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For Assessment Submission
June 2015 to June 2016

GCSE COMPUTING

A452 Practical Investigation

CONTROLLED ASSESSMENT MATERIAL 1

This assessment may be periodically reviewed. Please check on OCR Interchange that you have the Controlled Assessment material valid for the appropriate assessment session.

INSTRUCTIONS TO TEACHERS

- Please refer to Section 4 of the GCSE Computing specification for instructions on completing this controlled assessment task.
- The marking criteria should be available to candidates whilst completing the task.
- The quality of written communication will be assessed in the conclusions and evaluation section.
- The total number of marks for this unit is **45**.

INFORMATION FOR CANDIDATES

- This document consists of **4** pages. Any blank pages are indicated.

Teachers are responsible for ensuring that assessment is carried out against the Controlled Assessment set for the relevant examination series (detailed above).

Assessment evidence produced that does not reflect the relevant examination series will not be accepted.

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 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.

Candidates should complete all tasks

Low Level Processor Operation

Throughout your work, explain fully the thinking that underlies decisions that you have made.

All programs should be planned and include detailed algorithms as well as comments on problems faced and ideas for solutions.

All code must be shown and fully annotated.

Use annotated screenshots plus suitable commentary throughout to demonstrate the work that you have done.

All third-party material used to support your work must be properly referenced.

1. Here is some program code written in Python:

```
def mystery(n):
    a, b = 0, 1
    while a < n:
        print (a)
        a, b = b, a + b
```

Your assignment

(a) Explain the purpose of this code and give a line-by-line explanation of how it achieves its purpose.

(b) Express this code as a flowchart.

(c) As it stands, this code will not run. Add extra Python code in order to make it run on your computer.

(d) Plan, design and dry run a program for the Little Man Computer (LMC) that produces the same result using a fixed number of 10 iterations.

(e) Code and test this program.

(f) Change the program so that the number of iterations can be controlled by the user.

(g) Test this program.

2. The LMC has a very limited instruction set. For example, it has no division, multiplication or SHIFT LEFT instructions.

(a) Explain how you can get LMC to perform a multiplication.

(b) Plan an LMC program to perform a multiply operation. Make sure you show the algorithm that you intend to use.

(c) Write the program and demonstrate it.

3. Here is a program written in JavaScript:

```
<!DOCTYPE html>
<html>
<body>

<script>
var temp = 14;
var y = 2;
temp <<= y;
document.write(temp);
</script>

</body>
</html>
```

(a) Explain what this program does.

(b) Explain what happens if the value of `y` is changed to 3 and then to 4.

(c) Plan and write a program for LMC that would produce the same results.

4. Evaluate the success of your work, explaining clearly how you overcame any difficulties.

5. Discuss the relative merits of CISC and RISC architectures when a chip manufacturer is planning a new processor.