

# Cambridge International AS & A Level

---

**COMPUTER SCIENCE****9618/42**

Paper 4 Practical

**May/June 2025****MARK SCHEME**Maximum Mark: 75

---

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

---

This document consists of **45** printed pages.

**PUBLISHED****Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**PUBLISHED****GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

**Annotations guidance for centres**

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

**Annotations**

| <b>Annotation</b>                                                                   | <b>Meaning</b>                                                                                      |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|    | Benefit of the doubt                                                                                |
|    | To indicate where a key word/phrase/code is missing                                                 |
|    | Incorrect                                                                                           |
|   | Follow through                                                                                      |
|  | Indicate a point in an answer                                                                       |
| Highlighted text                                                                    | To draw attention to a particular aspect or to indicate where parts of an answer have been combined |
|  | Ignore                                                                                              |
|  | Not answered question                                                                               |
|  | No examples or not enough                                                                           |

**PUBLISHED**

| <b>Annotation</b>                                                                 | <b>Meaning</b>                                                                                                                             |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
|  | Not relevant or used to separate parts of an answer                                                                                        |
| Off-page comment                                                                  | Allows comments to be entered at the bottom of the RM marking window and then displayed when the associated question item is navigated to. |
|  | Repetition                                                                                                                                 |
|  | Indicates that work or a page has been seen including blank answer spaces and blank pages.                                                 |
|  | Correct                                                                                                                                    |
|  | Too vague                                                                                                                                  |

**PUBLISHED**

- **Bold** in mark scheme means that idea is required.
- / in mark scheme means alternative.
- // in mark scheme means alternative solution that gains the same mark point.
- ... at the end of one mark point without a ... at the start of the next just means the sentence follows on. There is no dependency.
- ... at the end of one mark point and at the start of the next, this means the second cannot be awarded without the first.
- () means what is in the brackets is not required, or it is not required in some languages but may be required in others.

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Answer                                                                                                                                                                                                                                                      | Marks |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>1 mark each</p> <ul style="list-style-type: none"> <li>(Global) <code>Stack</code> as 1D array (of strings) with 20 elements initialised to string <code>"-1"</code></li> <li>(Global) <code>TopOfStack</code> initialised to <code>-1</code></li> </ul> | 2     |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>public static String[] Stack = new String[20]; public static Integer TopOfStack; public static void main(String args[]){     for(Integer X = 0; X &lt; 20; X++){         Stack[X] = "-1";     }     TopOfStack = -1; }</pre> <p><b>VB.NET</b></p> <pre>Dim Stack(19) As String Dim TopOfStack As Integer For x = 0 To 19     Stack(x) = "-1" Next TopOfStack = -1</pre> <p><b>Python</b></p> <pre>Stack = [] TopOfStack = -1 #main for x in range(20):     Stack.append("-1")</pre> |                                                                                                                                                                                                                                                             |       |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Answer                                                                                                                                                                                                                                                                                                                                                                           | Marks |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>1 mark each</p> <ul style="list-style-type: none"> <li>• Push function header (and end where appropriate) taking one (string) parameter</li> <li>• Checking if stack is full <b>and</b> returning integer -1</li> <li>• (Otherwise) Incrementing TopOfStack</li> <li>• Storing parameter in the incremented the stack at TopOfStack <b>and</b> returning integer 1</li> </ul> | 4     |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>public static Integer Push(String Data){     if (TopOfStack == 19){         return -1;     }else{         TopOfStack++;         Stack[TopOfStack] = Data;         return 1;     } }</pre> <p><b>VB.NET</b></p> <pre>Function Push(ByVal Data)     If TopOfStack = 19 Then         Return -1     Else         TopOfStack = TopOfStack + 1         Stack(TopOfStack) = Data         Return 1     End If End Function</pre> |                                                                                                                                                                                                                                                                                                                                                                                  |       |

| Question      | Answer                                                                                                                                                                                                                           | Marks |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Python</b> | <pre>def Push(Data):<br/>    global Stack<br/>    global TopOfStack<br/>    if TopOfStack == 19:<br/>        return -1<br/>    else:<br/>        TopOfStack += 1<br/>        Stack[TopOfStack] = Data<br/>        return 1</pre> |       |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Answer                                                                                                                                                                                                                                                                                                                                                                   | Marks    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1(c)                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 mark each <ul style="list-style-type: none"> <li>• Function header (and end where appropriate) <b>and</b> returning a value in all cases.</li> <li>• Checking if stack is empty <b>and</b> returning string "-1"</li> <li>• (Otherwise) Decrementing TopOfStack</li> <li>• Returning element in stack at TopOfStack <b>before</b> TopOfStack is decremented</li> </ul> | <b>4</b> |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>public static String Pop(){     if (TopOfStack == -1){         return "-1";     }else{         String ReturnValue = Stack[TopOfStack];         TopOfStack--;         return ReturnValue;     } }</pre> <p><b>VB.NET</b></p> <pre>Function Pop()     If TopOfStack = -1 Then         Pop = "-1"     Else         Pop = Stack(TopOfStack)         TopOfStack = TopOfStack - 1     End If End Function</pre> |                                                                                                                                                                                                                                                                                                                                                                          |          |

