



# Fundamentals of Computing and Digital Literacy

## Sample

## Marking Scheme

This Marking Scheme has been prepared as a guide only to markers. This is not a set of model answers, nor is the Marking Scheme exclusive, for there will frequently be alternative responses which will provide a valid answer. Unless a question specifies that an answer be produced in a particular form, then an answer that is correct, factually or in practical terms, must be given the available marks.

If there is doubt as to the correctness of an answer the relevant NCC Education materials and associated module textbook should be the first authority.

**Throughout the question, please credit any valid alternative point.**

### Notice to Markers

Where markers award half marks in any part of a question they should ensure that the total mark recorded for a task is rounded up to a whole mark.

**PART A: (20 marks)**

Circle **ONE** (1) correct answer from **A, B, C** or **D** for each question.  
Each question is worth 4 marks.

**Question 1**

Which of the following components is responsible for co-ordinating all the timings inside the CPU?

- |                                           |                                      |
|-------------------------------------------|--------------------------------------|
| <b>A.</b> Arithmetic and Logic Unit (ALU) | <b>B.</b> Control Unit (CU)          |
| <b>C.</b> Instruction Register (IR)       | <b>D.</b> Memory Data Register (MDR) |

Answer: B

Award 4 marks for the correct answer

(4 marks)

**Question 2**

Which of the following components is used to provide permanent data storage?

- |                                 |                                      |
|---------------------------------|--------------------------------------|
| <b>A.</b> Hard Disk Drive (HDD) | <b>B.</b> Motherboard                |
| <b>C.</b> Cache memory          | <b>D.</b> Random Access Memory (RAM) |

Answer: A

Award 4 marks for the correct answer

(4 marks)

**Question 3**

Which of the following is **not** a benefit of modular programming?

- |                                   |                                |
|-----------------------------------|--------------------------------|
| <b>A.</b> Easier to debug         | <b>B.</b> Easier to reuse code |
| <b>C.</b> Less repetition of code | <b>D.</b> Improved IDE         |

Answer: D

Award 4 marks for the correct answer

(4 marks)

#### Question 4

The practice of using a network of remote servers hosted on the Internet to store, manage and process data is known as which of the following?

- A. Cloud computing
- B. Social networking
- C. Fat client computing
- D. Internet computing

Answer: A

Award 4 marks for the correct answer

(4 marks)

#### Question 5

What is the value of  $A2_{16}$  when represented in binary?

- A.  $1001\ 0010_2$
- B.  $0010\ 1001_2$
- C.  $1010\ 0010_2$
- D.  $1000\ 0011_2$

Answer: C

Award 4 marks for the correct answer

(4 marks)

**PART B: (30 marks)**

**Write the correct answer for each question in the space provided.**

**Question 6**

- a)** List ONE (1) type of diagram that could be used to show the steps involved in a computer program.

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(1 mark)

Answer: Flow chart, Activity Diagram, Data Flow Diagram or other suitable example.  
Award 1 mark for any suitable example

b) Write an algorithm for finding the highest value in a list of numbers and displaying the result. You may use simple English or pseudocode.

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(9 marks)

Steps could include the following:

Set highest equal to first value in list

Repeat

    If current value in list is greater than highest  
        Set highest = current value  
    End if

Until there are no more items in list

Display highest

Answer: Pseudocode need not be in the above format to achieve the marks, but should clearly describe the correct steps:

Award 1 mark for using a variable to store the highest value and initialising it to an appropriate value

Award 2 marks for using a loop

Award 2 marks for suitable loop condition (i.e. one that ensures each item in the list is checked)

Award 2 marks for using a selection statement with a suitable condition (checking whether current item in list is larger than current value of highest)

Award 1 mark for updating value of highest inside the selection statement

Award 1 mark for displaying the highest value after the loop has ended

Pseudocode need not be in the above format to achieve the marks but should clearly describe the correct steps

## Question 7

- a) List THREE (3) steps people should take to help them maintain their privacy when using social networking sites.

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(3 marks)

Answer: There are many steps people should take to minimise risks to their privacy when using social networking. Award 1 mark for any of the following, or any other suitable example, up to a maximum of 3 marks:

- Use strong passwords
- Keep your settings at the highest privacy level on social networking sites.
- Be aware of what friends post about you and ask them to delete photos, comments and tags if necessary.
- Never accept friend requests from people you have not met in person.
- Choose a username that does not include any personal information.
- Do not post any identifying information about yourself (e.g. phone numbers, address, date of birth)

- b) List THREE (3) rules people should follow to minimise the risk of spyware or computer viruses when using the Internet.

