1(a). Dipesh is thinking of buying a tablet computer to replace his old desktop computer.

Describe how the CPU and RAM work together to enable the tablet computer to operate.

[3]

(b). The tablet computer also uses cache memory. Describe the purpose of cache memory.

[2]

2. For each of the pseudocode algorithms shown below, tick the appropriate box to show whether they will loop infinitely or not.

Pseudocode	Will loop infinitely	Will <u>not</u> loop infinitely
`01 x = 0` `02 while True` `03  print x` `04 endwhile`		
`01 x = 0` `02 while x < 10`		

03 print x 04 endwhile		
01 x = 0 02 while x < 10 03 print x 04 x = x + 1 04 endwhile		
01 y = 5 02 for x = 1 to y 03 print x 04 next		

[4]

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3. A library gives each book a code made from the first three letters of the book title in upper case, followed by the last two digits of the year the book was published.

For example, "Poetry from the War", published in 2012 would be given the code `POE12`.

i. Complete the following pseudocode for a function definition that will take in the book title and year as parameters and return the book code.

```
01  function librarycode (title, ……)
02     parta = title.subString (0, ……)
03     partb = year.subString (2, 2)
04     …… parta.upper + partb
05  endfunction
```

ii.

iii.

iv. Use pseudocode to write an algorithm that does the following :

- Inputs the title and year of a book from the user.
- Uses the librarycode function above to work out the book code.
- Permanently stores the new book code to the text file `bookcodes.txt`

v.

vi.

vii.

viii.

ix.

x.

xi.

xii.

xiii.

xiv.

xv.

xvi.

xvii.

xviii.

xix.

xx.

xxi.

xxii.

xxiii.

xxiv.

xxv.

xxvi.

xxvii.

xxviii.

xxix.

xxx. **[6]**

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4. William is creating a film for a school project using a digital video camera.

William transfers the videos to a computer for editing.

i. The computer has 1GB of storage free.

Calculate the number of videos that could be stored on the computer if each video was 100MB in size.

Show your working.

[2]

ii. A program needs to calculate the size of files in bytes. The program must:

- Ask the user to input a file size in megabytes
- calculate and output the number of bytes this represents in a user friendly forr (e.g. "`There are 5242880 bytes in 5MB`").

iii.

Write an algorithm using pseudocode to calculate the number of bytes in a given number of megabytes.

iv.
v.
vi.
vii.
viii.
ix.
x.
xi.
xii.
xiii. **[6]**

5. Using pseudocode, write an algorithm that will use a count-controlled loop to print out the numbers 1 to 10 in ascending order.

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[3]

END OF QUESTION paper

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Mark scheme

<table>
<tr><th colspan="3">Question</th><th>Answer/Indicative content</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>a</td><td></td><td>• Instructions / programs(currently running) / data are stored in the RAM…
• these are fetched from the RAM by the CPU / Processor
• … where the instructions are executed / instructions are processed / data is processed</td><td>3</td><td>If the candidate has described the functions of RAM and the CPU separately, only award the 2nd bullet if it is cl fetched from RAM.

Mention of the fetch – execute cycle in the CPU is enough to award bullet 3.</td></tr>
<tr><td></td><td>b</td><td></td><td>• To store instructions / data that is frequently used / previously used / next to be used
• Data does not need to be fetched from RAM
• Speeds up access</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>5</td><td></td></tr>
<tr><td>2</td><td></td><td></td><td><table><tr><th>Will loop infinitely</th><th>Will <u>not</u> loop infinitely</th></tr><tr><td>✓</td><td></td></tr><tr><td>✓</td><td></td></tr><tr><td></td><td>✓</td></tr><tr><td></td><td>✓</td></tr></table></td><td>4</td><td>1 mark per row.

More than one tick in a row = 0 marks for that row.

<u>Examiner's Comments</u>

It was thought that candidates of all abilities would be able to attempt this question, with iteration possibly a re candidates showed a lack of understanding on this question, with far fewer receiving full marks than perhaps v candidates have had fewer opportunities to experience programming on screen than would be expected. Unde constructs and their application is certainly something which centres would do well to focus on.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
<tr><td>3</td><td></td><td>i</td><td>1 mark per filled gap, max 3

<pre>01 function librarycode(title, <u>year</u>)
02   parta = title.substring(0, <u>3</u>)
03   partb = year.substring(2, 2)
04   <u>return</u> parta.upper + partb
05 endfunction</pre></td><td>3</td><td>Ignore capitalisation.