**PUBLISHED**

| Question      | Answer                                                                                                                                                                                                                                         | Marks |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Python</b> | <pre>def Pop():<br/>    global Stack<br/>    global TopOfStack<br/>    if TopOfStack == -1:<br/>        return "-1"<br/>    else:<br/>        ReturnValue = Stack[TopOfStack]<br/>        TopOfStack -= 1<br/>        return ReturnValue</pre> |       |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Marks |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(d)     | <p>1 mark each</p> <ul style="list-style-type: none"> <li>• Procedure header (and end where appropriate) taking one (string) parameter</li> <li>• Opening the file with the filename parameter <b>and</b> closing the file in an appropriate place</li> <li>• Looping through to end of file <b>and</b> reading in each line ...</li> <li>• ... calling <code>Push()</code> <b>once</b> with each read in value ...</li> <li>• ... if any return value from <code>Push()</code> is integer <code>-1</code> outputting "Stack full"</li> <li>• Exception handling for opening and reading from file with appropriate catch and output</li> </ul> | 6     |

Example program code:

Java

```
public static void ReadData(String FileName){
    Integer ReturnValue;
    try{
        FileReader f = new FileReader(FileName);
        try{
            BufferedReader Reader = new BufferedReader(f);
            String Line= Reader.readLine();
            Line = Line.replace("\n","");
            while (Line != null){
                Line = Line.replace("\n","");
                ReturnValue = Push(Line);
                if (ReturnValue == -1){
                    System.out.println("Stack full");
                }
                Line = Reader.readLine();
            }
            Reader.close();
        }catch(IOException ex){}

    }catch(FileNotFoundException e){
        System.out.println("File not found");
    }
}
```

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Marks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <p><b>VB.NET</b></p> <pre> Sub ReadData(ByVal FileName As String)     Dim ReturnValue As String     Try         Dim FileReader As New System.IO.StreamReader(FileName)         While Not FileReader.EndOfStream             ReturnValue = Push(FileReader.ReadLine())             If ReturnValue = "-1" Then                 Console.WriteLine("Stack full")             End If         End While         FileReader.Close()     Catch ex As Exception         Console.WriteLine("Cannot open file")     End Try End Sub </pre> <p><b>Python</b></p> <pre> def ReadData(FileName):     global Stack     global TopOfStack     try:         File = open(FileName)         for Line in File:             ReturnValue = Push(Line.strip())             if ReturnValue == -1:                 print("Stack full")         File.close()     except:         print("Cannot open file") </pre> |       |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Marks |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(e)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>1 mark for:</p> <ul style="list-style-type: none"> <li>• Calculate() function header (and end where appropriate)</li> <li>• Looping until the stack is empty</li> <li>• Calling Pop() repeatedly within loop <b>and</b> storing/using return value</li> <li>• ... working out if return value from Pop() call is an operator or a number / alternating between operator and number</li> <li>• Select to determine if the operator is +, -, /, * or ^ <b>and</b> attempt the matching calculation</li> <li>• ... performing <b>correct</b> calculation using operator, number</li> <li>• ... updating total from previous loops <b>and</b> returning this final value</li> </ul> | 7     |
| <p>Example program code:</p> <p>Java</p> <pre> public static Double Calculate(){     Double Total = Double.parseDouble(Pop());     String ReturnValue = "";     String LastOperator = "";     Boolean OperatorFlag = true;     Integer TheData = 0;     while(ReturnValue != "-1"){         ReturnValue = Pop();         if(OperatorFlag == false){             TheData = Integer.parseInt(ReturnValue);             if(LastOperator.compareTo("+")==0){                 Total = Total + TheData;             }else if(LastOperator.compareTo("-")==0){                 Total = Total - TheData;             }else if(LastOperator.compareTo("*")==0){                 Total = Total * TheData;             }else if(LastOperator.compareTo("/")==0){                 Total = Total / TheData;             }else if(LastOperator.compareTo("^")==0){                 Total = Math.pow(Total, TheData);             }             OperatorFlag = true;         }     } } </pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |

**PUBLISHED**

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <pre>         }else{             LastOperator = ReturnValue;             OperatorFlag = false;         }     }     return Total; }  VB.NET Function Calculate()     Dim Total As Integer = Pop()     Dim ReturnValue As String = ""     Dim LastOperator As String = ""     Dim OperatorFlag As Boolean = True     Dim TheData As Integer = 0     While (ReturnValue &lt;&gt; "-1")         ReturnValue = Pop()         Select Case OperatorFlag             Case False                 TheData = ReturnValue                 Select Case LastOperator                     Case "+"                         Total = Total + TheData                     Case "-"                         Total = Total - TheData                     Case "*"                         Total = Total * TheData                     Case "/"                         Total = Total / TheData                     Case "^"                         Total = Total ^ TheData                 End Select                 OperatorFlag = True             Case Else                 LastOperator = ReturnValue </pre> |       |

**PUBLISHED**

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Marks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <pre> OperatorFlag = False End Select End While Return Total End Function  Python def Calculate():     global Stack     global TopOfStack     Total = Pop()     Total = int(Total)     Return = 0     LastOperator = ""     Operator = True     while(Return != "-1"):         Return = Pop()         if Operator == False:             Data = int(Return)             if LastOperator == "+":                 Total = Total + Data             elif LastOperator == "-":                 Total = Total - Data             elif LastOperator == "*":                 Total = Total * Data             elif LastOperator == "/":                 Total = Total / Data             elif LastOperator == "^":                 Total = Total ** Data             Operator = True         else:             LastOperator = Return             Operator = False     return Total </pre> |       |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Answer                                                                                                                                                                                                                                     | Marks |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(f)(i)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>1 mark each</p> <ul style="list-style-type: none"> <li>• Taking a filename as input <b>and</b> calling <code>ReadData()</code> with input</li> <li>• Calling <code>Calculate()</code> <b>and</b> outputting the return value</li> </ul> | 2     |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>TopOfStack = -1; System.out.println("Enter the filename"); Scanner scanner = new Scanner(System.in); String FileName = scanner.nextLine(); ReadData(FileName); Double ReturnValue = Calculate(); System.out.println(ReturnValue);</pre> <p><b>VB.NET</b></p> <pre>Console.WriteLine("Enter the filename") Dim FileName As String = Console.ReadLine() ReadData(FileName) Dim ReturnValue As Single ReturnValue = Calculate() Console.WriteLine(ReturnValue)</pre> <p><b>Python</b></p> <pre>FileName = input("Enter the filename: ") ReadData(FileName) ReturnValue = Calculate() print(ReturnValue)</pre> |                                                                                                                                                                                                                                            |       |

| Question                                                                                                                                       | Answer                                                                                                                                                                       | Marks    |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1(f)(ii)                                                                                                                                       | 1 mark for screenshot showing input of <code>StackData.txt</code> and output of 131<br>1 mark for screenshot showing input of <code>SecondStack.txt</code> and output of 320 | <b>2</b> |
| e.g.<br><br><div> <div>Enter the filename<br/>StackData.txt<br/>131.0</div> <div>Enter the filename<br/>SecondStack.txt<br/>320.0</div> </div> |                                                                                                                                                                              |          |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Answer                                                                                                                                                                | Marks |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>1 mark each</p> <ul style="list-style-type: none"> <li>Record/class <code>NewRecord</code> declared</li> <li>3 variables within structure (all integer)</li> </ul> | 2     |
| <p>Example program code:</p> <p><b>Java</b></p> <pre> class NewRecord{     private Integer Key;     private Integer Item1;     private Integer Item2;     public NewRecord(Integer pKey, Integer pItem1, Integer pItem2){         Key = pKey;         Item1 = pItem1;         Item2 = pItem2;     }     public Integer GetKey(){         return Key;     }     public Integer GetItem1(){         return Item1;     }     public Integer GetItem2(){         return Item2;     } } </pre> <p><b>VB.NET</b></p> <pre> Structure NewRecord     Dim Key As Integer     Dim Item1 As Integer     Dim Item2 As Integer End Structure </pre> |                                                                                                                                                                       |       |

| Question      | Answer                                                                                                                                                                                                                                                                                                                                           | Marks |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Python</b> | <pre>class Record:     def __init__(self, pKey, pItem1, pItem2):         self.__Key = pKey #integer         self.__Item1 = pItem1 #integer         self.__Item2 = pItem2 #integer      def GetKey(self):         return self.__Key     def GetItem1(self):         return self.__Item1     def GetItem2(self):         return self.__Item2</pre> |       |

