Chhetri Academy

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GCSE COMPUTER SCIENCE

1.3

Edexcel 1CP2 | Specification point 1.3.1

Be able to apply logical operators (AND, OR, NOT) in truth tables with up to three inputs to solve problems

Untiered

Answers and examiner comments

2	2016-2025	Untiered
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

Original question 4

The full source mark scheme begins on page 9. Use the original paper code, tier and question number shown above.

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>5(a)</td><td>Award one mark for each of:

• S = A AND C (1)
• T = B OR C (1)
• Correct values in column Q (1)

<table>
<tr><th>A</th><th>B</th><th>C</th><th>S</th><th>T</th><th>Q</th></tr>
<tr><td></td><td></td><td></td><td>A AND C</td><td>B OR C</td><td>NOT S AND T</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td></tr>
</table>
</td><td>Ignore capitalisation</td><td>(3)</td></tr>
</table>

Question Number	Answer	Additional Guidance	Mark
5(b)(i)	Award **one** mark for each correct cell: **Line numbers** **Traverses the records** — 17 (1) **Traverses the fields** — 19 (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
5(b)(ii)	Award **one** mark for any of the following: • if (item > currMax): (1) • item > currMax (1)	Do not award relational symbol only, as there is no indication which line the error is on Allow equivalent expressions: item >= currMax currMax < item currMax <= item	**(1)**

Question Number	Answer	Additional Guidance	Mark
5(c)	Award **one** mark for each of the following: • Number column is correct (goes from 1-6) (1) • Rows where number is 1, 2, 3 are correct (1) • Rows where number is 4, 5, 6 are correct (1) • Single accurate output only (1)	Interpret empty cells as unchanged values Ignore spacing/empty cells on first bullet as long as numbers in sequence Other formats of trace table are acceptable	**(4)**

number	remainder	total	output
		0	
1	0	1	
2	0	3	
3	0	6	
4	2	6	
5	1	6	
6	0	12	
			12

Question Number	Answer	Additional Guidance	Mark
5(d)(i)	Award up to **two** marks for a linked explanation, such as: • When the target is the last item/is not in the array (1) because the number of comparisons equals the number of items in the array / every item in the array must be compared to the target (1)	For both marks, the expansion must follow/associate with the statement.	**(2)**

Question Number	Answer	Additional Guidance	Mark
5(d)(ii)	Award up to **two** marks for a linked explanation, such as: • Only one pass of the array is needed (1) because the array is already in order (1) • A single pass will be done (1) because after one pass it can detect if the array is already sorted (1) • No swaps are needed/detected (1) because the array is already sorted (1)	For both marks, the expansion must follow/associate with the statement.	**(2)**

Question Number	Answer	Additional Guidance	Mark
5(e)	Award **one** mark for each point for a maximum of **six** marks: • 0 and 10 in first row (1) • Evidence of a calculation for midpoint that would result in 5 shown in first row (1) • N and lower in first row (1) • 6, 10, calculation/8, N, higher in second row (1) Rounding down method • 6, 7, calculation/6, N, lower in third row (1) • 7, 7, calculation/7, N, higher/none/<blank> in fourth row (1) Rounding up method • 6, 7, calculation/7, N, higher in third row (1) • 6, 6, calculation/6, N, lower/none/<blank> in fourth row (1)	Penalise only once on bullet 2 if mid-point value given instead of calculation shown For BP2 there needs to be some evidence of a calculation that would yield the result 5 for the first midpoint. Allow midpoint calculation method to be either rounding down or rounding up.	**(6)**

Method 1: DIV 2 rounding down

Start index	End index	Calculation of mid-point	Found Y or N	Discard lower, higher or none
0	10	(0 + 10) // 2 = 5	N	lower
6	10	(6 + 10) // 2 = 8	N	higher
6	7	(6 + 7) // 2 = 6	N	lower
7	7	(7 + 7) // 2 = 7	N	(higher) none/<blank>
7	6			