Allow <u>librarycode</u> = for 3rd mark – this is an equivalent in some languages for returning a value (eg. Visual Basi

<u>Examiner's Comments</u>

Responses to this question were mixed. The majority of candidates were able to decide on the correct passing had to be specifically <code>year</code> and nothing else as this identifier was referred to later in the algorithm.

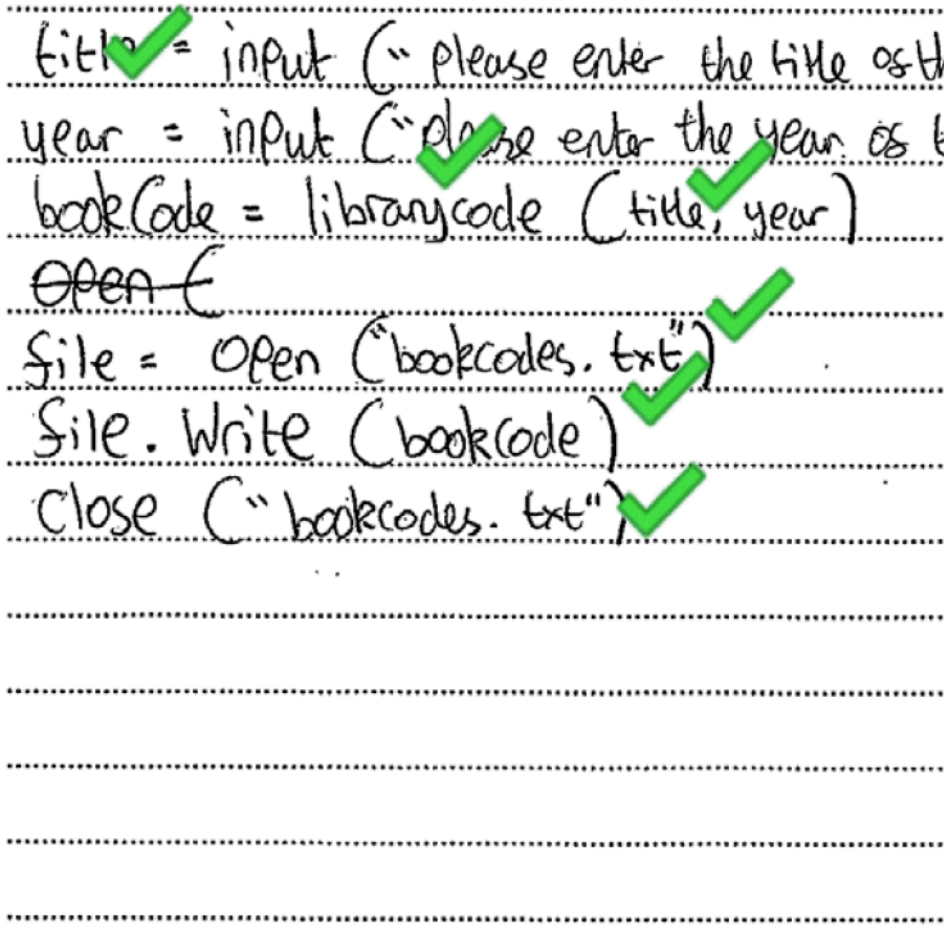
Fewer candidates were able to correctly decide that three characters were required from the title; this was ofte <code>subString</code> is listed in appendix 5f of the specification as a string handling tool that could be used in the exam is also given on line 03.