| Question                                                                                                                                                                                                                                                                                                                        | Answer                                                                                                                                                             | Marks |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(b)(i)                                                                                                                                                                                                                                                                                                                         | 1 mark for <ul style="list-style-type: none"><li>• <code>HashTable</code> (200 records) and <code>Spare</code> (100 records) declared as (global) arrays</li></ul> | 1     |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>public static NewRecord[] HashTable = new NewRecord[200]; public static NewRecord[] Spare = new NewRecord[100];</pre> <p><b>VB.NET</b></p> <pre>Dim HashTable(199) As NewRecord Dim Spare(99) As NewRecord</pre> <p><b>Python</b></p> <pre>HashTable = [] Spare = []</pre> |                                                                                                                                                                    |       |

| Question | Answer                                                                                                                                                                                                                                                                            | Marks    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 2(b)(ii) | 1 mark each <ul style="list-style-type: none"> <li>• Procedure <code>Initialise()</code> header (and close where appropriate) that initialises all elements in both arrays ...</li> <li>• ... to an empty record with <code>-1</code> in each of the 3 fields/elements</li> </ul> | <b>2</b> |

Example program code:

#### Java

```
public static void Initialise(){
    NewRecord EmptyRecord = new NewRecord(-1,-1,-1);

    for(Integer X = 0; X < 200; X++){
        HashTable[X] = EmptyRecord;
    }
    for(Integer X = 0; X < 100; X++){
        Spare[X] = EmptyRecord;
    }
}
```

#### VB.NET

```
Sub Initialise()
    Dim EmptyRecord As NewRecord
    EmptyRecord.Key = -1
    EmptyRecord.Item1 = -1
    EmptyRecord.Item2 = -1
    For X = 0 To 199
        HashTable(X) = EmptyRecord
    Next
    For X = 0 To 99
        Spare(X) = EmptyRecord
    Next
End Sub
```

**PUBLISHED**

| Question      | Answer                                                                                                                                                                                                 | Marks |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Python</b> | <pre>def Initialise():     global HashTable     global Spare     for X in range(200):         HashTable.append(Record(-1,-1,-1))     for X in range(100):         Spare.append(Record(-1,-1,-1))</pre> |       |

**PUBLISHED**

| Question                                                                                                                                                                                                                                                                                                                 | Answer                                                                                                                                                                                                                          | Marks    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 2(c)                                                                                                                                                                                                                                                                                                                     | 1 mark each <ul style="list-style-type: none"> <li>Function header (and close where appropriate), taking one (integer) parameter <b>and</b> returning the calculated value</li> <li>Calculation of parameter MOD 200</li> </ul> | <b>2</b> |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>public static Integer CalculateHash(Integer TheKey){     return(TheKey % 200); }</pre> <p><b>VB.NET</b></p> <pre>Function CalculateHash(Key)     Return Key Mod 200 End Function</pre> <p><b>Python</b></p> <pre>def CalculateHash(Key):     return Key % 200</pre> |                                                                                                                                                                                                                                 |          |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Marks    |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 2(d)     | <p>1 mark each:</p> <ul style="list-style-type: none"><li>• Procedure header (and end where appropriate) taking one record as a parameter</li><li>• Calling <code>CalculateHash()</code> with key from parameter record <b>and</b> storing/using return value</li><li>• Checking if <code>HashTable</code> at return value from <code>CalculateHash</code> is <b>empty record</b> ...</li><li>• ... if it is empty, store parameter in location</li><li>• ... otherwise, locating <b>next</b> free space in <code>Spare</code> ...</li><li>• ... and storing in that index only (i.e. not in all other free spaces)</li></ul> | <b>6</b> |

**PUBLISHED**

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Marks |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <p>Example program code:</p> <p><b>Java</b></p> <pre>public static void InsertIntoHash(NewRecord TheRecord){     Integer HashValue = CalculateHash(TheRecord.GetKey());     if(HashTable[HashValue].GetKey().equals(-1)){         HashTable[HashValue] = TheRecord;     }else{         for(Integer X = 0; X &lt; 99; X++){             if(Spare[X].GetKey().equals(-1)){                 Spare[X] = TheRecord;                 X = 99;             }         }     } }</pre> <p><b>VB.NET</b></p> <pre>Sub InsertIntoHash(TheRecord)     Dim HashValue As Integer = CalculateHash(TheRecord.Key)     If HashTable(HashValue).Key = -1 Then         HashTable(HashValue) = TheRecord     Else         For X = 0 To 99             If Spare(X).Key = -1 Then                 Spare(X) = TheRecord                 X = 100             End If         Next     End If End Sub</pre> |       |