Method 2: rounding up midpoint calculation

Start index	End index	Calculation of mid-point	Found Y or N	Discard lower, higher or none
0	10	(0 + 10) / 2 = 5	N	lower
6	10	(6 + 10) / 2 = 8	N	higher
6	7	(6 + 7) / 2 = 6.5 → 7	N	higher
6	6	(6 + 6) / 2 = 6	N	(lower) none/<blank>
7	6			

edexcel

Mark Scheme (Results)

Summer 2016

GCSE Computer Science (1CP0/01)
Paper 1: Principles of Computer Science

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Summer 2016
Publications Code 1CP0_01_1606_MS
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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

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Question Number	Answer	Additional Guidance	Mark
1(a)(i)	Any one of: • To allow connected machines to communicate • To provide the rules of communication between two networked devices	Any other response indicating communication	**1**

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	Any one of: • Backbone • Connecting backbone • Internet backbone • Fibre backbone • Network backbone		**1**

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	Ring		**1**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>1(a)(iv)</td><td>One mark for each correct cell.

<table>
<tr><th>LAN</th><th>WAN</th><th>PAN</th><th>VPN</th></tr>
<tr><td></td><td></td><td>X</td><td></td></tr>
<tr><td>X</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>X</td></tr>
<tr><td></td><td>X</td><td></td><td></td></tr>
</table></td><td></td><td>4</td></tr>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>1(b)(i)</td><td>Any one of:

• To keep information private/secure/secret as it is being transmitted across networks
• So that unauthorised persons will not be able to translate/understand the transmitted data</td><td>Do not accept:
• to keep secure when stored on devices, which is not the context of the question</td><td>1</td></tr>
</table>

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>1(b)(ii)</td><td>
<table>
<tr><th>Plain Text</th><th>Shift</th><th>Cipher Text</th></tr>
<tr><td>d i g i t</td><td>+3</td><td>g l j l w</td></tr>
<tr><td>b i n a r y</td><td>-2</td><td>z g l y p w</td></tr>
</table>
</td><td></td><td>2</td></tr>
</table>

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	1 0 0 1 0 1 0 1		**1**

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	6 E	Ignore case	**1**

Question Number	Answer	Additional Guidance	Mark
1(c)(iii)	1 1 0 0 0 1 0 0	Ignore spacing Must be 8-bits	**1**

Question Number	Answer	Additional Guidance	Mark
1(c)(iv)	Any one of: • 2^n and n=8 • 2^8 • 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 • 2^4 x 2^4 • 2^2 x 2^2 x 2^2 x 2^2 • Any other appropriate formula giving a result of 256		**1**

Question Number	Answer	Additional Guidance	Mark
1(d)(i)	Any one of the following: • Data is permanently lost (during the compression process) • Resolution is lost in images, (usually where it will not be noticed by the human eye) • Signal is degraded in audio files, (usually not noticeable to the human ear)	Accept answers that indicate a loss of quality	**1**

Question Number	Answer	Additional Guidance	Mark
1(d)(ii)	Any one of: B = JPEG		**1**

Question Number	Answer	Additional Guidance	Mark
1(e)	One mark for each of: • X-Dimension = 2 • Y-Dimension = 3 Examples: • (2,3) • X=2, Y=3	Values of 2 and 3 alone, with no indication of ordering, cannot be awarded. Accept any other notation clearly indicating (x,y) ordering and values	**2**

(Total for Question 1 = 18 marks)

Question Number	Answer	Additional Guidance	Mark
2(a)	<table><tr><th>EU Cookie Law (e-Privacy Directive)</th><th>Computer Misuse Act</th><th>Copyright, Designs, and Patents Act</th></tr><tr><td></td><td></td><td>X</td></tr><tr><td></td><td>X</td><td></td></tr><tr><td>X</td><td></td><td></td></tr></table>		**3**

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	<table><tr><th>High-Level Programming Language</th><th>Low-Level Programming Language</th></tr><tr><td>X</td><td></td></tr><tr><td></td><td>X</td></tr><tr><td>X</td><td></td></tr><tr><td></td><td>X</td></tr></table>		**4**

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	Comment(s) / Annotation(s)	Do not penalise spelling	**1**

