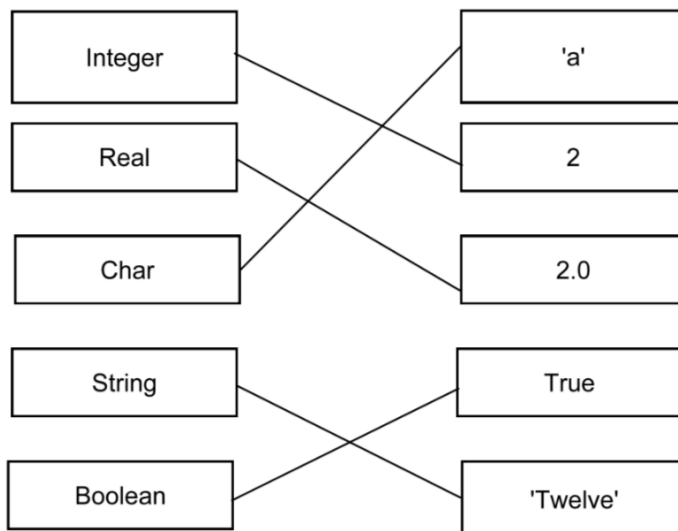


Comp Sci – Programming Concepts - Answers

Question	Answer	Marks
5(a)	<ul style="list-style-type: none"> – initialising counter outside the loop – updating counter inside loop – suitable exit value at start of loop – correct use of WHILE ... DO ... ENDWHILE <p>Example:</p> <pre> INPUT Num Counter ← 1 WHILE Counter <= 12 DO Num ← Num * Counter A [Counter] ← Num Counter ← Counter + 1 ENDWHILE </pre>	4
5(b)	<ul style="list-style-type: none"> – WHILE has criteria check at start / pre-test – may never run – REPEAT UNTIL has criteria check at end / post-test – will always run at least once 	4

4 1 mark for each correct link, up to maximum of 4 marks



[4]

Comp Sci – Programming Concepts - Answers

5 Any **two** points from

- a variable is used to store data that can change during the running of a program
- a constant is used to store data that will not be changed during the running of a program

[2]

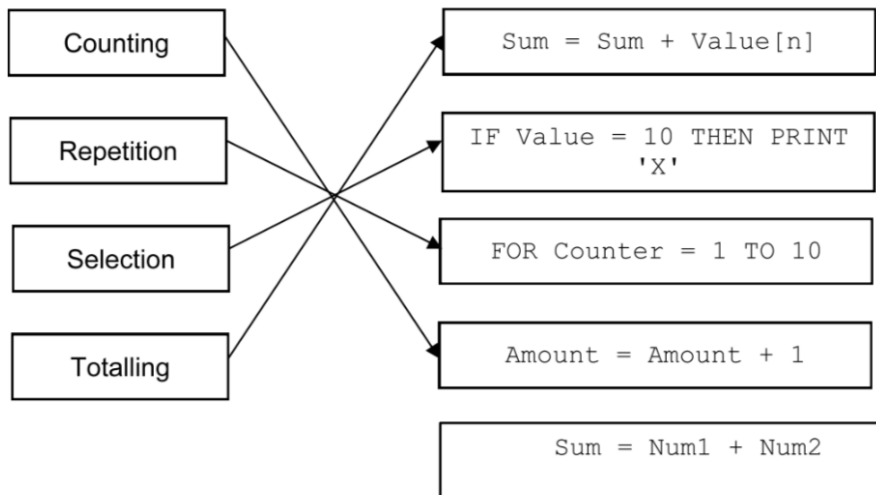
6 - FOR (... TO ... NEXT)

- REPEAT (... UNTIL)

- WHILE (... DO ... ENDWHILE)

[3]

4 1 mark for each correct line, two lines from one box not allowed



[4]