Even fewer candidates understood that a function must return a value, this being the answer to line 04. The mo was candidates attempting to print / output the book code rather than return it. A mark was given if they assig the function (e.g. <code>librarycode = parta.upper + partb</code>) as this is a valid method of returning a value in Visual Basic.</td></tr>
<tr><td></td><td></td><td>ii</td><td>1 mark per bullet, max 6

• Input title <u>and</u> year from user
• Open <u>bookcodes.txt</u>
• Call the librarycode() function…</td><td>6</td><td>Example algorithm

<pre>title = input("enter title")
year = input ("enter year")
code = librarycode(title, year)
myFile = openWrite("bookcodes.txt")
myFile.writeLine(code)
MyFile.close()</pre></td></tr>
</table>

			• … with the two parameters that match input values • … write out **code obtained** to the text file • Close text file		Note, pseudocode shown above is an example – candidates may answer very differently, but award marks if ir Bullet points 3,4 and 5 could be done in one line: `myFile.writeLine(librarycode(title, year))` Do not award bullet point 3 if candidate is defining the function rather than calling it. Allow bullet point 2 (opening text file) if correctly referred to during write operation. Bullet point 3 must include brackets () to signify it is the function being called or indication that is being called. **Examiner's Comments** This question was answered extremely poorly by candidates and shows a lack of understanding of the use of f Where candidates scored highly here, it was a very good indicator that they would score highly across the pap The majority of candidates were able to access the first mark for inputting the two requested values. However, clear that the value inputted had to be stored somewhere* (typically in a variable). Therefore although `x = inp` simply stating `input('enter a title')` was too vague to achieve the mark. Another common misunderstа input at the same time; a variable will only ever store one value and so asking for both in one go is unlikely to a * Where higher ability candidates showed an understanding of how to do this differently, e.g. using the input va function, this was of course credited by examiners. However, the bigger misconception was around the use of pre-existing functions. One of the benefits of subro modularised and re-used without requiring programmers to copy and paste code if they require it multiple time student answer for this question was to write out the code from the function again to try to calculate the book from the question and shows a fundamental lack of understanding of the use of functions. Marks were given for calling the existing function, passing in the values previously input and then writing the re majority of candidates achieved none of these marks. Other independent marks were given for opening and closing the text file and a pleasing number of candidates  **Misconception** Functions modularise code; they can be written once and used multiple times in a program. If a pre-written fun and candidates are told to use it, they will NOT be credited for simply copying and pasting the code inside the understanding. **Exemplar 3**