Question Number	Answer	Additional Guidance	Mark
2(b)(iii)	cubeNum	Do not penalise spelling Do not award if other information from function header is provided because the question asks for name only.	**1**

Question Number	Answer	Additional Guidance	Mark
2(b)(iv)	Any one of: • 18 to 22 • 18 - 22 • 18, 19, 20, 21, 22 • 18, 20, 22	Entire range must be provided Award any discernible notation	**1**

Question Number	Answer	Additional Guidance	Mark
2(b)(v)	Any one of: • 25 • 27		**1**

Question Number	Answer	Additional Guidance	Mark
2(b)(vi)	Any one of: • 10 • 19 • 21 • 23		**1**

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	First box = $\frac{1}{2}$ or equivalent expression for 1 mark / 0.5 Second box = $\frac{1}{4}$ or equivalent expression for 1 mark / 0.25 Conversion = $2\frac{3}{4}$ or equivalent expression for 1 mark / 2.75		**3**

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	4		**1**

Question Number	Answer	Additional Guidance	Mark
2(c)(iii)	One mark for: • Numerator (top) calculation • Denominator (bottom) calculation Any of the following: $\frac{\left(\frac{10Kilobytes}{1}\right)\left(\frac{1024bytes}{Kilobytes}\right)\left(\frac{8\ bits}{byte}\right)}{\left(\frac{10Megabits}{Seconds}\right)\left(\frac{1000Kilobits}{Megabits}\right)\left(\frac{1000\ bits}{Kilobits}\right)}$ $\frac{10\ \times 1024\ \times 8}{10\ \times 1000\ \times 1000}$ $\frac{81920}{10000000}$ $\frac{8192}{1000000}$ Any other correct calculation where the unit conversions are discernible.		**2**

(Total for Question 2 = 18 marks)

Question Number	Answer	Additional Guidance	Mark
3(a)	One mark for each concept: Organisation of files is in a **hierarchy/tree** structure A **node** is either a folder/directory/sub-folder/sub-directory or the file itself The top node/folder/directory/drive is the **root**		**3**

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	One mark for each concept: The client makes a connection / shares its IP with the server The client machine (web browser) **sends a request to the server** for a web page The server machine **sends the (requested) page back** to the client machine		**2**

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	One mark for One mark for both items in One mark for inside Example (3 marks) - Socket - Open Ended Example (2 marks) - Socket Example (1 mark) - Socket - Open Ended	Ignore formatting as long as enclosure <> and </> are correct	**3**

Question Number	Answer	Additional Guidance	Mark
3 (c)(i)	Any two of: • Library code has already been debugged, so it should not have a bug • Library code has already been tested, so it should produce the correct results • Using libraries can reduce the time needed to develop a solution • Library code is usually optimised/faster than own code • Library code can be reused many times without having to rewrite the code	Do not accept just 'saves time'	**2**

Question Number	Answer	Additional Guidance	Mark

3(c)(ii)	One mark for each of (**in this order only**):
	
	1. AND
	2. OR
	3. NOT
	4. AND
	
	==========
	1 Mon, 2 Tues, 3 Wed, 4 Thur, 5 Fri, 6 Sat, 7 Sun
	
	IF day >= 1 AND day <= 5 THEN
	SEND "weekday" TO DISPLAY
	ENDIF
	IF day = 6 OR day = 7 THEN
	SEND "weekend" TO DISPLAY
	ENDIF
	IF NOT (day >= 1 AND day <= 7) THEN
	SEND "error" TO DISPLAY
	ENDIF
			4

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>3(d)</td><td>One mark for each row (maximum 4 marks):

<table>
<tr><td>(1)</td><td>SELECT (id, description)</td><td></td></tr>
<tr><td>(1)</td><td>FROM tblProduct</td><td></td></tr>
<tr><td rowspan="2">(1)</td><td>WHERE id LIKE 'G%'</td><td>Pattern must be discernible as a string (“”), the letter G (g), and a wild card character (*,#,?)</td></tr>
<tr><td>WHERE id>=”G000” AND id <=”G999”</td><td>Pattern must be discernible as a string (“”), the letter G (g), and the operator “AND”</td></tr>
<tr><td>(1)</td><td>ORDER BY id ASC</td><td>Award ASCEND(ING)</td></tr>
</table></td><td>Do not penalise spelling</td><td>4</td></tr>
</table>