Comp Sci – Programming Concepts - Answers

5 (a) 1 mark for FOR ... TO ... NEXT 1 mark for INPUT

```
FOR Count ← 1 TO 1000  
  INPUT A[Count]  
NEXT (Count)
```

[2]

(b) 4 marks

- initialisation
- start of loop
- update loop counter
- end of loop

Example1

```
Count ← 1 (1 mark)  
REPEAT (1 mark)  
  INPUT A[Count]  
  Count ← Count + 1 (1 mark)  
UNTIL Count > 1000 (1 mark)
```

Example2

```
Count ← 0 (1 mark)  
WHILE Count < 1000 (1 mark)  
  DO  
    Count ← Count + 1 (1 mark)  
    INPUT A[Count]  
  ENDWHILE (1 mark)
```

[4]

3

- (i) Name type – string
Gender type – char/string
Status type – char/string
Fee type – real
Team member type – Boolean

[5]

(ii) Data Structure – several Arrays

.....Reason – to simplify programming/ make programs shorter/index can be used to identify the same member across the arrays etc.

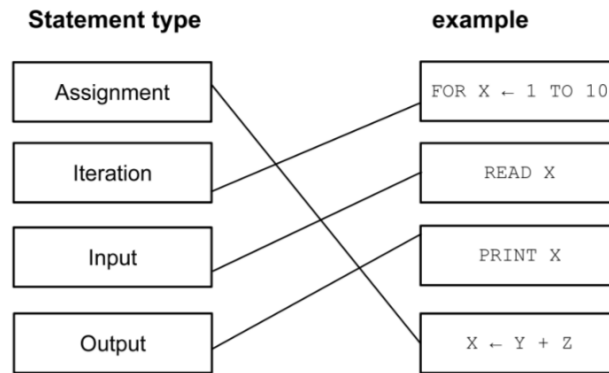
[2]

Comp Sci – Programming Concepts - Answers

- 5
- FOR (... TO ... NEXT) ...
 - ... a set number of iterations
 - WHILE (... DO ... ENDWHILE) ...
 - ... used where the loop may never be executed/whilst a specified condition exists

[4]

- 4 1 mark for each correct line, maximum 3 (zero correct 0, one correct 1, two correct 2, three or four correct 3), each box must have only one connection.



[3]

- 5
- data structure (one—dimensional) array
 - reason to simplify programming/ make programs shorter, etc.

[2]

- 6
- IF (... THEN ... ELSE ... ENDIF)
 - CASE (... OF ... OTHERWISE ... ENDCASE)

[2]

Comp Sci – Programming Concepts - Answers

Question	Answer	Marks
3	<p>Must match question. 2 marks for three suitable sub system names 1 mark for two suitable sub system names</p> <div style="text-align: center;"> <pre> graph TD A[Satellite Navigation System] --> B[Input destination] A --> C["(Output) Directions"] B --> D["New (Destination)"] B --> E["Saved (Destination)"] C --> F[Map] C --> G[List] </pre> </div>	2

Question	Answer	Marks
5(a)	<p>Any two from:</p> <ul style="list-style-type: none"> - Loop with 300 repetitions (starting at 1) / Loops from 1 to 300 - Values input/stored (in consecutive/different locations) in an array (at position I) - Increases the loop counter/I value by 1 (and returns to the start of the loop) 	2
5(b)	<p>Any one from: REPEAT (... UNTIL) WHILE (... DO ... ENDWHILE)</p>	1
5(c)	<ul style="list-style-type: none"> - Prompt and input number (1) - Checking the input number is between 0 and 100 - both limits (1) - Correct error message (1) <p>Many correct algorithms. This is an example only.</p> <pre> OUTPUT "Enter a number between 0 and 100 " INPUT Number IF Number < 0 OR Number > 100 THEN OUTPUT "The number you have entered is outside the specified range" ENDFIF </pre>	3