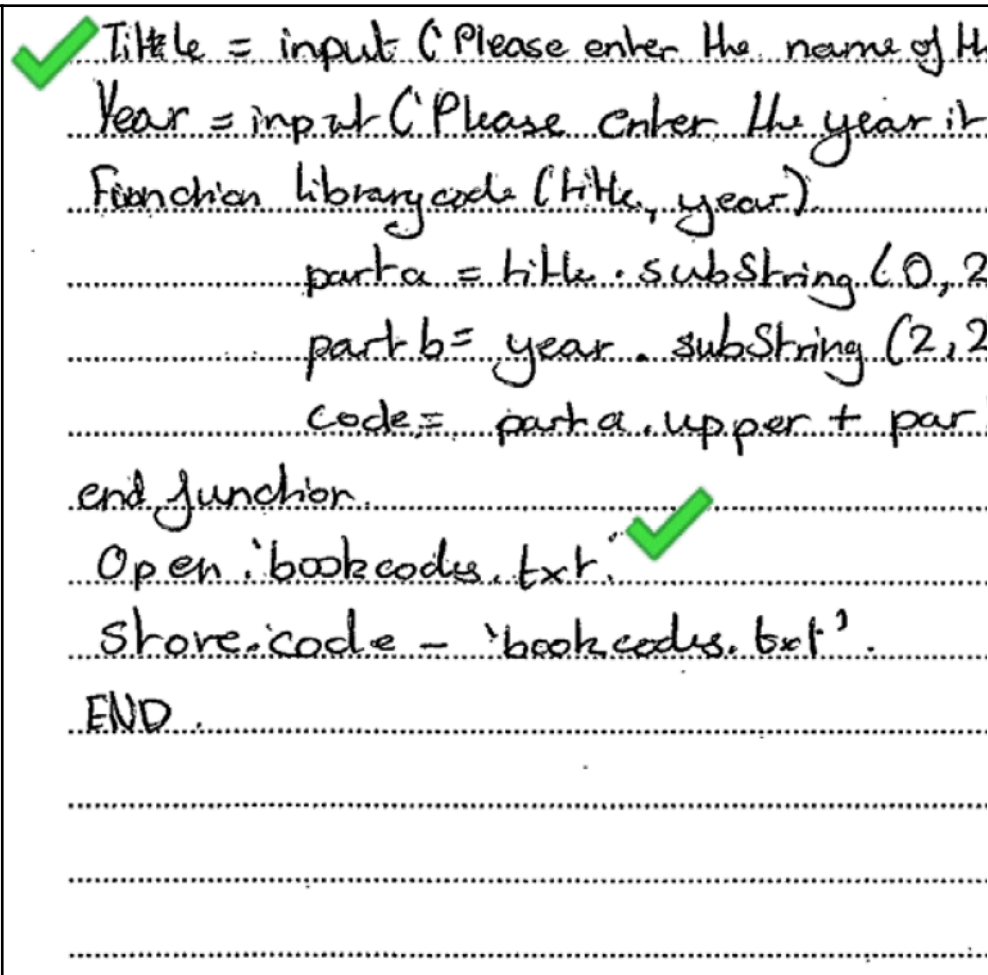


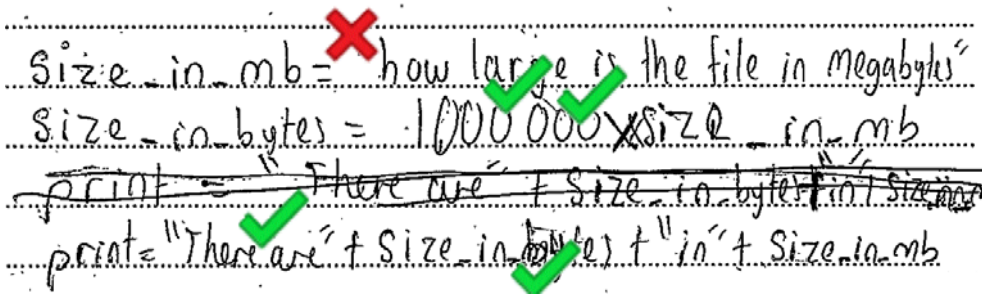
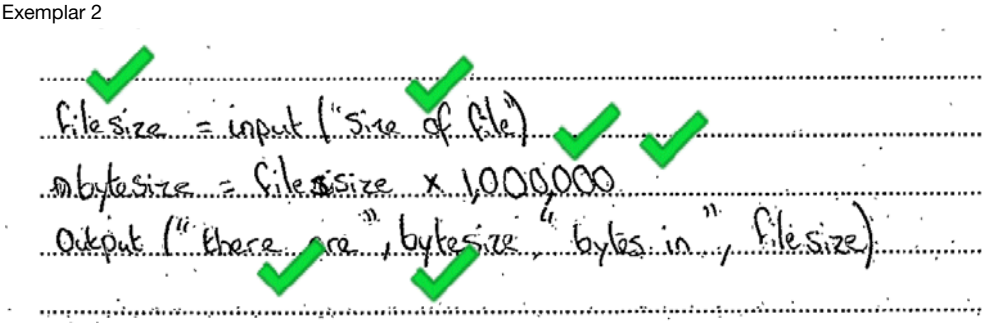
In the exemplar above, the candidate has successfully input two values from the user. They have then called th with the values previously input as arguments (in parenthesis). This will return a value which is stored in the var is then opened, the returned value is written to the text file and then the file is closed. This response covered e and so is credited with full marks [6 out of 6].