(Total for Question 3 = 18 marks)

Question Number	Answer	Additional Guidance	Mark
4(a)	Any two of: • Both the instructions and data for a program are stored in main memory • Instructions and data are stored in binary code • Instructions and data are fetched, decoded, and executed in a sequence by the CPU		**2**

Question Number	Answer	Additional Guidance	Mark
4(b)(i)	One mark for: • Software (layer) One mark for any of: • Allows the operating system on one physical computer **to simulate another computer**, usually of a different operating system. • Allows a **guest operating system** to reside on a machine • Allows **a program written for one machine to run on another** wit**hout changes (Java Virtual Machine).** • Any other appropriate and correct response.	An example (JVM or Linux on Windows) is not enough for marks	**2**

Question Number	Answer	Additional Guidance	Mark
4(b)(ii)	At least one from both sections for full marks Any four of: Sequential: • Individual instructions are executed one after another • Flow control is accomplished by jump/branch/goto instructions • Results are usually achieved less quickly than parallel processing (do not award twice) Parallel: • Individual instructions can be routed to different processors for simultaneous execution • Results are usually achieved quicker than sequential instruction (do not award twice) • Requires multi-core processors or multiple microprocessors • Tasks may be split into different parts with each part executed on a different processor • Results need to be merged back together after completion Any other appropriate and correct response.		**4**

Question Number	Answer	Additional Guidance	Mark
4(c)(i)	Coding solution **(one mark for each item):** • **Calli**ng code must provide an input parameter • `calcCircleArea` signature must take an input parameter • Input parameter must be used in calculation 47 48 calcCircleArea (radiusOfCircle) 49 50 PROCEDURE calcCircleArea (radiusOfCircle) 51 BEGIN PROCEDURE 52 SET area TO Pi * radiusOfCircle * radiusOfCircle 53 SEND area TO DISPLAY 54 END PROCEDURE 55	Ignore any reference to data types	**3**

Question Number	Answer	Additional Guidance	Mark
4(c)(ii)	One mark for each correct cell **Pupil Number Visited** | **Sub-list** 2245 | 837, 1529, 1683 1529 | 1683 1683 |		**5**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>4 (c)(iii)</td><td>One mark for each correct column

<table>
<tr><th>A</th><th>B</th><th>R = A OR B</th><th>S=NOT(A AND B)</th><th>Q=R AND S</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr>
</table></td><td></td><td>3</td></tr>
</table>

(Total for Question 4 = 19 marks)

Question Number	Answer	Additional Guidance	Mark
5(a)	Characteristics – Any of the following: • Branch of computer science based on enabling computers to behave like humans/mimic aspects of human intelligence • AI is implemented in software. • Combines psychology, biology, linguistics, mathematics, neuroscience, and philosophy (ethics) • AI is not the same as the general intelligence of human beings Uses – Any of the following: • Game playing (chess, quiz, video games) • Analytics (analyse buying patterns, predicting behaviours, predictive text, financial markets) • Image processing (recognising objects/patterns) • Logistics (scheduling, order fulfilment) • Control systems (cars, manufacturing, weapons, navigation) • Expert systems (medical, mechanical, electrical diagnosis) • Neural networks (simulating neuron behaviours as in brains) • Natural languages processing (chatterbots, chatbots, speech recognition) • Robotics (dangerous situations, help aged or disabled) Ethical issues – Any of the following: • Take the work of humans, thereby affecting employment rates • Is a computer to be trusted to make decisions (life-death)?	A bulleted list of facts is only worth 2 marks max.	**6**