| Question      | Answer                                                                                                                                                                                                                                                                                                                                                                                                                | Marks |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Python</b> | <pre>def InsertIntoHash(TheRecord):<br/>    global HashTable<br/>    global Spare<br/>    HashValue = CalculateHash(TheRecord.GetKey())<br/><br/>    if HashTable[HashValue].GetKey() == -1:<br/>        HashTable[HashValue] = TheRecord<br/><br/>    else:<br/>        for x in range(0, 100):<br/>            if Spare[x].GetKey() == -1:<br/>                Spare[x] = TheRecord<br/>                break</pre> |       |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Marks |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(e)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>1 mark each to max 5</p> <ul style="list-style-type: none"> <li>• Procedure header (and end where appropriate), opening <b>and</b> closing file <code>HashData.txt</code></li> <li>• Reading in all lines of data ...</li> <li>• ... splitting each line by commas</li> <li>• Creating <b>record</b> with correct values with each line read in from file</li> <li>• Calling <code>InsertIntoHash()</code> with <b>each record</b> they have created</li> <li>• Exception handling for opening and reading from file with appropriate catch and output.</li> </ul> | 5     |
| <p>Example program code:</p> <p>Java</p> <pre>public static void CreateHashTable(){      String[] Data = new String[3];     Integer NewKey;     Integer NewItem1;     Integer NewItem2;     try{         FileReader File = new FileReader("HashData.txt");         try{             BufferedReader Reader = new BufferedReader(File);             String Line= Reader.readLine();             while (Line != null){                 Line = Line.replace("\n", "");                 Data = Line.split(",");                 NewKey = Integer.parseInt(Data[0]);                 NewItem1 = Integer.parseInt(Data[1]);                 NewItem2 = Integer.parseInt(Data[2]);                 NewRecord ReadData = new NewRecord(NewKey, NewItem1, NewItem2);                 InsertIntoHash(ReadData);                 Line= Reader.readLine();             }             Reader.close();         }catch(IOException ex){}     }catch(FileNotFoundException e){System.out.println("File not found");} }</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Marks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <p><b>VB.NET</b></p> <pre> Sub CreateHashTable()     Dim Line As String     Dim Data(3) As String     Dim TheRecord As NewRecord     Try         Dim FileReader As New System.IO.StreamReader("HashData.txt")         While Not FileReader.EndOfStream             Line = FileReader.ReadLine()             Data = Split(Line, ",")             TheRecord.Key = Integer.Parse(Data(0))             TheRecord.Item1 = Integer.Parse(Data(1))             TheRecord.Item2 = Integer.Parse(Data(2))             InsertIntoHash(TheRecord)         End While         FileReader.Close()     Catch ex As Exception         Console.WriteLine("Cannot open file")     End Try End Sub </pre> <p><b>Python</b></p> <pre> def CreateHashTable():     global HashTable     global Spare     try:         File = open("HashData.txt")         for Line in File:             Data = Line.strip()             Data = Line.split(",")             InsertIntoHash(Record(int(Data[0]), int(Data[1]), int(Data[2])))         File.close()     except:         print("Cannot open file") </pre> |       |

| Question | Answer                                                                                                                                                                                                                                                           | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(f)(i)  | 1 mark each <ul style="list-style-type: none"> <li>• Procedure header (and end where appropriate) <b>and</b> looping through each element in Spare ...</li> <li>• ... checking if <b>record</b> is empty and outputting <b>key field</b> if not empty</li> </ul> | 2     |

Example program code:

#### Java

```
public static void PrintSpare(){
    Integer X = 0;
    while(Spare[X].GetKey() != -1){
        System.out.println(Spare[X].GetKey());
        X++;
    }
}
```

#### VB.NET

```
Sub PrintSpare()
    Dim X As Integer = 0
    While Spare(X).Key <> -1
        Console.WriteLine(Spare(X).Key)
        X = X + 1
    End While
End Sub
```

#### Python

```
def PrintSpare():
    global Spare
    X = 0
    while Spare[X].GetKey() != -1:
        print(Spare[X].GetKey())
        X +=1
```

| Question                                                                                                                                                                                                                                                                                                                                                                                  | Answer                                                                                                          | Marks |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------|
| 2(f)(ii)                                                                                                                                                                                                                                                                                                                                                                                  | 1 mark for calling <code>Initialise()</code> then <code>CreateHashTable()</code> then <code>PrintSpare()</code> | 1     |
| <p>Example program code:</p> <p><b>Java</b><br/><code>Initialise();</code><br/><code>CreateHashTable();</code><br/><code>PrintSpare();</code></p> <p><b>VB.NET</b><br/><code>Initialise()</code><br/><code>CreateHashTable()</code><br/><code>PrintSpare()</code></p> <p><b>Python</b><br/><code>Initialise()</code><br/><code>CreateHashTable()</code><br/><code>PrintSpare()</code></p> |                                                                                                                 |       |

