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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.

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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.

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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.

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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

Annotation	Meaning
	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

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Annotation	Meaning
	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

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- **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.

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Question	Answer	Marks
1(a)	1 mark each • (Global) `Stack` as 1D array (of strings) with 20 elements initialised to string `"-1"` • (Global) `TopOfStack` initialised to `-1`	**2**

Example program code:

Java
```
public static String[] Stack = new String[20];
public static Integer TopOfStack;
public static void main(String args[]){
      for(Integer X = 0; X < 20; X++){
            Stack[X] = "-1";
      }
      TopOfStack = -1;
}
```
VB.NET
```
Dim Stack(19) As String
Dim TopOfStack As Integer
For x = 0 To 19
    Stack(x) = "-1"
Next
TopOfStack = -1
```

Python
```
Stack = []
TopOfStack = -1
#main
for x in range(20):
    Stack.append("-1")
```

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Question	Answer	Marks
1(b)	1 mark each • `Push` function header (and end where appropriate) taking one (string) parameter • Checking if stack is full **and** returning integer `-1` • (Otherwise) Incrementing `TopOfStack` • Storing parameter in the incremented the stack at `TopOfStack` **and** returning integer `1`	**4**

Example program code:

Java

```
public static Integer Push(String Data){
      if (TopOfStack == 19){
            return -1;
      }else{
            TopOfStack++;
            Stack[TopOfStack] = Data;
            return 1;
      }
}
```

VB.NET

```
Function Push(ByVal Data)
    If TopOfStack = 19 Then
        Return -1
    Else
        TopOfStack = TopOfStack + 1
        Stack(TopOfStack) = Data
        Return 1
    End If
End Function
```

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Question	Answer	Marks

Python

```
def Push(Data):
    global Stack
    global TopOfStack
    if TopOfStack == 19:
        return -1
    else:
        TopOfStack += 1
        Stack[TopOfStack] = Data
        return 1
```

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Question	Answer	Marks
1(c)	1 mark each • Function header (and end where appropriate) **and** returning a value in all cases. • Checking if stack is empty **and** returning string `"-1"` • (Otherwise) Decrementing `TopOfStack` • Returning element in stack at `TopOfStack` before `TopOfStack` is decremented	**4**

Example program code:

Java

```
public static String Pop(){
      if (TopOfStack == -1){
            return "-1";
      }else{
            String ReturnValue = Stack[TopOfStack];
            TopOfStack--;
            return ReturnValue;
      }
}
```

VB.NET

```
Function Pop()
    If TopOfStack = -1 Then
        Pop = "-1"
    Else
        Pop = Stack(TopOfStack)
        TopOfStack = TopOfStack - 1
    End If
End Function
```

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Question	Answer	Marks

Python

```
def Pop():
    global Stack
    global TopOfStack
    if TopOfStack == -1:
        return "-1"
    else:
        ReturnValue = Stack[TopOfStack]
        TopOfStack -= 1
        return ReturnValue
```

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Question	Answer	Marks
1(d)	1 mark each • Procedure header (and end where appropriate) taking one (string) parameter • Opening the file with the filename parameter **and** closing the file in an appropriate place • Looping through to end of file **and** reading in each line ... • … calling `Push()` **once** with each read in value … • … if any return value from `Push()` is integer `-1` outputting `"Stack full"` • Exception handling for opening and reading from file with appropriate catch and output	**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

VB.NET

```
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
```

Python

```
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")
```

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Question	Answer	Marks
1(e)	1 mark for: • `Calculate()` function header (and end where appropriate) • Looping until the stack is empty • Calling `Pop()` repeatedly within loop **and** storing/using return value • … working out if return value from `Pop()` call is an operator or a number / alternating between operator and number • Select to determine if the operator is +, -, /, * or ^ **and** attempt the matching calculation • … performing **correct** calculation using operator, number • … updating total from previous loops **and** returning this final value	**7**

Example program code:

Java

```
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;
```

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Question	Answer	Marks

```
            }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 <> "-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
```

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Question	Answer	Marks

```
                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
```

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Question	Answer	Marks
1(f)(i)	1 mark each • Taking a filename as input **and** calling `ReadData()` with input • Calling `Calculate()` **and** outputting the return value	**2**

Example program code:

Java
```
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);
```

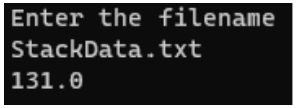
VB.NET
```
Console.WriteLine("Enter the filename")
Dim FileName As String = Console.ReadLine()
ReadData(FileName)
Dim ReturnValue As Single
ReturnValue = Calculate()
Console.WriteLine(ReturnValue)
```

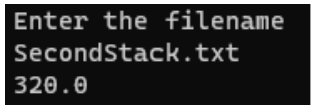
Python
```
FileName = input("Enter the filename: ")
ReadData(FileName)
ReturnValue = Calculate()
print(ReturnValue)
```

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Question	Answer	Marks
1(f)(ii)	1 mark for screenshot showing input of `StackData.txt` and output of 131 1 mark for screenshot showing input of `SecondStack.txt` and output of 320	**2**

e.g.