	• If a computer discovers something that humans can't prove, should it be accepted as truth? • Do AI machines have rights? • Will people be comfortable interacting with machines that are considered intelligent? Quality of Written Communication: • 1-2: Some basic points from **at least one** of the categories; little clarification or expansion of points; spelling, grammar, and punctuation **errors hinder meaning**. • 3-4: At least one relevant point **from two categories**; some clarification or expansion of points; spelling, grammar, and punctuation **errors occur**, but do not hinder meaning. • 5-6: Relevant points from **three categories**; comprehensive clarification or expansion of points; spelling, grammar, and punctuation are **used accurately** and meaning is clear. **Example:** Robots are machines that use artificial intelligence to do jobs that people tell them to. They are not as smart as real humans. One category only; no expansion; QWC ok; 2 marks max) **Example:** Artificial intelligence is based on getting machines to behave like humans. The cleverness of AI is really in the software. AI is used in game playing. Recently the AI software has beat humans at some games. (Two categories; Some expansion; QWC ok; 4 marks max)		

	Example: AI is a branch of computer science that tries to make software imitate human intelligence. However, we're not there yet. It is used in expert systems to diagnose problems with car engines. It can also be used to predict which products people might buy in a grocery store based on their loyalty card purchases. There are problems with AI. One is the issue of ethics. Courts may decide that AI robots have the same rights as humans. People may not like the idea of computers making life and death decisions, such as when to turn off life support systems. This may make people very uncomfortable. (Three categories; Comprehensive expansion; QWC ok; 6 marks max) **Example**: AI: • Making robots behave like humans Uses: • Used to help people with disabilities live in normal homes Ethical Issues: • They will be taking over human jobs and putting people out of work (Three categories; QWC unmarkable; 2 marks max)		

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>5(b)(i)</td><td>One mark for initialisation of variables (max 1 mark)
One mark for each complete pass of loop (max 4 marks)

<table>
<tr><th>R3</th><th>R4</th><th>R5</th><th></th></tr>
<tr><td>1</td><td>2</td><td>4</td><td>1 mark</td></tr>
<tr><td>2</td><td></td><td></td><td rowspan="2">1 mark</td></tr>
<tr><td></td><td></td><td>3</td></tr>
<tr><td>4</td><td></td><td></td><td rowspan="2">1 mark</td></tr>
<tr><td></td><td></td><td>2</td></tr>
<tr><td>8</td><td></td><td></td><td rowspan="2">1 mark</td></tr>
<tr><td></td><td></td><td>1</td></tr>
<tr><td>16</td><td></td><td></td><td rowspan="2">1 mark</td></tr>
<tr><td></td><td></td><td>0</td></tr>
</table>

Other formats for this table are acceptable. For example, each combination of 2 values may be on a single line (indicated in grey).</td><td></td><td>5</td></tr>
</table>

Question Number	Answer	Additional Guidance	Mark
5(b)(ii)	Calculates the number defined as one of (or equivalent statement) • $R4^{R5}$ • 16 • 2^4 • 2 x 2 x 2 x 2		**1**

Question Number	Answer	Additional Guidance	Mark
5(b)(iii)	**Part** / **Name** `MOV` — Opcode / operation code field / operation `R4,#2` — Operand / operand code field / operand field	• Do not penalise spelling	**2**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>5(b)(iv)</td><td>One mark for each of:
• Initialisation (R3, R4, R5)
• Correct loop construction showing blocking
• Correct two lines inside of loop blocking

<table>
<tr><td><pre>SET R3 TO 1
SET R4 TO 2
SET R5 TO 4
WHILE R5 <> 0
    SET R3 TO R3 * R4
    SET R5 TO R5 - 1
END WHILE</pre></td><td><pre>SET R3 TO 1
SET R4 TO 2
SET R5 TO 4
FOR X FROM 1 TO R5 DO
    SET R3 TO R3 * R4
    SET R5 TO R5 - 1
END FOR</pre></td></tr>
<tr><td><pre>SET R3 TO 1
SET R4 TO 2
SET R5 TO 4
REPEAT
    SET R3 TO R3 * R4
    SET R5 TO R5 - 1
UNTIL R5 = 0</pre></td><td><pre>SET R3 TO 1
SET R4 TO 2
SET R5 TO 4
FOR EACH X FROM R5 DO
    SET R3 TO R3 * R4
    SET R5 TO R5 - 1
END FOR</pre></td></tr>
</table>
</td><td>• Accept alternate solution of DO/WHILE as long as test is “R5 <> 0”
• Do not penalise pseudocode usage as long as response is blocked and discernible
• A specific language construct of a while, repeat, or for loop should be awarded if blocked and discernible</td><td>3</td></tr>
</table>