| Question                                                                                                                                                                                                                                                                                                                                            | Answer            | Marks |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------|
| 2(f)(iii)                                                                                                                                                                                                                                                                                                                                           | 1 mark for output | 1     |
| <p>For example:</p> <pre>915 136 415 55 349 775 846 469 246 752 8 889 695 292 417 181 810 972 781 46 120 95 378 433 994 946 586 365 615 580 128 944      88 2        362 689      629 962      986 704      31 948      823 435      527 195      141 981      905 320      965 658      697 831      15 408      24 947      977 830      88</pre> |                   |       |

**PUBLISHED**

| Question | Answer                                                                                                                                                                                                                                                                                                                         | Marks    |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 3(a)(i)  | <p>1 mark each</p> <ul style="list-style-type: none"><li>• Class header (and end when appropriate)</li><li>• Four attributes with appropriate data types</li><li>• Constructor header (and end where appropriate) within class taking (min) 4 parameters ...</li><li>• ... assigning each parameter to its attribute</li></ul> | <b>4</b> |

**PUBLISHED**

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <p>Example program code:</p> <p><b>Java</b></p> <pre>class Animal{     public String Name;     public String Sound;     public Integer Size;     public Integer Intelligence;      public Animal(String pName, String pSound, Integer pSize, Integer pIntelligence){         Name = pName;         Sound = pSound;         Size = pSize;         Intelligence = pIntelligence;     } }</pre> <p><b>VB.NET</b></p> <pre>Class Animal     Public Name As String     Public Sound As String     Public Size As Integer     Public Intelligence As Integer      Sub New(pName, pSound, pSize, pIntelligence)         Name = pName         Sound = pSound         Size = pSize         Intelligence = pIntelligence     End Sub End Class</pre> |       |

**PUBLISHED**

| Question      | Answer                                                                                                                                                                                                                                            | Marks |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Python</b> | <pre>class Animal:     def __init__(self, pName, pSound, pSize, pIntelligence):         self.Name = pName #string         self.Sound = pSound #string         self.Size = pSize #integer         self.Intelligence = pIntelligence #integer</pre> |       |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Answer                                                                                                                                                                                                                                                                                          | Marks    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 3(a)(ii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>1 mark each</p> <ul style="list-style-type: none"> <li>• <code>Description()</code> <b>method</b> header (and end where appropriate) with <b>no</b> parameter</li> <li>• Concatenating the attributes with the given message ...</li> <li>• ... and returning the created message</li> </ul> | <b>3</b> |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>public String Description(){     String Message = "The animal's name is " + Name + ", it makes a " + Sound + ", its size is " + Size + " and its intelligence level is " + Intelligence;     return Message; }</pre> <p><b>VB.NET</b></p> <pre>Function Description()     Dim Message As String = "The animal's name is " &amp; Name &amp; ", it makes a " &amp; Sound &amp; ", its size is " &amp; CStr(Size) &amp; " and its intelligence level is " &amp; CStr(Intelligence)     Return Message End Function</pre> <p><b>Python</b></p> <pre>def Description(self):     Message = "The animal's name is " + self.Name + ", it makes a " + self.Sound + ", its size is " + str(self.Size) + " and its intelligence level is " + str(self.Intelligence)     return Message</pre> |                                                                                                                                                                                                                                                                                                 |          |

**PUBLISHED**

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Marks    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 3(b)(i)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>1 mark each</p> <ul style="list-style-type: none"> <li>• Class header (and end where appropriate) <b>inherits</b> from <code>Animal</code></li> <li>• Constructor header (and end where appropriate) taking 6 parameters within class <b>and</b> calling parent constructor with the four parameters ...</li> <li>• ... <code>WingSpan</code> <b>and</b> <code>NumberWords</code> <b>attributes</b> defined with data types <b>and</b> parameters assigned within constructor</li> <li>• <code>ChangeNumberWords()</code> <b>method</b> header (and end where appropriate) takes one parameter <b>and</b> adds parameter to <b>attribute</b> <code>NumberWords</code></li> </ul> | <b>4</b> |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>class Parrot extends Animal{     public Integer WingSpan;     public Integer NumberWords;      public Parrot(String pName, String pSound, Integer pSize, Integer pIntelligence, Integer pWingSpan, Integer pNumberWords){         super(pName, pSound, pSize, pIntelligence);         WingSpan = pWingSpan;         NumberWords = pNumberWords;     }      public void ChangeNumberWords(Integer Change){         NumberWords = NumberWords + Change;     } }</pre> <p><b>VB.NET</b></p> <pre>Class Parrot     Inherits Animal     Dim WingSpan As Integer     Dim NumberWords As Integer     Sub New(pName, pSound, pSize, pIntelligence, pWingSpan, pNumberWords)         MyBase.New(pName, pSound, pSize, pIntelligence)         WingSpan = pWingSpan         NumberWords = pNumberWords     End Sub</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |