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Question	Answer	Marks
2(a)	1 mark each • Record/class `NewRecord` declared • 3 variables within structure (all integer)	**2**

Example program code:

Java

```
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;
      }}
```

VB.NET

```
Structure NewRecord
        Dim Key As Integer
        Dim Item1 As Integer
        Dim Item2 As Integer
    End Structure
```

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Question	Answer	Marks

Python

```
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
```

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Question	Answer	Marks
2(b)(i)	1 mark for • `HashTable` (200 records) and `Spare` (100 records) declared as (global) arrays	**1**

Example program code:

Java
```
public static NewRecord[] HashTable = new NewRecord[200];
public static NewRecord[] Spare = new NewRecord[100];
```

VB.NET
```
Dim HashTable(199) As NewRecord
Dim Spare(99) As NewRecord
```

Python
```
HashTable = []
Spare = []
```

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Question	Answer	Marks
2(b)(ii)	1 mark each • Procedure `Initialise()` header (and close where appropriate) that initialises all elements in both arrays … • … to an empty record with –1 in each of the 3 fields/elements	**2**

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
```

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Question	Answer	Marks

Python

```
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))
```

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Question	Answer	Marks
2(c)	1 mark each • Function header (and close where appropriate), taking one (integer) parameter **and** returning the calculated value • Calculation of parameter MOD 200	**2**

Example program code:

Java
```
public static Integer CalculateHash(Integer TheKey){
     return(TheKey % 200);
}
```

VB.NET
```
Function CalculateHash(Key)
    Return Key Mod 200
End Function
```

Python
```
def CalculateHash(Key):
    return Key % 200
```

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Question	Answer	Marks
2(d)	1 mark each: • Procedure header (and end where appropriate) taking one record as a parameter • Calling `CalculateHash()` with key from parameter record **and** storing/using return value • Checking if `HashTable` at return value from `CalculateHash` is **empty record** … • … if it is empty, store parameter in location • … otherwise, locating **next** free space in `Spare` … • … and storing in that index only (i.e. not in all other free spaces)	**6**

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Question	Answer	Marks

Example program code:

Java

```
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 < 99; X++){
                  if(Spare[X].GetKey().equals(-1)){
                        Spare[X] = TheRecord;
                        X = 99;
                  }
            }
      }
}
```

VB.NET

```
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
```

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Question	Answer	Marks

Python

```
def InsertIntoHash(TheRecord):
    global HashTable
    global Spare
    HashValue = CalculateHash(TheRecord.GetKey())

    if HashTable[HashValue].GetKey() == -1:
        HashTable[HashValue] = TheRecord

    else:
        for x in range(0, 100):
            if Spare[x].GetKey() == -1:
                Spare[x] = TheRecord
                break
```

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Question	Answer	Marks
2(e)	1 mark each to max 5 • Procedure header (and end where appropriate), opening **and** closing file `HashData.txt` • Reading in all lines of data … • … splitting each line by commas • Creating **record** with correct values with each line read in from file • Calling `InsertIntoHash()` with **each record** they have created • Exception handling for opening and reading from file with appropriate catch and output.	**5**

Example program code:

Java

```
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");}
}
```

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Question	Answer	Marks

VB.NET

```
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
```

Python

```
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")
```

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Question	Answer	Marks
2(f)(i)	1 mark each • Procedure header (and end where appropriate) **and** looping through each element in `Spare` … • … checking if **record** is empty and outputting **key field** if not empty	**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
```

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Question	Answer	Marks
2(f)(ii)	1 mark for calling `Initialise()` then `CreateHashTable()` then `PrintSpare()`	**1**

Example program code:

Java
```
Initialise();
CreateHashTable();
PrintSpare();
```

VB.NET
```
Initialise()
CreateHashTable()
PrintSpare()
```

Python
```
Initialise()
CreateHashTable()
PrintSpare()
```

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Question	Answer	Marks
2(f)(iii)	1 mark for output	**1**