Comp Sci – Programming Concepts - Answers

Question	Answer	Marks
2(a)	<p>award full marks for any working solution</p> <ul style="list-style-type: none"> - Input three numbers (1) - Attempt to select largest number (1) - Working method (1) - print out largest number (1) <p>Sample algorithm</p> <pre> INPUT Num1, Num2, Num3 IF (Num1 > Num2) AND (Num1 > Num3) THEN PRINT Num1 ENDIF IF (Num2 > Num1) AND (Num2 > Num3) THEN PRINT Num2 ENDIF IF (Num3 > Num1) AND (Num3 > Num2) THEN PRINT Num3 ENDIF </pre> <p>or</p> <pre> INPUT Num1 Big ← Num1 INPUT Num2, Num3 IF Num2 > Big THEN Big ← Num2 ENDIF IF Num3 > Big THEN Big ← Num3 ENDIF PRINT Big </pre>	4
2(b)	<p>1 mark for each data set and 1 mark for the matching reason.</p> <p>There are many possible correct answers, these are examples only.</p> <p><i>Test data set 1:</i> 30, 29, 28 <i>Reason:</i> first number is the largest</p> <p><i>Test data set 2:</i> x, y, z <i>Reason:</i> abnormal data, should be rejected</p> <p align="right">Max 4 marks</p>	4

Comp Sci – Programming Concepts - Answers

Question	Answer	Marks
4(a)	Error - Count ← 0 Correction - Count ← 1 or Error - UNTIL Count > 100 Correction - UNTIL Count >= 100 or UNTIL Count = 100 or UNTIL Count > 99	2
4(b)	- use of FOR with correct start and end values ... - ... use of NEXT - ... removal of increment for Count Sample algorithm Sum ← 0 FOR Count ← 1 TO 100 INPUT Number Sum ← Sum + Number NEXT // NEXT Count PRINT Sum	3

4 There are many possible correct answers this is an example only.

Normal e.g. 1.7
 Extreme 0.5 or 2.0 only
 Abnormal e.g. one

[3]

5 - IF (... THEN ... ELSE ... ENDIF)
 - CASE (... OF ... OTHERWISE ... ENDCASE)

[2]

4 (a) (i) Normal

(ii) Acceptable data to test that the results are as expected.

[2]

(b) **One** mark for the data set, **one** mark for the type and **one** mark for the matching reason

There are many possible correct answers this is an example only.

Set 1 - Age 4, height 0.9
 Type - Boundary/Extreme
 Reason - Data to test the validation that is just within the limits of acceptability
 Set 2 - Age 10, height 1.4
 Type - Abnormal
 Reason - Data that should be rejected and produce an error message

[6]

Comp Sci – Programming Concepts - Answers

- 5 For each example **1 mark** for **correct structure**, **1 mark** for **appropriate content** inside loop and **1 mark** for **reason**. There are many correct answers these are only samples

```
REPEAT
..INPUT Number
  Total ← Total + Number
UNTIL Number = 0
  – at least one repeat is required
```

```
WHILE Number <> -1 DO
..INPUT Number
  Total ← Total + Number
ENDWHILE
  – the loop may never be executed
```

[6]

- 4 For each example: **1 mark** for **correct structure**, **1 mark** for **appropriate content**, **1 mark** for **the reason**. There are many correct answers these are only examples

```
IF X > 0 AND X <= 10
  THEN PRINT 'In Range'
  ELSE PRINT 'Out of Range'
ENDIF
```

– e.g. checking a condition that may be complex//uses relational operators// checking for a range of values// only 2 options

```
CASE X OF
  1 : PRINT 'Option 1'
  2 : PRINT 'Option 2'
  3 : PRINT 'Option 3'
  OTHERWISE PRINT 'Incorrect choice'
ENDCASE
```

