CAMBRIDGE
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Cambridge International AS & A Level

COMPUTER SCIENCE **9618/41**

Paper 4 Practical **May/June 2026**

MARK SCHEME

Maximum Mark: 75

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

This document consists of **41** printed pages.

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General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions 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 benefit of doubt given
	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	Guidance
1(a)	1 mark each • (Global) array of 10 integers • (Global) head pointer and tail pointer both initialised to –1 • Queue values are initialised to –1	**3**	

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Question	Answer	Marks	Guidance

Example program code

Python

```
Queue = []
HeadPointer = -1
TailPointer = -1
for x in range(10):
    Queue.append(-1)
```

VB.NET

```
Dim Queue(9) As Integer
Dim HeadPointer As Integer
Dim TailPointer As Integer
Sub Main(args As String())
     HeadPointer = -1
     TailPointer = -1

     For x = 0 To 9
         Queue(x) = -1
     Next
End Sub
```

Java

```
public static Integer[] Queue = new Integer[10];
public static Integer HeadPointer;
public static Integer TailPointer;
public static void main(String args[]){
  HeadPointer = -1;
  TailPointer = -1;
  for(Integer x = 0; x < 10; x++){
     Queue[x] = -1;
  }
}
```

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Question	Answer	Marks	Guidance
1(b)	1 mark each • Enqueue header taking 1 (integer) parameter • Checking if the queue is full … • … returning False • (otherwise) Storing parameter in tail pointer +1 • Incrementing tail pointer • … returning True • Dealing with first element and changing head pointer to be 0	**7**	

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Question	Answer	Marks	Guidance

Example program code

Python

```
def Enqueue(Data):
    global Queue
    global TailPointer
    global HeadPointer
    if TailPointer < 9:
        TailPointer = TailPointer + 1
        Queue[TailPointer] = Data
        if HeadPointer == -1:
            HeadPointer = 0
        return True
    else:
        return False
```

VB.NET

```
Function Enqueue(DataValue As Integer)
    If TailPointer < 9 Then
        TailPointer = TailPointer + 1
        Queue(TailPointer) = DataValue
        If HeadPointer = -1 Then
            HeadPointer = 0
        End If
        Return True
    Else
        Return False
    End If End
Function
```

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Question	Answer	Marks	Guidance

	Java
	`public static Boolean Enqueue(Integer DataValue){`
	`  if (TailPointer < 9){`
	`  TailPointer++;`
	`  Queue[TailPointer] = DataValue;`
	`  if(HeadPointer == -1){`
	`  HeadPointer = 0;`
	`  }`
	`  return true;`
	`  }else{`
	`  return false;`
	`  }`
	`}`		

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Question	Answer	Marks	Guidance
1(c)(i)	1 mark each • Taking 11 (integer) values as input • … calling `Enqueue()` with each input • Checking/storing return value … • … output message if False is returned • Output content of array in any form	**5**	

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Question	Answer	Marks	Guidance

Example program code

Python

```
for x in range(11):
    Returned = Enqueue(int(input("Enter a number ")))
    if not(Returned):
        print("Queue full")
print(Queue)
```

VB.NET

```
Dim Returned As Boolean
For x = 0 To 10
    Console.WriteLine("Enter a number ")
    Returned = Enqueue(Console.ReadLine())
    If Not Returned Then
        Console.WriteLine("Queue full")
    End If
Next
```

Java

```
Scanner scanner = new Scanner(System.in);
Boolean Returned;
for(Integer x = 0; x < 12; x++){
     System.out.println("Enter a number");
     Returned = Enqueue(Integer.parseInt(scanner.nextLine()));
     if(! Returned){
          System.out.println("Queue full");
     }
}
for(Integer x = 0; x < 10; x++){
     System.out.println(Queue[x]);
}
```

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Question	Answer	Marks	Guidance
1(c)(ii)	1 mark for ss showing inputs and output	**1**	

e.g.

```
Enter a number 1
Enter a number 2
Enter a number 3
Enter a number 4
Enter a number 5
Enter a number 6
Enter a number 7
Enter a number 8
Enter a number 9
Enter a number 10
Enter a number 11
Queue full
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

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Question	Answer	Marks	Guidance
1(d)	1 mark each • Dequeue header taking no parameter • Checking if queue is empty (e.g. TailPointer == -1 or HeadPointer > TailPointer) … • … returning –1 • (otherwise) accessing data at head pointer … • … and returning • Incrementing HeadPointer (before any return)	**6**	

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Question	Answer	Marks	Guidance

Example program code

Python

```
def Dequeue():
    global Queue
    global HeadPointer
    global TailPointer
    if HeadPointer > -1 and HeadPointer <= TailPointer:
        ReturnValue = Queue[HeadPointer]
        HeadPointer = HeadPointer + 1
        return ReturnValue
    else:
        return -1
```

VB.NET

```
    Function Dequeue()
        Dim ReturnValue As Integer
        If HeadPointer > -1 And HeadPointer <= TailPointer Then
           ReturnValue = Queue(HeadPointer)
           HeadPointer = HeadPointer + 1
           Return ReturnValue
        Else
           Return -1
        End If End
     Function
```

Java

```
public static Integer Dequeue(){
    if (HeadPointer > -1 && HeadPointer <= TailPointer){
          Integer ReturnValue = Queue[HeadPointer];
          HeadPointer++;
          return ReturnValue;
    }else{
          return -1;
    }
}
```

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Question	Answer	Marks	Guidance
1(e)(i)	1 mark each • Taking 6 integers as input and storing in the queue • Calling `Dequeue()` 4 times and storing/using return value • Outputs each removed element from the queue	3	

Example program code

Python

