<table>
<tr><th colspan="2">Question</th><th></th><th>Marks</th></tr>
<tr><td>05</td><td>1</td><td>
4 marks for AO3 (design) and 8 marks for AO3 (programming)

<u>Mark Scheme</u>
<table>
<tr><th>Level</th><th>Description</th><th>Mark Range</th></tr>
<tr><td>4</td><td>A line of reasoning has been followed to arrive at a logically structured working or almost fully working programmed solution that meets most of the requirements. All of the appropriate design decisions have been taken. To award 12 marks, all of the requirements must be met.</td><td>10–12</td></tr>
<tr><td>3</td><td>There is evidence that a line of reasoning has been followed to produce a logically structured program. The program displays relevant prompts, inputs the required numbers, at least one iterative structure and one selection structure and suitable data structure(s) to store the numbers entered and the frequencies. An attempt has been made to determine the modal frequency, although this may not work correctly under all circumstances. The solution demonstrates good design work as most of the correct design decisions have been made.</td><td>7–9</td></tr>
<tr><td>2</td><td>A program has been written and some appropriate, syntactically correct programming language statements have been written. There is evidence that a line of reasoning has been partially followed as although the program may not have the required functionality, it can be seen that the response contains some of the statements that would be needed in a working solution. There is evidence of some appropriate design work as the response recognises at least one appropriate technique that could be used by a working solution, regardless of whether this has been implemented correctly.</td><td>4–6</td></tr>
<tr><td>1</td><td>A program has been written and a few appropriate programming language statements have been written but there is no evidence that a line of reasoning has been followed to arrive at a working solution. The statements written may or may not be syntactically correct. It is unlikely that any of the key design elements of the task have been recognised.</td><td>1–3</td></tr>
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</td><td>12</td></tr>
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		Guidance **Evidence of AO3 design – 4 points:** Evidence of design to look for in responses: 1. Identifying that data structure(s) are needed to store ten frequencies 2. Identifying that a loop is needed that repeats a number of times determined by the first number entered by the user 3. Identifying that a Boolean (or equivalent) variable is needed to store if the data was multimodal 4. Selection structure that either outputs a calculated number (**I.** incorrectly calculated) or a message saying "`Data was multimodal`" (**A.** any suitable message) Note that AO3 (design) points are for selecting appropriate techniques to use to solve the problem, so should be credited whether the syntax of programming language statements is correct or not and regardless of whether the solution works. **Evidence for AO3 programming – 8 points:** Evidence of programming to look for in response: 5. Suitable prompts asking user to enter the number of digits followed by user inputs being assigned to appropriate variable **R.** if inside or after iterative structure 6. Correct number of numeric digits obtained from the user 7. Adds one to correct frequency count **R**. if only works for one digit 8. Selection structure, inside iterative structure, that correctly compares calculated frequency (**I.** incorrect frequency) of a digit with the highest frequency found so far 9. Boolean (or equivalent) variable that is used to indicate if data is multimodal is set to true under correct circumstances 10. Boolean (or equivalent) variable that is used to indicate if data is multimodal is set to false when new higher frequency is found 11. Program works correctly if the data has more than one modal value **A.** any sensible message 12. Program displays the correct frequency of the modal value under all circumstances and does not say data is multimodal when it is not **I.** frequency being displayed when data is multimodal **Max 11** if code contains any errors	
05	**2**	**Mark is for AO3 (evaluate)** ****** SCREEN CAPTURE ****** *Must match code from **05.1**, including prompts on screen capture matching those in code.* *Code for **05.1** must be sensible.* Screen captures showing:	**1**

		• the number 6 being entered followed by the numbers 0, 1, 2, 1, 2 and 1 (**I.** order of these six numbers) and then a message displayed saying 3
		• the number 5 being entered followed by the numbers 0, 1, 2, 2 and 1 (**I.** order of these five numbers) and then a message displayed saying that the data is multimodal.
		
		`Enter number of digits: 6`
		`Enter a numeric digit: 0`
		`Enter a numeric digit: 1`
		`Enter a numeric digit: 2`
		`Enter a numeric digit: 1`
		`Enter a numeric digit: 2`
		`Enter a numeric digit: 1`
		`The modal digit appeared 3 times`
		
		`Enter number of digits: 5`
		`Enter a numeric digit: 0`
		`Enter a numeric digit: 1`
		`Enter a numeric digit: 2`
		`Enter a numeric digit: 2`
		`Enter a numeric digit: 1`
		`Data was multimodal`	