OCR
RECOGNISING ACHIEVEMENT

SPECIMEN

GENERAL CERTIFICATE OF SECONDARY EDUCATION

A452

COMPUTING

Unit A452: Practical investigation

Specimen Controlled Assessment Material

INSTRUCTIONS TO TEACHERS

- Please refer to Section 4 of the Computing specification for instructions on completing controlled assessment tasks.
- Each task can be contextualised appropriately to suit facilities available in your centre.
- The marking criteria should be available whilst completing the tasks.
- The quality of written communication will be assessed in the judgements and conclusion section.
- The total number of marks for this unit is 45.

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The purpose of this unit is to carry out a practical investigation of a topic chosen from a set of options supplied by OCR. In the course of the investigation, there will be an opportunity to look in depth at an aspect of computing that goes beyond the subject matter outlined in Unit A451. The tasks will require a significant element of practical activity which must be evidenced in the report and which will form a major element of the assessment. The topics will enable practical investigation and some supplementary research to be carried out in a variety of ways. These will include, but are not restricted to:

- practical investigations with hardware or software
- practical investigations with online resources.

Supplementary research may be required and resources may include:

- web-based enquiry
- contact with IT professionals
- research using computer industry publications.

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Candidates should complete all tasks.

INSIDE THE MACHINE

Most computers are built to the same basic architecture – the Von Neumann architecture. They have **memory** where program instructions and other data are stored and they have a **processor** that decodes and carries out the program instructions.

The processor has special memory locations called registers. This is where the program instructions are acted on. There is a working demonstration of how the processor and memory interact called the Little Man Computer (LMC). Some versions run as an embedded applet in a browser. The details are here:

http://www.atkinson.yorku.ca/~sychen/research/LMC/LMCHome.html

The applet itself is here:

http://www.atkinson.yorku.ca/~sychen/research/LMC/LittleMan.html

Alternatively you can access another version from:

http://www.cs.ru.nl/~erikpoll/Teaching/III/lmc/

1 Investigate the instruction set provided with one implementation of the LMC.

2 Run at least two of the demonstration programs supplied with the implementation.

3 Explain in your own words what happens as each of the instructions is executed.

4 Write programs to run in LMC:

(a) Take in two numbers and output the smaller first, then the larger

(b) Produce a multiplication table from 1 to 10 for any number input by the user

(c) Input five numbers and output them in reverse order.

Produce evidence to show that you have planned, written and tested your code.

5 Produce an evaluation of your solutions.

6 Write a conclusion about the possibility of writing effective and complex programs with only a limited instruction set.

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RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

General Certificate of Secondary Education

COMPUTING A452

Unit A452: Practical investigation

Specimen Controlled Assessment Mark Scheme

The maximum mark for this paper is **45**.

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The assessment grids are intended to allow assessors to support their decisions by providing best fit.

A. Practical activity **0-15 marks**

Under this category you should provide evidence of the practical activity you carried out

	Marks		
Marking criteria	**0-5**	**6-10**	**11-15**
AO2 – 10 marks AO3 – 5 marks	There may be little or no evidence of any practical investigation. The evidence supplied is minimal and poorly documented with little relevance to the set task. The practical evidence may all be the result of group or teacher led activity with little input from the student.	There is evidence of a practical investigation. The evidence supplied is documented clearly and is relevant to the set task. There is evidence of individual research beyond the group activity and any teacher led activity. The practical investigation shows signs of planning but there may be omissions made in assessing the consequences.	There is evidence of a well structured practical investigation. The evidence supplied is well organised and clearly relevant to the set task. There is extensive evidence of individual practical investigation beyond the group activity and any teacher led activity. The practical investigation shows clear signs of planning and a structured approach, providing a complete investigation of the set topic area. Practical investigation has been carried out with skill and due regard to safety issues.

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B. Effectiveness and efficiency 0-10 marks

Under this category you should show effective use of the skills you have developed to produce the solutions to the identified problems.

Marks			
Marking criteria	**0-3**	**4-7**	**8-10**
AO2 – 10 marks	The techniques used may not be entirely appropriate to the problem and will only produce partially working solutions to a small part of the problem.	The techniques will be used appropriately giving working solutions to most of the parts of the problem. Some parts of the solution may be executed in a partial or inefficient manner.	The techniques are used appropriately in all cases giving an efficient, working solution for all parts of the problem.

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C. Technical Understanding 0-10 marks

You should present the evidence behind your investigation and apply the evidence in order to support your analysis of the scenario.

You will be expected to use appropriate technical vocabulary in a way that indicates that the principles are understood.

Marking criteria	**0-3**	**4-7**	**8-10**
AO1 – 4 marks AO2 – 3 marks AO3 – 3 marks	The candidate demonstrates a limited understanding of the technical issues related to the scenario. Little detail is presented. There will be limited indication of any evidence provided being analysed. There is little correct use of technical terminology.	The candidate demonstrates a reasonable understanding of the technical issues related to the scenario. The amount of detail presented is adequate to support the arguments. There is some analysis carried out on the evidence collected. The use of technical terminology is largely correct but it may be limited.	The candidate demonstrates a thorough and secure understanding of the technical issues related to the scenario. A wide range of relevant and detailed information is presented. The evidence which has been collected is fully analysed. Technical terminology is used correctly. At the top end of the band, this will be extensive and confidently used.

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D. Testing, evaluation and conclusions 0-10 marks

Marks			
Marked criteria	**0-3**	**4-7**	**8-10**
AO1 – 3 marks AO2 – 3 marks AO3 – 4 marks	Conclusions are weak or missing with little or no justification. The solution is presented with little, if any, evidence of testing. Information may be ambiguous or disorganised. There is limited if any reference to evidence. The evidence of written communication is limited with little or no use of specialist terms. There are many errors in spelling, punctuation and grammar. The evaluation may be simplistic with little or no relevance.	The material has structure and coherence with justifiable conclusions being reached although there may be some omissions. There is evidence that the solutions have been tested for basic functionality. Specialist terms will be used appropriately and for the most part correctly. Evidence of good written communication using some specialist terms. There are few errors in spelling, grammar and punctuation. Candidates will have produced a sound evaluation which reviews some aspects of the task.	Thorough and convincing conclusions have been reached, which are borne out by the research carried out by the candidate. The solutions are fully tested and there is little doubt that the solutions presented are fully functional. This material has been presented in a clear and relevant way which is simple to navigate. A high level of written communication is obvious throughout the task and specialist terms/technology with accurate use of spelling is used. Grammar and punctuation is consistently correct. The evaluation will be relevant, clear, organised and presented in a structured and coherent format.

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