

Revision Sheet

A-Level Computer Science · Unit 9 Algorithm Design and Problem-solving

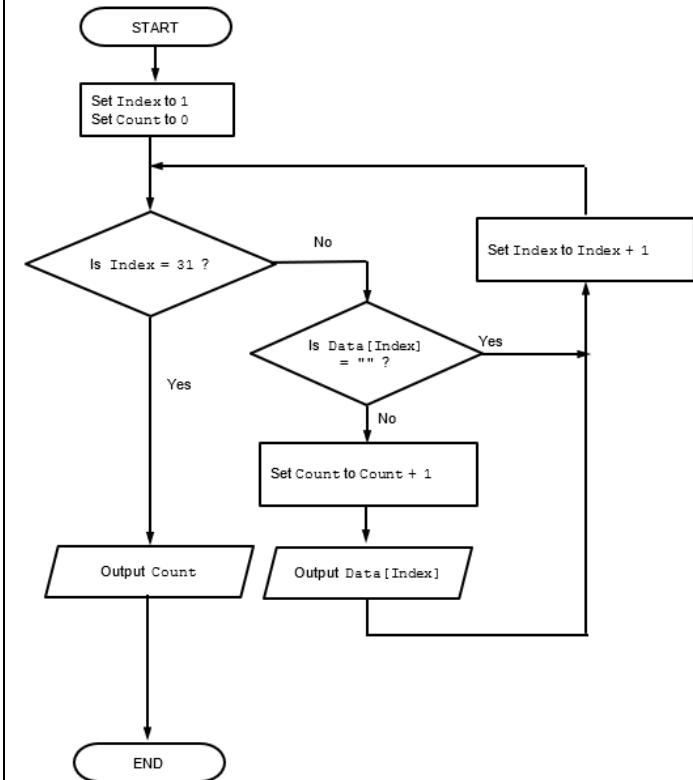
10 vocabulary items · 39 marks of exam questions (5 questions)

Part 1 · Vocabulary review answer key. Section A wants the exact English spelling.

Question	Answer	Marks
1	abstraction	1
2	decomposition	1
3	algorithm	1
4	identifier table	1
5	pseudocode	1
6	sequence	1
7	iteration	1
8	flowchart	1
9	stepwise refinement	1
10	identifier	1

11

Example solution



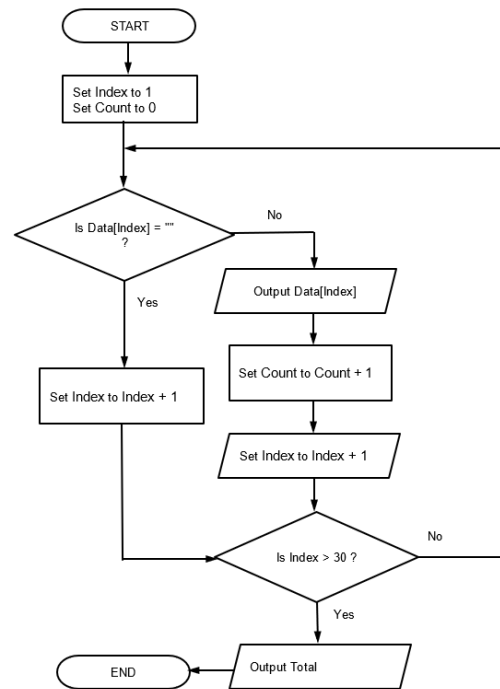
Mark as follows:

- 1 Initialisation of variables used as **array index** and **count**
- 2 Loop through exactly 30 elements in the array
- 3 Test for empty string in current array element // Test for non-empty string
- 4 Increment count if appropriate **in a loop**
- 5 Both required outputs under correct conditions with correct outputs