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(3 marks)

Answer: There are many steps people should take to minimise the risk of getting computer viruses or spyware. Award 1 mark for any of the following, or any other suitable example, up to a maximum of 3 marks:

- Use an antivirus program and keep it up to date.
- Use real-time anti-spyware protection.
- Use a firewall.
- Do not give remote access to your computer to anyone unless you are 100% sure who they are or who they work for.
- Do not download email attachments if you do not know who the sender is.
- Always scan email attachments for viruses before opening them.
- Only download files from trusted Internet sites.
- Disable image previews

c) Explain what is meant by the term *strong password* and describe THREE (3) techniques to improve the strength of a password.

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(4 marks)

Answer: Award 1 mark for a suitable explanation of a strong password. Award 1 mark for the following, or any other suitable explanation:

- A strong password is a password that is hard to guess and is hard to crack using automated cracking tools.

Award 1 mark for each suitable method of making a password strong, up to a maximum of 3 marks. These could be any of the bullet points below, or any other suitable suggestion:

- Include both upper- and lower-case characters
- Include special characters
- Include numbers and letters
- Use two or more words rather than just one (makes it harder for a dictionary crack to work)

### Question 8

a) Complete the truth table for the following Boolean logic equation:

$$(A \text{ OR } B) \text{ AND } (A \text{ OR } C)$$

| A | B | C | A OR B | A OR C | OUTPUT |
|---|---|---|--------|--------|--------|
| 0 | 0 | 0 |        |        |        |
| 0 | 0 | 1 |        |        |        |
| 0 | 1 | 0 |        |        |        |
| 0 | 1 | 1 |        |        |        |
| 1 | 0 | 0 |        |        |        |
| 1 | 0 | 1 |        |        |        |
| 1 | 1 | 0 |        |        |        |
| 1 | 1 | 1 |        |        |        |

(6 marks)

Answer: Award 2 marks for each correct column of answers. Deduct 1 mark per column for one error in the column. Award no marks for a column if two or more cells contain errors.

| A | B | C | A OR B | A OR C | OUTPUT |
|---|---|---|--------|--------|--------|
| 0 | 0 | 0 | 0      | 0      | 0      |
| 0 | 0 | 1 | 0      | 1      | 0      |
| 0 | 1 | 0 | 1      | 0      | 0      |
| 0 | 1 | 1 | 1      | 1      | 1      |
| 1 | 0 | 0 | 1      | 1      | 1      |
| 1 | 0 | 1 | 1      | 1      | 1      |
| 1 | 1 | 0 | 1      | 1      | 1      |
| 1 | 1 | 1 | 1      | 1      | 1      |

### Question 9

a) Explain what is meant by the term *data structure*.

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(2 marks)

Award 2 marks for a suitable explanation such as the bullet point below or any other suitable explanation. The explanation should state that the structure is organised **and** that it contains related data in order to be awarded both marks. Award 2 marks for the following, or any other suitable example:

- A data structure is an organised collection of related variables.

b) List TWO (2) benefits of using arrays.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

Award 1 mark for each suitable benefit stated, up to a maximum of 2 marks. These could be any of the points below, or any other suitable suggestion:

- Easy to sort data stored in an array
- Easy to search through data stored in an array
- Easy to manipulate contents of the array
- Keeps related data in one place

**END OF PARTS A and B**

**PART C: (50 marks) Practical Component**

**Question 10**

- a) Use presentation software to produce THREE (3) slides with the titles shown below. Choose an appropriate font, layout and colour scheme and check that this is the same across all three slides.

*Slide One*

|                                    |
|------------------------------------|
| Three collaborative software tools |
| 1.                                 |
| 2.                                 |
| 3.                                 |

*Slide Two*

|                                                |
|------------------------------------------------|
| Three benefits of using collaborative software |
| 1.                                             |
| 2.                                             |
| 3.                                             |

*Slide Three*

|                                                       |
|-------------------------------------------------------|
| Two security issues when using collaborative software |
| 1.                                                    |
| 2.                                                    |

(10 marks)

- Award 1 mark for creating the presentation with three slides as requested.
- Award 1 mark per slide for the correct content (up to a maximum of 3 marks)
- Award 2 marks for suitable and consistent font.
- Award 2 marks for suitable and consistent layout.
- Award 2 marks for suitable and consistent colour scheme.

b) Fill in the information required on each slide.