**PUBLISHED**

| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Marks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <pre> Sub ChangeNumberWords (Change)     NumberWords = NumberWords + Change End Sub End Class  Python class Parrot(Animal):     def __init__(self, pName, pSound, pSize, pIntelligence, pWingSpan, pNumberWords):         super().__init__(pName, pSound, pSize, pIntelligence)         self.WingSpan = pWingSpan #integer         self.NumberWords = pNumberWords #integer      def ChangeNumberWords(self, Change):         self.NumberWords = self.NumberWords + Change </pre> |       |

| Question | Answer                                                                                                                                                                                                                                                                                   | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3(b)(ii) | 1 mark each <ul style="list-style-type: none"> <li>• <code>Description()</code> method header (and end where appropriate) taking <b>no</b> parameters <b>and</b> overriding/overloads/extending/using parent method</li> <li>• Concatenating and returning the correct string</li> </ul> | 2     |

Example program code:

#### Java

```
public String Description(){
    String Message = "The animal's name is " + Name + ", it makes a " + Sound + ", its size is " + Size
+ " and its intelligence level is " + Intelligence + ". It has a wingspan of " + WingSpan + "cm and can say
" + NumberWords + " words.";
    return Message;
}
```

#### VB.NET

```
Overloads Function Description()
    Dim Message As String = "The animal's name is " & Name & ", it makes a " & Sound & ", its size is " &
CStr(Size) & " and its intelligence level is " & CStr(Intelligence) & ". It has a wingspan of " &
CStr(WingSpan) & "cm and can say " & CStr(NumberWords) & " words."
    Return Message
End Function
```

#### Python

```
def Description(self):
    Message = "The animal's name is " + self.Name + ", it makes a " + self.Sound + ", its size is " +
str(self.Size) + " and its intelligence level is " + str(self.Intelligence) + ". It has a wingspan of " +
str(self.WingSpan) + "cm and can say " + str(self.NumberWords) + " words."
    return Message
```

**PUBLISHED**

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Marks    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 3(c)(i)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>1 mark each</p> <ul style="list-style-type: none"> <li>• Class header (and end where appropriate) <b>inherits</b> from <code>Animal</code></li> <li>• Constructor header (and end where appropriate) taking 5 parameters within class <b>and</b> calling parent constructor with parameters</li> <li>• Attribute <code>Territory</code> defined as <code>int</code> and parameter assigned within constructor</li> <li>• <code>SetTerritory()</code> <b>method</b> header (and end) takes 1 parameter and adds parameter to attribute <code>TerritorySize</code></li> </ul> | <b>4</b> |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>class Wolf extends Animal{     public Integer TerritorySize;      public Wolf(String pName, String pSound, Integer pSize, Integer pIntelligence, Integer pTerritorySize){         super(pName, pSound, pSize, pIntelligence);         TerritorySize = pTerritorySize;     }      public void SetTerritorySize(Integer Change){         TerritorySize = TerritorySize + Change;     } }</pre> <p><b>VB.NET</b></p> <pre>Class Wolf     Inherits Animal     Dim TerritorySize As Integer     Sub New(pName, pSound, pSize, pIntelligence, pTerritory)         MyBase.New(pName, pSound, pSize, pIntelligence)         TerritorySize = pTerritory     End Sub      Sub SetTerritorySize(Change)         TerritorySize = TerritorySize + Change     End Sub End Class</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |

**PUBLISHED**

| Question | Answer                                                                                                                                                                                                                                                                                                                                                            | Marks |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|          | <p>Python</p> <pre>class Wolf(Animal):<br/>    def __init__(self, pName, pSound, pSize, pIntelligence, pTerritorySize):<br/>        super().__init__(pName, pSound, pSize, pIntelligence)<br/>        self.TerritorySize = pTerritorySize #integer<br/>    def SetTerritorySize(self, Change):<br/>        self.TerritorySize = self.TerritorySize + Change</pre> |       |

| Question | Answer                                                                                                                                                                                                                                                                                    | Marks |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3(c)(ii) | 1 mark each <ul style="list-style-type: none"> <li>• <code>Description()</code> method header (and end where appropriate) taking <b>no</b> parameters <b>and</b> overriding/overloads/extending/using parent method</li> <li>• Concatenating <b>and</b> return correct message</li> </ul> | 2     |

