

Name:

Class Teacher:

Date:



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# OCR J276

# GCSE Computer Science

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## *REVISION BOOKLET*

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### 2.3 PRODUCING ROBUST PROGRAMS

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#### **Content in J276 GCSE Computer Science:**

- 1.1 Systems Architecture
- 1.2 Memory
- 1.3 Storage
- 1.4 Wireless and Wired Networks
- 1.5 Network Topologies, Protocols and Layers
- 1.6 System Security
- 1.7 Systems Software
- 1.8 Ethical, Legal, Cultural and Environmental Concerns
- 2.1 Algorithms
- 2.2 Programming Techniques
- 2.3 Producing Robust Programs
- 2.4 Computational Logic
- 2.5 Translators and Facilities of Languages
- 2.6 Data Representation

## 2.3 PRODUCING ROBUST PROGRAMS

TOPIC			
Defensive design considerations:			
Input sanitisation/validation			
Planning for contingencies			
Anticipating misuse			
Authentication			
Maintainability:			
Comments			
Indentation			
The purpose of testing			
Types of testing:			
Iterative			
Final/terminal			
How to identify syntax and logic errors			
Selecting and using suitable test data			

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## 2.3 PRODUCING ROBUST PROGRAMS

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### **DEFENSIVE DESIGN CONSIDERATIONS**

*INPUT SANITISATION/VALIDATION*

*PLANNING FOR CONTINGENCIES*

*ANTICIPATING MISUSE*

*AUTHENTICATION*

### **MAINTAINABILITY**

*COMMENTS*

*INDENTATION*

### **THE PURPOSE OF TESTING**

## **TYPES OF TESTING**

*ITERATIVE*

*FINAL/TERMINAL*

**HOW TO IDENTIFY SYNTAX AND LOGIC ERRORS**

**SELECTING AND USING SUITABLE TEST DATA**

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## EXAM QUESTIONS

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### QUESTION 1

The area of a circle is calculated using the formula  $A = \pi r^2$ , where  $\pi$  is equal to 3.142 and  $r$  is the radius. Finn has written a program to allow a user to enter the radius of a circle as a whole number, between 1 and 30, and output the area of the circle.

```
01  int radius = 0
02  real area = 0.0
03  input radius
04  if radius < 1 OR radius > 30 then
05  print ('Sorry, that radius is invalid')
06  else
07  area = 3.142 * (radius ^ 2)
08  print (area)
09  end if
```

Explain, using examples from the program, **two** ways Finn can improve the maintainability of the program.

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**QUESTION 2**

Charley is writing a program for music students. To make sure that there are no logic errors in the program, Charley uses a test plan. Describe what is meant by a logic error.

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[2]

The program uses the letters in the following list to represent musical notes.

**C D E F G A B**

When the user inputs a letter from this list, the program outputs the next three notes in the list. If it gets to the end of the list, it starts again from the beginning, so the next note after B is C. Complete the test plan below by stating, for each input data, the expected outcome and a reason for the test.

<b>Input Data</b>	<b>Expected outcome</b>	<b>Reason for test</b>
C	.....	..... .....
A	.....	..... .....
H	.....	..... .....

[6]

### QUESTION 3

When customers pay using a card such as the one below, shops use computer systems to process the payment.



Explain why it is important for computer systems that process card payments to be reliable. The quality of written communication will be assessed in your answer.

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#### QUESTION 4

Joseph is an author and programmer, and he needs to estimate how many pages his new book will have. Each page has an average of 300 words. Each chapter starts with a chapter title page. The number of pages is estimated by:

- Dividing the number of words by 300
- Ignoring the decimal part of the division
- Adding the number of chapters to this total

Joseph uses the algorithm below to estimate the number of pages, but his algorithm does not give the correct result.

```
01 INPUT numberOfWords
02 INPUT numberOfChapters
03 CONST wordsPerPage = 300
04 numberOfPages = RoundDown(numberOfWords / wordsPerPage)
05 numberOfPages = numberOfWords + numberOfChapters
06 OUTPUT numberOfPages
```

Joseph has used a **RoundDown** function to remove the decimal part of the division, e.g. **RoundDown(6.2)** would return 6, **RoundDown(7.8)** would return 7. There is an error in Line 05 of the algorithm. Write a corrected line of code to replace line 05.

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[1]