(8 marks)

Three collaborative software tools

1. Wikispaces
2. Google Hangouts
3. Doodle

Any suitable tool should be awarded a mark up to a maximum of 3 marks. This could include any conferencing, scheduling, project management, brainstorming software with a collaborative element.

Three benefits of using collaborative software

1. Cheaper for long distance collaboration
2. Easier to get everyone together
3. Prevents version control issues

Any suitable benefit stated should be awarded a mark up to a maximum of 3 marks.

Two security issues when using collaborative software

1. Data theft
2. Hacking

Any suitable reason should be awarded a mark up to a maximum of 2 marks.

(Total 18 marks)

## Question 11

- a) Design an algorithm for the following problem. You can do this using simple English, pseudocode or a flow chart.

Exam grade checker:

Design a program which will take in the exam marks for a class of 5 students. For each student, if the mark is under 50, "Fail" is printed. If the mark is between 50 and 100, "Pass" is printed. If the mark is below 0 or above 100 then "Invalid mark" is printed.

(13 Marks)

Steps could include the following

For count = 1 to 5

    Read mark

    If mark > 0 and mark <50

        Write "Fail"

    Else If mark >= 50 and mark <= 100

        Write "Pass"

    Else

        Write "Invalid mark"

Next

Pseudocode need not be in the above format to achieve the marks but should clearly describe the correct steps:

Award 1 mark for using a loop

Award 2 marks for suitable loop condition (i.e. one that ensures each item in the list is checked)

Award 1 mark for using a selection statement

Award 1 mark for correct placement of the selection statement inside the loop

Award 2 marks for correct check for Fail marks

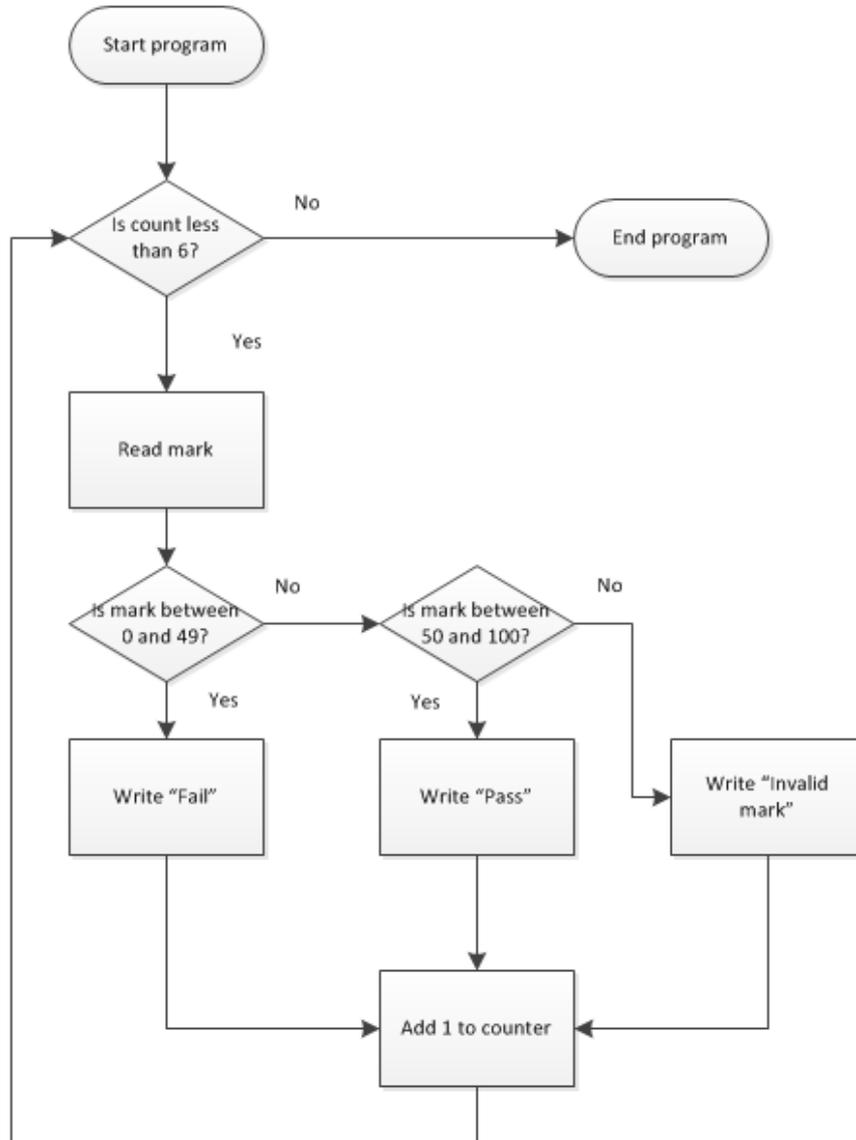
Award 1 mark for each correct output statement (Pass, Fail and Invalid) up to a maximum of 3 marks.