	``
	SET R3 TO 1
	SET R4 TO 2
	SET R5 TO 4
	REPEAT R5 TIMES
	    SET R3 TO R3 * R4
	    SET R5 TO R5 - 1
	END REPEAT
	``
	``
	SET R3 TO 1
	SET R4 TO 2
	SET R5 TO 4
	FOR X FROM 1 TO R5 STEP 1 DO
	    SET R3 TO R3 * R4
	    SET R5 TO R5 - 1
	END FOR
	``
	Other solutions may be correct, as long as it includes a sensible loop with the correct test for terminating condition.		

(Total for Question 5 = 17 marks)

Total for paper = 90 marks

Content Mapping Grid

Question	Specification	Marks
1a(i)	5.1.5	1
1a(ii)	5.2.1	1
1a(iii)	5.2.9	1
1a(iv)	5.1.2	4
1b(i)	3.4.1	1
1b(ii)	3.4.2	2
1c(i)	3.1.4	1
1c(ii)	3.1.5	1
1c(iii)	3.1.5	1
1c(iv)	3.2.4	1
1d(i)	3.3.2	1
1d(ii)	3.3.2	1
1e	2.4.3 1.1.1	2
2a	6.1.3	3
2b(i)	4.5.1	4
2b(ii)	2.1.2	1
2b(iii)	2.2.1	1
2b(iv)	2.2.2	1

Question	Specification	Marks
2b(v)	2.3.5	1
2b(vi)	2.3.5	1
2c(i)	3.1.2	3
2c(ii)	3.3.1	1
2c(iii)	3.3.4	2
3a	4.4.1	3
3b(i)	5.2.4	2
3b(ii)	5.2.3	3
3c(i)	2.6.1	2
3c(ii)	4.3.2	4
3d	3.5.3	4
4a	4.2.2	2
4b(i)	4.1.1	2
4b(ii)	4.1.2	4
4c(i)	2.6.3	3
4c(ii)	1.1.8	5
4c(iii)	4.3.1	3
5a	6.1.1	6

Question	Specification	Marks
5b(i)	2.1.6	5
5b(ii)	1.1.1	1
5b(iii)	4.2.3	2
5b(iv)	2.2.2	3

Question 5(a)

Many candidates found it difficult to derive the correct expressions for S and T in the truth table. Where candidates struggled to derive the expressions, they were often able to complete the actual truth table values.

Question 5(b)i

Most candidates attempted this question, but relatively few could identify both lines of code that were required.

Question 5(b)ii

Many candidates who attempted most of Q5 were able to identify the correct expression, but there were many candidates who omitted a response to this question.

Question 5(c)

It was encouraging to see many candidates attempt the trace table at this stage in the paper. When candidates attempted the question, it was noticeable that many iterated the loop too many times and traced *number* from 1 to 7. Remainders were more accurately given in rows 1 to 3 where numbers divided exactly, but in rows 4 to 6 more errors occurred. Some candidates gave outputs on each line rather than giving the final output which would only be printed at the end of the algorithm.

Complete the trace table.

You may not need to fill in all the rows in the table.

(4)

number	remainder	total	Output
		0	
1	0	1	
2	0	3	
3	0	6	
4	2		
5	1		
6	0	12	
7	-1		
			12

ResultsPlus Examiner Comments

This response scored 3 marks.

It did not get mark point 1 because it iterated numbers from 1 to 7 instead of 1 to 6. It did get mark points 2 and 3 for correctly tracing the intervening rows. It also achieved mark point 4 for giving the final output of 12 once only at the end.