Example program code:

#### Java

```
public String Description(){
    String Message = "The animal's name is " + Name + ", it makes a " + Sound + ", its size is " + Size
+ " and its intelligence level is " + Intelligence + ". Its territory is " + TerritorySize + " square
miles.";
    return Message;
}
```

#### VB.NET

```
Overloads Function Description()
    Dim Message As String = "The animal's name is " & Name & ", it makes a " & Sound & ", its size is " &
CStr(Size) & " and its intelligence level is " & CStr(Intelligence) + ". Its territory is " &
CStr(TerritorySize) & " square miles."
    Return Message
End Function
```

#### Python

```
def Description(self):
    Message = "The animal's name is " + self.Name + ", it makes a " + self.Sound + ", its size is " +
str(self.Size) + " and its intelligence level is " + str(self.Intelligence) + " it's territory is " +
str(self.TerritorySize) + " square miles."
    return Message
```

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Answer                                                                                                                                                                                                                              | Marks    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 3(d)(i)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 mark each <ul style="list-style-type: none"> <li>• 1 correct instance created and stored in a suitable variable/structure</li> <li>• 2nd and 3rd correct instances created and stored in a suitable variable/structure</li> </ul> | <b>2</b> |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>Parrot Animal1 = new Parrot("Chewie", "Squawk", 1, 10, 30, 29); Wolf Animal2 = new Wolf("Nighteyes", "Howl", 8, 7, 100); Animal Animal3 = new Animal("Copper", "Neigh", 10, 6);</pre> <p><b>VB.NET</b></p> <pre>Dim Animal1 As Parrot Animal1 = New Parrot("Chewie", "Squawk", 1, 10, 30, 29) Dim Animal2 As Wolf Animal2 = New Wolf("Nighteyes", "Howl", 8, 7, 100) Dim Animal3 As Animal Animal3 = New Animal("Copper", "Neigh", 10, 6)</pre> <p><b>Python</b></p> <pre>Animal1 = Parrot("Chewie","Squawk",1,10,30,29) Animal2 = Wolf("Nighteyes","Howl",8,7,100) Animal3 = Animal("Copper", "Neigh", 10, 6)</pre> |                                                                                                                                                                                                                                     |          |

| Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Answer                                                                                                                                                                                                                                                                                                                            | Marks    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 3(d)(ii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 mark each <ul style="list-style-type: none"> <li>• Calling <code>SetTerritorySize(-20)</code> for instance of Nighteyes</li> <li>• Calling <code>ChangeNumberWords(2)</code> for instance of Chewie</li> <li>• Calling <code>Description()</code> for all 3 animals (after any updates) and outputting return values</li> </ul> | <b>3</b> |
| <p>Example program code:</p> <p><b>Java</b></p> <pre>Animal2.SetTerritorySize(-20); Animal1.ChangeNumberWords(2); System.out.println(Animal1.Description()); System.out.println(Animal2.Description()); System.out.println(Animal3.Description());</pre> <p><b>VB.NET</b></p> <pre>Animal2.SetTerritorySize(-20) Animal1.ChangeNumberWords(2) Console.WriteLine(Animal1.Description()) Console.WriteLine(Animal2.Description()) Console.WriteLine(Animal3.Description())</pre> <p><b>Python</b></p> <pre>Animal2.SetTerritorySize(-20) Animal1.ChangeNumberWords(2) print(Animal1.Description()) print(Animal2.Description()) print(Animal3.Description())</pre> |                                                                                                                                                                                                                                                                                                                                   |          |

**PUBLISHED**

| Question                                                                                                                                                                                                                                                                                                                                                                                                           | Answer                                                                                                                                                                                                      | Marks    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 3(d)(iii)                                                                                                                                                                                                                                                                                                                                                                                                          | 1 mark each: <ul style="list-style-type: none"> <li>• All three messages accurate with all relevant values</li> <li>• ... showing correctly updated territory for Nighteyes and words for Chewie</li> </ul> | <b>2</b> |
| e.g.<br><br><pre> The animal's name is Chewie, it makes a Squawk, its size is 1 and its intelligence level is 10. It has a wingspan of 30cm and can say 31 words. The animal's name is Nighteyes, it makes a Howl, its size is 8 and its intelligence level is 7 it's territory is 80 square miles. The animal's name is Copper, it makes a Neigh, its size is 10 and its intelligence level is 6           </pre> |                                                                                                                                                                                                             |          |