– e.g. checking for discrete/large number/more than 2 of values

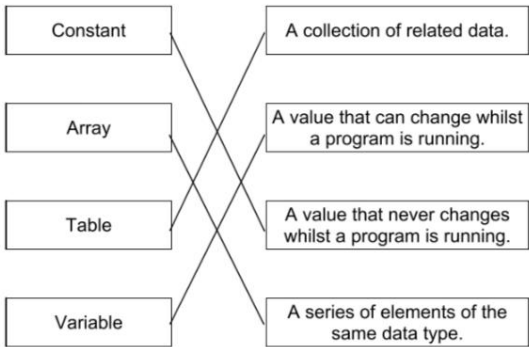
[6]

Comp Sci – Programming Concepts - Answers

Question	Answer	Marks		
<p>4(a)</p>	<p>1 mark for each correct line</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Pseudocode description</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">A loop that will iterate at least once.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">A conditional statement to deal with many possible outcomes.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">A loop that will iterate a set number of times.</div> <div style="border: 1px solid black; padding: 5px;">A conditional statement with different outcomes for true and false.</div> </td> <td style="width: 50%; vertical-align: top;"> <p>Pseudocode statement</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">FOR...TO...NEXT</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">IF...THEN...ELSE...ENDIF</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">WHILE...DO...ENDWHILE</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">CASE...OF...OTHERWISE...ENDCASE</div> <div style="border: 1px solid black; padding: 5px;">REPEAT...UNTIL</div> </td> </tr> </table>	<p>Pseudocode description</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">A loop that will iterate at least once.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">A conditional statement to deal with many possible outcomes.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">A loop that will iterate a set number of times.</div> <div style="border: 1px solid black; padding: 5px;">A conditional statement with different outcomes for true and false.</div>	<p>Pseudocode statement</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">FOR...TO...NEXT</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">IF...THEN...ELSE...ENDIF</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">WHILE...DO...ENDWHILE</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">CASE...OF...OTHERWISE...ENDCASE</div> <div style="border: 1px solid black; padding: 5px;">REPEAT...UNTIL</div>	<p>4</p>
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<p>4(b)</p>	<p>1 mark per bullet:</p> <ul style="list-style-type: none"> Appropriate loop controls Read from array Print from array (the last two points can be in one statement) <p>Note reading and printing MUST be within the same loop</p> <p>Example algorithm:</p> <pre> Count ← 0 WHILE Count < 50 DO OUTPUT Name[Count] Count ← Count + 1 ENDWHILE </pre>	<p>3</p>		

Comp Sci – Programming Concepts - Answers

Question	Answer	Marks
2	<p>1 mark for each, there may be other solutions, award full marks for any working solution</p> <p>any six from:</p> <ul style="list-style-type: none"> initialise total (outside loop) Input number of numbers (outside loop with validation) Loop using input value Input number (inside loop) Update Total (inside loop) Calculate average Print average and total (outside loop) <p>Sample algorithm:</p> <pre> INPUT NumberCount Total ← 0 FOR Count ← 1 TO NumberCount INPUT Number Total ← Total + Number NEXT Average ← Total/NumberCount PRINT Total, Average </pre>	6

Question	Answer	Marks
3	<p>1 mark for each correct line, max 3 marks.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Data Structure</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 0 auto;">Constant</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 0 auto;">Array</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 0 auto;">Table</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 0 auto;">Variable</div> </div> </div> <div style="text-align: center;"> <p>Description</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 0 auto;">A collection of related data.</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 0 auto;">A value that can change whilst a program is running.</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 0 auto;">A value that never changes whilst a program is running.</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 0 auto;">A series of elements of the same data type.</div> </div> </div> </div> 	3

Question	Answer	Marks
4	<p>2 marks for identification, 1 mark for description, 1 mark for reason.</p> <p>Identification:</p> <pre> CASE OF ... OTHERWISE ... (ENDCASE) or ... OF ... (OTHERWISE) ... ENDCASE </pre> <p>Description:</p> <ul style="list-style-type: none"> - a statement that allows for multiple selections // not any of the above <p>Reason:</p> <ul style="list-style-type: none"> - to simplify pseudocode/ make pseudocode more understandable etc. 	4