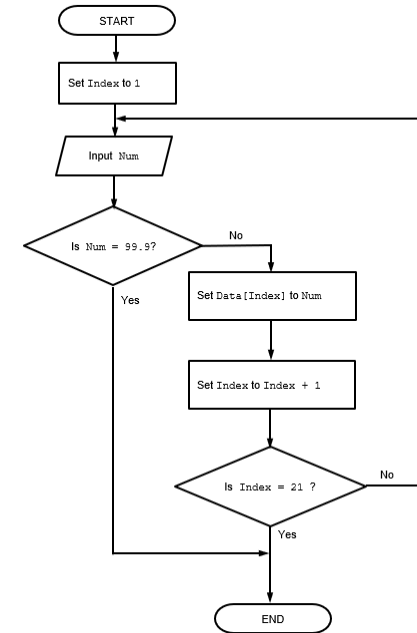
11

Alternative solution

Checking for empty string first



12

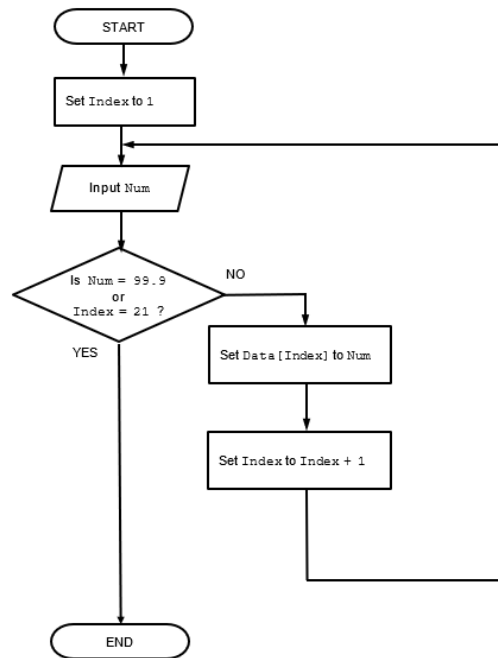


Mark as follows:

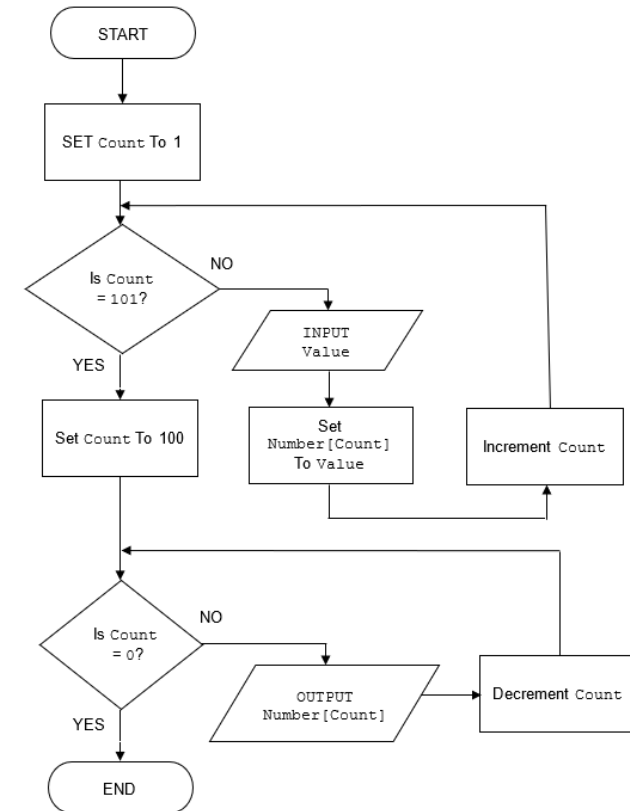
MP1 Initialisation of the array index**MP2** Input number **in a loop****MP3** Test for termination value (99.9) **and** correct ending**MP4** Test for array full / maximum 20 iterations **and** correct ending**MP5** Assign number to Data array element **and** increment index

12

Alternative solution:



13



One mark for each functional group as listed:

1. Initialise Index used for Number to either 1 or 0 before first loop
2. Loop 100 times
3. Input value
4. Increment array index **and** store value in Number array at element referenced by array index **in a loop**
5. Output loop starts at last element in Number array
6. Output Number array element referenced by Index **in a loop**
7. Output all elements of Number array **once** in reverse order

Max 6

14(a)	MyDOB ← SETDATE(17, 11, 2007)
14(b)	<u>NumMonths ← 12 - MONTH(MyDOB)</u> One mark per underlined part

14(c)	<p>One mark per array definition bullet:</p> <ul style="list-style-type: none"> • A (1D) array containing 7 elements • of type STRING <p>One mark per Step:</p> <p>Step1: Assign value "Sunday" to first element, "Monday" to second element etc.</p> <p>Step2: Use the function <code>DAYINDEX()</code> to return / find the day number from <code>MyDoB</code></p> <p>Step3: Use the returned value as the array index / to access the element that contains the name / string</p> <p>Step4: Output the element / name / string</p> <p>Note: Max 2 for Array definition, Max 4 for steps</p>
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15(a)(i)	<p>One from:</p> <ul style="list-style-type: none"> • The program obeys the rules / grammar of the programming language used • The program will run // it can be compiled / interpreted • Accept by example. e.g. 'no mis-spelt keywords' / 'all brackets match' 										
15(a)(ii)	<p>One mark for type plus one for corresponding description</p> <p>Type of error: A logic error</p> <p>Description:</p> <ul style="list-style-type: none"> • An error in the algorithm / design of the solution • the program does not behave as expected / give the expected output. • Accept by example e.g. wrong arithmetic operator used / wrong loop count <p>OR</p> <p>Type of error: Run-time error</p> <p>Description:</p> <ul style="list-style-type: none"> • The program performs an illegal instruction / invalid operation • Accept by example: divide by zero or endless loop or simply 'crashes' / freezes 										
15(b)	<table border="1"> <thead> <tr> <th>Use of variable</th><th>Data type</th></tr> </thead> <tbody> <tr> <td>The average mark in a class of 40 students</td><td>REAL</td></tr> <tr> <td>An email address</td><td>STRING</td></tr> <tr> <td>The number of students in the class</td><td>INTEGER</td></tr> <tr> <td>Indicate whether an email has been read</td><td>BOOLEAN</td></tr> </tbody> </table> <p>One mark per row</p>	Use of variable	Data type	The average mark in a class of 40 students	REAL	An email address	STRING	The number of students in the class	INTEGER	Indicate whether an email has been read	BOOLEAN
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15(c)(i)	<table><tr><th>Information</th><th>Essential</th><th>Not essential</th></tr><tr><td>Departure time</td><td>✓</td><td></td></tr><tr><td>Flight Number</td><td></td><td>✓</td></tr><tr><td>Departure airport</td><td>✓</td><td></td></tr><tr><td>Aircraft type</td><td></td><td>✓</td></tr><tr><td>Ticket price</td><td>✓</td><td></td></tr><tr><td>Number of seats in aircraft</td><td></td><td>✓</td></tr></table> <p>One mark for two rows correct Two mark for four rows correct Three mark for all rows correct</p>	Information	Essential	Not essential	Departure time	✓		Flight Number		✓	Departure airport	✓		Aircraft type		✓	Ticket price	✓		Number of seats in aircraft		✓
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15(c)(ii)	<p>One mark for technique and one for benefit, Max 1 mark for 'Benefit'</p> <p>Technique: Abstraction</p> <p>Benefit:</p> <ul style="list-style-type: none">• The solution is simplified so easier / quicker to design / implement• The system is tailored to the need of the user																					
15(c)(iii)	<p>Answers include:</p> <ul style="list-style-type: none">• Destination / arrival airport• Arrival time / flight duration• Date of flight• Seat number• Seat availability <p>Max 2 marks</p>																					