For example:

```
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
```

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Question	Answer	Marks
3(a)(i)	1 mark each • Class header (and end when appropriate) • Four attributes with appropriate data types • Constructor header (and end where appropriate) within class taking (min) 4 parameters … • … assigning each parameter to its attribute	**4**

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Question	Answer	Marks

Example program code:

Java

```
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;
      }
}
```

VB.NET

```
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
```

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Question	Answer	Marks

Python

```
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
```

Question	Answer	Marks
3(a)(ii)	1 mark each • `Description()` **method** header (and end where appropriate) with **no** parameter • Concatenating the attributes with the given message … • … and returning the created message	**3**

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;
     return Message;
}
```

VB.NET
```
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)
    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)
        return Message
```

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Question	Answer	Marks
3(b)(i)	1 mark each • Class header (and end where appropriate) **inherits** from `Animal` • Constructor header (and end where appropriate) taking 6 parameters within class **and** calling parent constructor with the four parameters … • … `WingSpan` and `NumberWords` attributes defined with data types **and** parameters assigned within constructor • `ChangeNumberWords()` **method** header (and end where appropriate) takes one parameter **and** adds parameter to attribute `NumberWords`	**4**

Example program code:

Java

```
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;
      }}
```

VB.NET

```
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
```

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Question	Answer	Marks

```
    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
```

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Question	Answer	Marks
3(b)(ii)	1 mark each • `Description()` method header (and end where appropriate) taking **no** parameters **and** overriding/overloads/extending/using parent method • Concatenating and returning the correct string	**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
```

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Question	Answer	Marks
3(c)(i)	1 mark each • Class header (and end where appropriate) **inherits** from `Animal` • Constructor header (and end where appropriate) taking 5 parameters within class **and** calling parent constructor with parameters • Attribute `Territory` defined as int and parameter assigned within constructor • `SetTerritory()` **method** header (and end) takes 1 parameter and adds parameter to attribute `TerritorySize`	**4**

Example program code:

Java

```
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;
      }}
```

VB.NET

```
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
```

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Question	Answer	Marks

Python

```
class Wolf(Animal):
    def __init__(self, pName, pSound, pSize, pIntelligence, pTerritorySize):
        super().__init__(pName, pSound, pSize, pIntelligence)
        self.TerritorySize = pTerritorySize #integer
    def SetTerritorySize(self, Change):
        self.TerritorySize = self.TerritorySize + Change
```

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Question	Answer	Marks
3(c)(ii)	1 mark each • `Description()` method header (and end where appropriate) taking **no** parameters **and** overriding/overloads/extending/using parent method • Concatenating **and** return correct message	**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
```

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Question	Answer	Marks
3(d)(i)	1 mark each • 1 correct instance created and stored in a suitable variable/structure • 2nd and 3rd correct instances created and stored in a suitable variable/structure	**2**

Example program code:

Java

```
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);
```

VB.NET

```
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)
```

Python

```
Animal1 = Parrot("Chewie","Squawk",1,10,30,29)
Animal2 = Wolf("Nighteyes","Howl",8,7,100)
Animal3 = Animal("Copper", "Neigh", 10, 6)
```

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Question	Answer	Marks
3(d)(ii)	1 mark each • Calling `SetTerritorySize(-20)` for instance of Nighteyes • Calling `ChangeNumberWords(2)` for instance of Chewie • Calling `Description()` for all 3 animals (after any updates) and outputting return values	**3**

Example program code:

Java
```
Animal2.SetTerritorySize(-20);
Animal1.ChangeNumberWords(2);
System.out.println(Animal1.Description());
System.out.println(Animal2.Description());
System.out.println(Animal3.Description());
```

VB.NET
```
Animal2.SetTerritorySize(-20)
Animal1.ChangeNumberWords(2)
Console.WriteLine(Animal1.Description())
Console.WriteLine(Animal2.Description())
Console.WriteLine(Animal3.Description())
```

Python
```
Animal2.SetTerritorySize(-20)
Animal1.ChangeNumberWords(2)
print(Animal1.Description())
print(Animal2.Description())
print(Animal3.Description())
```

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Question	Answer	Marks
3(d)(iii)	1 mark each: • All three messages accurate with all relevant values • … showing correctly updated territory for Nighteyes and words for Chewie	**2**

e.g.

```
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
```

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