Question 5(d)i

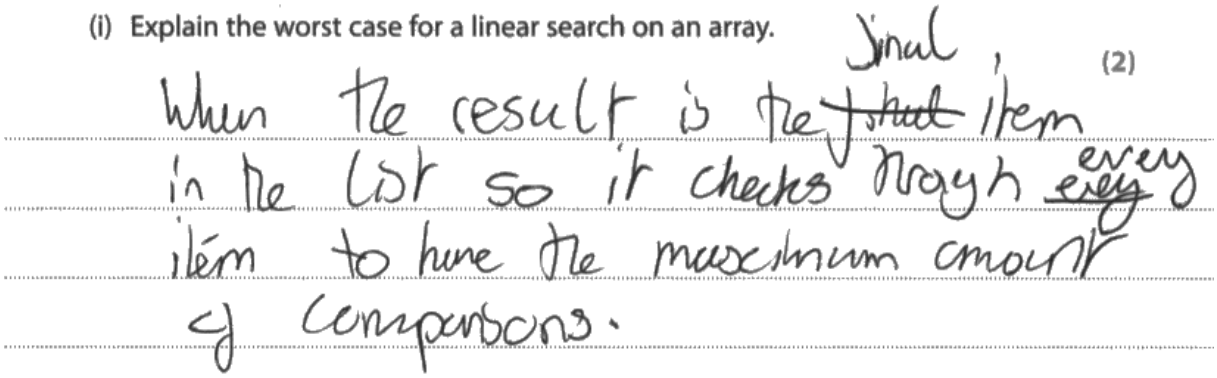
Whilst many candidates identified that the worst case for a linear search was when the item to locate was either the last item or not in the list, fewer were able to give the reason for this.

(d) The efficiency of algorithms can be analysed.

The worst case is when the most comparisons are required.

The best case is when the fewest comparisons are required.

(i) Explain the worst case for a linear search on an array. (2)



ResultsPlus
Examiner Comments

This response scored 2 marks for giving a clear linked explanation that justified the worst case being that the item was the last in the list because all preceding items had to be compared first.

Question 5(d)ii

Answers to this question tended to mirror Q5d(i) with many identifying that the best case for a bubble sort was when the data was already in order. Fewer were able to give the reason for this. Many candidates reiterated the wording of the question stating that the best case was when the fewest comparisons were needed. Responses that reiterated the question were not creditworthy.

(ii) Explain the best case for a bubble sort on an array.

(2)

The best case is that it only needs one pass to be in order.

ResultsPlus
Examiner Comments

This response scored 1 mark for stating that the best case was when the list was already in order, but there was no linked explanation to explain why this was the case.

Question 5(e)

Encouragingly, most candidates attempted the last question on the paper. Many achieved the first mark or two for tracing the initialisation of the start and end index and stating whether the item was found or not. Fewer were then able to update the start/end indexes correctly to reflect the part of the list that would be discarded and fewer still were able to trace the algorithm to the point when the algorithm would stop. Another common error was to continue to include the midpoint rather than discarding it when deciding on the bounds for the new sublist.

Start index	End index	Calculation of mid-point	Found Y or N	Discard lower, higher or none
[0]	[10]	(0+10)÷2 = [5]	N	discard lower
[5]	[10]	(5+10)÷2 = 7.5 → [8]	N	discard higher
[8]	[6]	(8+6)÷2 = 7 [7]	N	discard higher
[7]	[6]	(7+6)÷2 = 6.5 → [6]	N	discard none. (error)

ResultsPlus Examiner Comments

This response, like many, scored the first 3 marks.

Where candidates had an idea as to how a binary search calculated a midpoint and then discarded the half of the list that did not contain the target item, they scored 3 marks. More detailed knowledge of the specific way in which the upper/lower bounds are updated in a binary search was required to update the start/end indexes accurately to continue the algorithm.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- Learn and use clear definitions for technical terms within the specification.
- Read and interpret the question prompt to focus on the specific requirements and provide more relevant responses that address the critical aspects of the question.
- Where a context or scenario is provided, respond by using the contextual information in the question.
- Expand and explain answers using examples and reasons, especially where more than a simple statement or list is requested.
- Understand that characteristics are properties or features.
- Clarify understanding of the differences between high and low level languages.
- Develop clear understanding between the difference between different searching and sorting algorithms.

Grade boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link: https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html