Award 2 marks for correct check for Pass marks

Award 1 mark for correctly identifying Invalid marks

Pseudocode need not be in the above format to achieve the marks, but should clearly describe the correct steps

If a flow chart is produced instead, it may look similar to the one below. This is only a guide. Again, marks should be distributed based on showing the steps mentioned above, only in flow chart format.



b) Using your design from part (a), write the program in a programming language of your choice.

(13 marks)

Answer:

Module Module1

Sub Main()

Dim mark As Integer

For count = 1 To 5

Console.WriteLine("Enter the next mark")

mark = Console.ReadLine()

If mark >= 0 And mark < 50 Then

Console.WriteLine("Fail")

Elseif mark >= 50 And mark <= 100 Then

Console.WriteLine("Pass")

Else

Console.WriteLine("Invalid mark")

End If

Next

End Sub

End Module

Above is a possible solution using VB.NET. Award full marks if the program runs and meets all functionality correctly. Award marks for functionality as follows:

Award 1 mark for using a loop

Award 2 marks for suitable loop condition (i.e. one that ensures each item in the list is checked)

Award 1 mark for using a selection statement

Award 1 mark for correct placement of the selection statement inside the loop

Award 2 marks for correct check for Fail marks

Award 1 mark for each correct output statement (Pass, Fail and Invalid) up to a maximum of 3 marks.

Award 2 marks for correct check for Pass marks

Award 1 mark for correctly identifying Invalid marks

c) Design THREE (3) test cases which will test each of the outputs.

(3 marks)

Answer: Award 1 mark for a test case where mark is between 0 and 49

Award 1 mark for a test case where mark is between 50 and 100

Award 1 mark for a test case where mark is below 0 or over 100

Below is a possible set of test cases, but any values are fine as long as one test covers the "Fail" range, one covers the "Pass" range and one covers the "Invalid" range

Test case 1: mark = 24

Test case 2: mark = 76

Test case 3: mark = 101

d) Test the program with your THREE (3) test cases from part (c) and record the results.

(3 marks)

Do not penalise students if their test cases did not cover all three marks ranges. For each of the three test cases, if their recorded test result matches what their program does then award 1 mark. In the example given, for the program code given for question (b), this would be as follows:

| Test number | Input data | Expected Result | Actual Result |
|-------------|------------|-----------------|---------------|
| 1           | mark = 24  | Fail            | Fail          |
| 2           | mark = 76  | Pass            | Pass          |
| 3           | mark = 101 | Invalid mark    | Invalid mark  |

(Total 32 marks)

**END OF EXAMINATION**

## Question Matrix

| <b>Part A</b>      |                                                                                                                         |
|--------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Question</b>    | <b>Related Learning Outcome</b>                                                                                         |
| <b>Question 1</b>  | LO1: Understand the components of a computer system and its input devices                                               |
| <b>Question 2</b>  | LO1: Understand the components of a computer system and its input devices                                               |
| <b>Question 3</b>  | LO5: Be able to structure, manipulate and represent data                                                                |
| <b>Question 4</b>  | LO3: Be able to collaborate and communicate online                                                                      |
| <b>Question 5</b>  | LO2: Use principles of computational thinking to solve problems                                                         |
| <b>Part B</b>      |                                                                                                                         |
| <b>Question</b>    | <b>Related Learning Outcome</b>                                                                                         |
| <b>Question 6</b>  | LO2: Use principles of computational thinking to solve problems                                                         |
| <b>Question 7</b>  | LO4: Know how to minimise risk to privacy and security when using the Internet                                          |
| <b>Question 8</b>  | LO2: Use principles of computational thinking to solve problems                                                         |
| <b>Question 9</b>  | LO5: Be able to structure, manipulate and represent data                                                                |
| <b>Part C</b>      |                                                                                                                         |
| <b>Question</b>    | <b>Related Learning Outcome</b>                                                                                         |
| <b>Question 10</b> | LO3: Be able to collaborate and communicate online                                                                      |
| <b>Question 11</b> | LO2: Use principles of computational thinking to solve problems<br>LO6: Be able to develop, test and debug program code |