrying out calculations. [1]
- 9. Compilers translate source code into object code. Identify **two** other operations performed by a compiler. [2]
- 10. Identify **two** ways that user documentation may be provided. [2]
- 11. Outline **one** reason why protocols are used in communications between computers. [2]
- 12. Identify **two** characteristics of a personal area network (PAN). [2]
- 13. Explain how data is transmitted by packet switching. [3]

Section B

Answer **all** questions.

14. A large mail order company is concerned about the security of its stored data.

- (a) Describe **two** possible causes of data loss. [4]
- (b) Outline **two** backup strategies that may be used to limit data loss. [4]

The company decides to improve its service by introducing a new user interface for its customers and has developed this interface to the point that it needs to be tested by users who are outside of the company.

- (c) Explain why beta testing is used to gather feedback for the new user interface. [3]
- (d) Outline **one** consequence of not involving end-users in the design and testing stages. [2]
- (e) Identify **two** features that could be used to improve the accessibility of the new user interface. [2]

15. A company that provides training for teachers plans to set up a training room in its offices with a network of 15 computers. Each computer has 1 TB of storage and 16 GB of random access memory (RAM).

- (a) Identify **two** characteristics of RAM. [2]
- (b) State the purpose of persistent storage on the computers. [1]

In order to minimize costs, the company decided only to install general application software on the training computers.

- (c) Identify **two** types of general application software that would be installed on the training computers. [2]

The company has decided to allow the teachers to use their own devices in its training room by adding wireless networking.

- (d) (i) Outline **one** advantage to the company of implementing this change. [2]
- (ii) Outline **one** disadvantage to the company of implementing this change. [2]
- (e) Describe **one** method of security that may be used on this wireless network. [2]
- (f) Explain why the speed of data transmission on the wireless network in the training room may vary. [4]

Turn over

16. A school teacher decides to write a program to store class records and marks. Part of this program involves using a sort algorithm. The algorithm shown is a selection sort and to test it, the teacher has set up an array `VALUES []` with 5 elements of test data.

```
LIMIT = 4

loop COUNTER1 from 0 to LIMIT - 1
  MINIMUM = COUNTER1

  loop COUNTER2 from COUNTER1 + 1 to LIMIT
    if VALUES[COUNTER2] < VALUES[MINIMUM] then
      MINIMUM = COUNTER2
    end if
  end loop

  if MINIMUM ≠ COUNTER1 then
    TEMPORARY = VALUES[MINIMUM]
    VALUES[MINIMUM] = VALUES[COUNTER1]
    VALUES[COUNTER1] = TEMPORARY
  end if

end loop
```

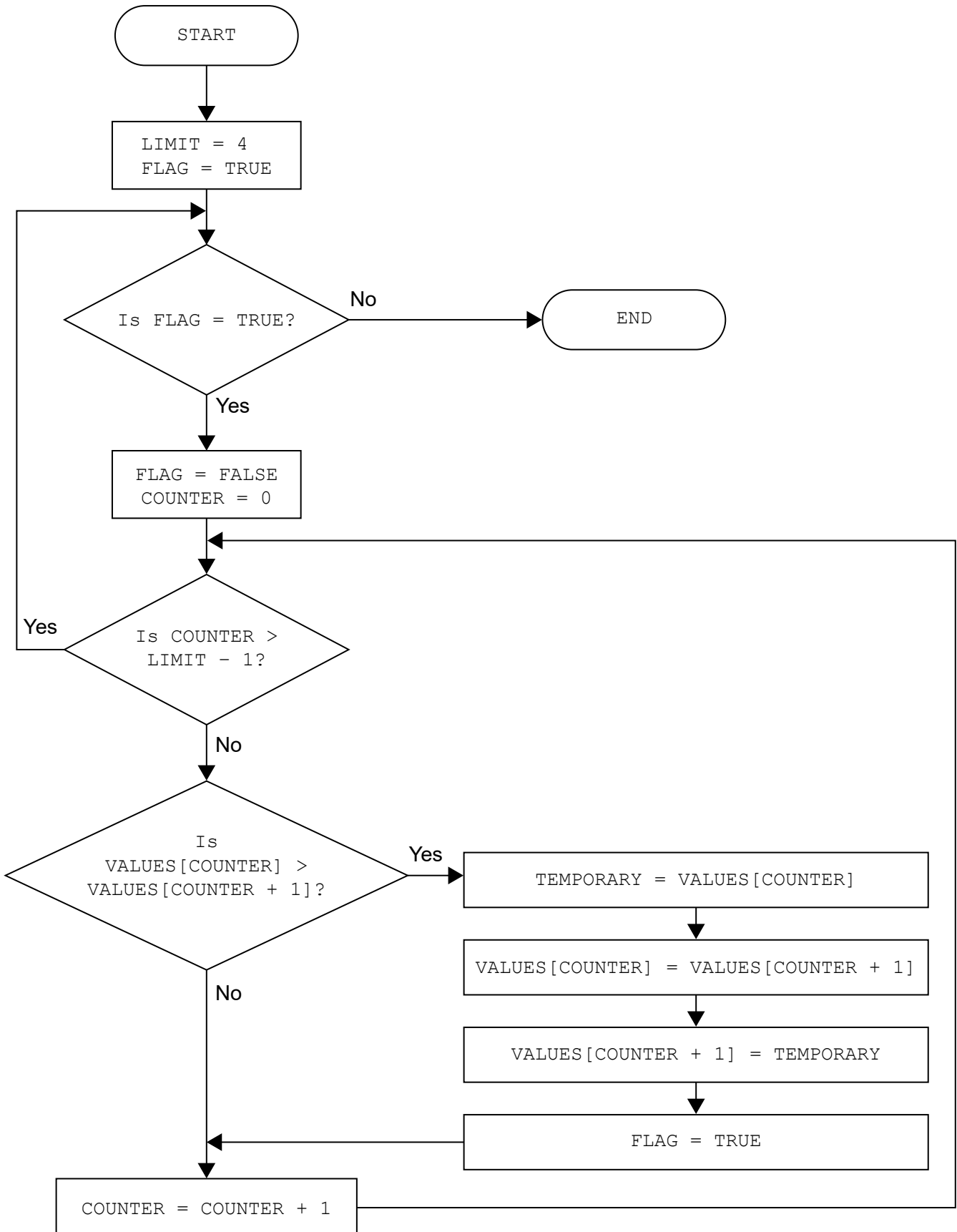
- (a) Identify **two** variables that have been used in the algorithm. [1]
- (b) Copy and complete the table below to trace the algorithm using the data set:
20, 6, 38, 50, 40

			Array VALUES []					
COUNTER1	MINIMUM	COUNTER2	[0]	[1]	[2]	[3]	[4]	TEMPORARY
0	0	1	20	6	38	50	40	

[5]

(This question continues on the following page)

(Question 16 continued)



(This question continues on the following page)

Turn over

(Question 16 continued)

(c) (i) With reference to the algorithm in the flow chart, construct this algorithm in pseudocode so that it performs the same function. [3]

(ii) State the type of sort in the algorithm constructed in c(i). [1]

(d) Construct an algorithm fragment to output the data in the array `VALUES []` [2]

The sorting algorithm could be part of a sub-program within a larger program.

(e) Explain the benefits of using sub-programs when constructing a larger program. [3]