Exemplar 4

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					 In the exemplar above, the candidate has successfully input two values from the user. However, they then misu and instead of calling this, re-write out the function code. Note that there is no call to this function, which could assumption is that the candidate thinks they must place the code here for it to run, which is incorrect. The candidate does gain a mark from opening the text file but they cannot get the mark for writing to it (as no l they do not close the file. This response gained two out of six marks and is typical of the average candidate ar
			Total	**9**	
4		i	1 mark for working, 1 mark for answer • 1024(1000) / 100 / 10*100 = 1000 • = 10 (videos)	2 AO2 1a (1) AO2 1b (1)	Final answer must be 10, not 10.24 **Examiner's Comments** Most candidates were able to answer this question fully. They performed the correct calculation and gained th number of videos appropriately. The most common error involved candidates multiplying 100 by 1000.
		ii	1 mark per bullet to max 6 • Output asking for file size (in megabytes) • Taking number of MB as input • Multiplying by 1024 or 1000 • Multiplying by 1024 or 1000 (may be same line as bullet 3, this must be the final value with no further changes) • Outputting the final bytes value…	6 AO3 2b (6)	Award bullet 5 even if bullets 3 and 4 are wrong. Do not award if outputting the original input value. Bullet 4 must be the final calculation to get the mark. If there are any further calculations, or changes to the fin awarded. `Input = value` is incorrect, variable must be on left. Bullet 6 is dependent on bullet 5. Input must be stored e.g. `user input` – no mark Outputs must have "" around strings, variable identifiers must not have "". If bullet 5 is not given because the variable is in "", still award bullet 6 if correct. Bullet 3 and 4, could be multiplying by 1,000,000 or 1,048,576 (award both bullets).

			• …in an appropriate message output "Please enter the file size in megabytes" input numberMB numberKB = numberMB * 1024 (or 1000) numberBytes = numberKB * 1024 (or 1000) output "There are " & numberBytes & " bytes in " & numberMB & "MB"		`numberMB = input("Enter the file size")` would get both bullets 1 and 2. Concatenation is not required for the final bullet. `input("Filesize")` will get 1 mark for outputting File size, it will not get the input as there is no variable. **Examiner's Comments** This question covered the synoptic algorithm element of the examinations. Candidates were required to use th write a pseudocode algorithm. Most candidates attempted to write a pseudocode algorithm. A small number c does not meet the criteria of pseudocode. Most candidates were able to gain at least some marks, most comm and then input of the required data. Common errors including inaccurate use of assignment, for example INPUT = FileSize is incorrect. This line of FileSize is stored in INPUT. The correct assignment is FileSize = INPUT. Candidates need to be aware of how to output strings and values within variables. These could have been outp when combined candidates need to differentiate between the variables and text. For example, OUTPUT (The n of concatenation, but the text is not identified as a string and requires speech marks e.g. OUTPUT (The new fil Some candidates did not attempt to output a message to the user, asking them to input the file size. Candidate question carefully to make sure they are meeting all of the criteria. Exemplar 1  This candidate has not identified that "how large is the file in megabytes" is an output, and has not explicitly as gain either of these marks. This first line of code is assigning a string to the variable size_in_mb. This error is n candidate has performed the correct calculation, and then output an appropriate message along with the new Exemplar 2  This candidate has outputted an appropriate message and read the input into the variable filesize. They have p (although * is preferable for multiplication, as an algorithm x is accepted). They have output an appropriate mes
			Total	**8**	
5			1 mark per bullet, max 3. • FOR loop used • That outputs the counter variable • loops 10 time	**3**	Example algorithm `for i = 1 to 10` `  print i` `next` Do not accept WHILE loop for first mark, although other marks can be accessed. No need for `next` If candidate manually increments counter within FOR loop, do not award bullet point 3.

					Accept pseudocode that suggests looping 10 times, even if this may not function correctly in a specific langua **Examiner's Comments** Very few candidates achieved full marks on this question, mainly due to a lack of understanding of what a cou by example in appendix 5f of the specification. Many candidates used a condition controlled (WHILE) loop and a comparison of a variable which was incremented on every iteration, this was still condition controlled and the However, where this met the requirement of the question, the other marks were achievable. A FOR loop is truly count-controlled and so was able to achieve full marks. However, some candidates then w counter variable inside the FOR loop which is at best not necessary and at worst harmful to the correct operat not therefore achieve full marks. Examiners were instructed to be generous this time where answers were slightly ambiguous because of the wa (such as Python) handle count-controlled iteration. Centres should be aware that Python is only one of many s it is perhaps best practice to introduce candidates to overall concepts before looking at how these are implem choice. Where possible, if candidates were able to use multiple high-level languages during the course of their beneficial.
			Total	**3**	

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