

Name:

Class Teacher:

Date:



OCR J276

GCSE Computer Science




REVISION BOOKLET

2.5 TRANSLATORS AND FACILITIES OF LANGUAGES

Content in J276 GCSE Computer Science:

- 1.1 Systems Architecture
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2.5 TRANSLATORS AND FACILITIES OF LANGUAGES

TOPIC			
Characteristics and purpose of different levels of programming language, including low level languages			
The purpose of translators			
The characteristics of an assembler, a compiler and an interpreter			
Common tools and facilities available in an integrated development environment (IDE):			
Editors			
Error diagnostics			
Run-time environment			
Translators			

2.5 TRANSLATORS AND FACILITIES OF LANGUAGES

CHARACTERISTICS AND PURPOSE OF DIFFERENT LEVELS OF PROGRAMMING LANGUAGE, INCLUDING LOW LEVEL LANGUAGES

THE PURPOSE OF TRANSLATORS

THE CHARACTERISTICS OF AN ASSEMBLER, A COMPILER AND AN INTERPRETER

COMMON TOOLS AND FACILITIES AVAILABLE IN AN INTEGRATED DEVELOPMENT ENVIRONMENT (IDE)

EDITORS

ERROR DIAGNOSTICS

RUN-TIME ENVIRONMENT

TRANSLATORS

EXAM QUESTIONS

QUESTION 1

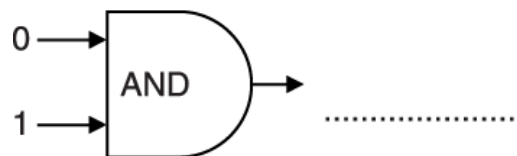
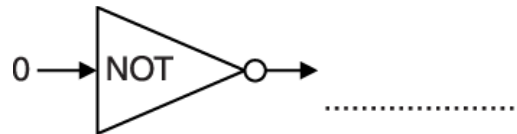
Complete the truth table below for the Boolean statement $p = \text{NOT}(A \text{ AND } B)$.

A	B	P
FALSE	FALSE	TRUE
FALSE	TRUE	
TRUE	FALSE	
TRUE	TRUE	FALSE

[2]

QUESTION 2

State the output of each of the following logic circuits for the inputs given.



[2]

Fig 1. is a circuit diagram.

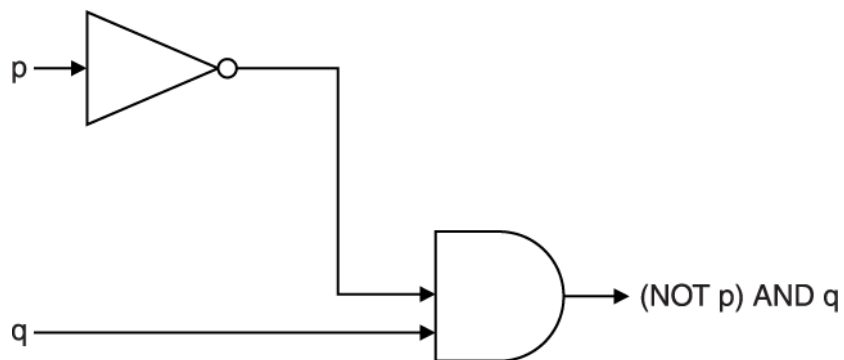


Fig. 1

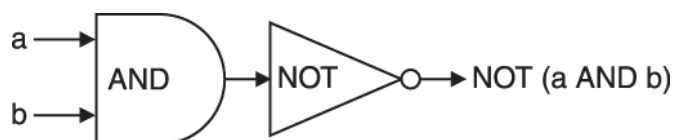
Complete the truth table for Fig 1.

p	q	(NOT p) AND q
0	0	0
1	0	0

[3]

QUESTION 3

The following logic diagram shows the expression **NOT (a AND b)**.



Complete the missing boxes in the truth table below to show the value of **NOT (a AND b)** that will be output for each possible set of values of a and b.

a	b	NOT (a AND b)
0	0	1
0		1
1	0	

[4]

QUESTION 4

Harry is planning to create a computer game using a high-level programming language. State why the computer needs to translate the code before it is executed.

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[1]

Harry can either use a compiler or an interpreter to translate the code. Describe **two** differences between how a compiler and an interpreter would translate Harry's computer game.

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[4]

QUESTION 5

The area of a circle is calculated using the formula $A = \pi r^2$, where π 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
```

Finn uses an IDE (Integrated Development Environment) to write his programs. Identify **two** features of an IDE that Finn might use.

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[2]

QUESTION 6

Jim is writing a program to calculate the wages of workers in a teddy bear factory. Jim uses an Integrated Development Environment (IDE) to create the program. Describe **two** tools in an IDE that can help Jim when creating the program.

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[4]

QUESTION 7

A microwave oven is controlled by a small, specially built CPU. The table below shows some CPU instructions and what they mean.

CPU instruction	Meaning
00001000 00010100	Add 20 to the timer
00001000 00000001	Add 1 to the timer
00000100 00000001	Subtract 1 from the timer

Using examples from the instructions above, state what is meant by:

An opcode

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.....

[2]

An operand

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.....

[2]

The time displayed on the microwave oven is represented as two 8-bit binary numbers, one for the minutes and one for the seconds. For example:

“8:20” is stored as 00001000 00010100

“15:45” is stored as 00001111 00101101

Show how the time **5:30** will be stored.

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.....

[2]

00001000 00010100 can represent either the instruction for "Add 20 to the timer" or the data for the time "8:20". Explain how the CPU can determine whether it represents an instruction or data.

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[1]

QUESTION 8

Graeme is a freelance programmer. He has written a program for a client and gives the client both the high-level code and the machine code of the program. Describe what is meant by:

High level code

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Machine code

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.....

[4]

State why Graeme needs a compiler.

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[1]

QUESTION 9

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. Joseph is using an Integrated Development Environment (IDE) to produce the program. One tool in an IDE that Joseph uses is a translator. Describe **two** additional tools in an IDE that Joseph could use to help him produce his program.

Tool 1 Name

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Description

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Tool 2 Name

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Description

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Joseph's IDE allows him to use both a compiler and an interpreter. Describe how Joseph could make use of a compiler and an interpreter when producing his program.

Compiler

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Interpreter

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[4]