```
for x in range(6):
    returnValue = Enqueue(int(input("Enter a number ")))
for x in range(4):
    returnValue = Dequeue()
    print(returnValue)
```

VB.NET

```
    For x = 0 To 5
       Console.WriteLine("Enter a number ")
       Returned = Enqueue(Console.ReadLine())
   Next
   Dim ReturnValue As Integer = -1
   For x = 0 To 3
       ReturnValue = Dequeue()
       Console.WriteLine(ReturnValue)
   Next
```

Java

```
for(Integer x = 0; x < 6; x++){
     System.out.println("Enter a number");
     Returned = Enqueue(Integer.parseInt(scanner.nextLine()));
}
Integer ReturnValue = -1;
for(Integer x = 0; x < 4; x++){
     ReturnValue = Dequeue();
     System.out.println(ReturnValue);
       }
```

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Question	Answer	Marks	Guidance
1(e)(ii)	1 mark for ss showing inputs and output	**1**	

e.g.

```
Enter a number 100
Enter a number 10
Enter a number 5
Enter a number 6
Enter a number 18
Enter a number 68
100
10
5
6
```

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Question	Answer	Marks	Guidance
2(a)	1 mark each • Record structure / class with identifier `ToyRecord` • Four fields declared/initialised	2	Class needs a constructor for MP1 (allow/ignore parameters). Fields can be attributes declared by comment

Example program code

Python

```
class ToyRecord:
    def __init__(self, pName, pNumBricks, pDifficulty, pCategory):
        self.ToyName = pName #string
        self.NumberBricks = pNumBricks #integer
        self.Difficulty = pDifficulty #string
        self.Category = pCategory #string
```

VB.NET

```
Structure ToyRecord
    Dim ToyName As String
    Dim NumberBricks As Integer
    Dim Difficulty As String
      Dim Category As
  String End Structure
```

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Question	Answer	Marks	Guidance

Java

```
public class ToyRecord {
    public String
    ToyName;
    public Integer
    NumberBricks; public
    String Difficulty; public
    String Category;

    public ToyRecord(String pToyName, Integer pNumberBricks, String pDifficulty, String pCategory){
          ToyName = pToyName;
          NumberBricks =
          pNumberBricks; Difficulty
          = pDifficulty; Category =
          pCategory;
    }
}
```

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Question	Answer	Marks	Guidance
2(b)(i)	1 mark each • Function header taking parameter and returning populated array • Exception handling with suitable output (all file handling inside try) • Opening the file • …closing the file in an appropriate place • Looping until EOF/16 times and reading in each line • Splitting data by comma (and removing new line) • Creating new `ToyRecord` with data // updating pre-existing record • Appending each record to array	**8**	

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Question	Answer	Marks	Guidance

Example program code

Python

```
def ReadData(TheToys):
    try:
        TheFile = open("Toys.txt")
        for Line in TheFile:
            DataSplit = (Line.strip()).split(",")
            TheToys.append(ToyRecord(DataSplit[0],int(DataSplit[1]), DataSplit[2], DataSplit[3]))
        TheFile.close()
    except:
        print("Cannot open file")
    return TheToys
```

VB.NET

```
Function ReadData(TheToys() As ToyRecord)
    Dim TempData(3) As String
    Dim TempRecord As ToyRecord
    Try
        Dim FileReader As New System.IO.StreamReader("Toys.txt")
        While Not FileReader.EndOfStream
            TempData = (FileReader.ReadLine()).Split(",")
            TempRecord.ToyName = TempData(0)
            TempRecord.NumberBricks = TempData(1)
            TempRecord.Difficulty = TempData(2)
            TempRecord.Category = TempData(3)
            TheToys(NumberToys) = TempRecord
            NumberToys = NumberToys + 1
        End While
        FileReader.Close()
    Catch ex As Exception
        Console.WriteLine("Cannot open or read from file")
    End Try
    Return TheToys
End Function
```

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Question	Answer	Marks	Guidance

Java

```
public static ToyRecord[] ReadData(ToyRecord[] TheToys){
    String[] TempData;
    try{
       Scanner Scanner1 = new Scanner(new File("Toys.txt"));
       while(Scanner1.hasNextLine()){
         TempData = Scanner1.nextLine().split(",");
         TheToys[NumberToys] =  new ToyRecord(TempData[0],Integer.parseInt(TempData[1]),TempData[2],TempData[3]);
         NumberToys++;
       }
       Scanner1.close();
    } catch(FileNotFoundException ex){
       System.out.println("No file found");
    }
    return TheToys;
}
```

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Question	Answer	Marks	Guidance
2(b)(ii)	1 mark each • Procedure header, taking array parameter • Looping through each array element … • …outputting the data	3	

Example program code

Python

```
def OutputToys(TheToys):
    for Item in TheToys:
        print(Item.ToyName, Item.NumberBricks, Item.Difficulty, Item.Category)
```

VB.NET

```
Sub OutputToys(TheToys)
    For x = 0 To NumberToys - 1
        Console.WriteLine(TheToys(x).ToyName & " " & TheToys(x).NumberBricks & " " &
TheToys(x).Difficulty & " " & TheToys(x).Category)
    Next
End Sub
```

Java

```
    public static void OutputToys(ToyRecord[] TheToys){
        for(Integer x = 0; x < NumberToys; x++){
            System.out.println(TheToys[x].ToyName + " " + TheToys[x].NumberBricks + " " +
TheToys[x].Difficulty + " " + TheToys[x].Category);
        }
    }
```

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Question	Answer	Marks	Guidance
2(b)(iii)	1 mark each • Declaring array of (16 `ToyRecord` elements) • Calling `ReadData()` with empty array parameter and storing return array • Calling `OutputToys()` with returned array	3	

Example program code

Python

```
TheToys = [] #16 elements
TheToys = ReadData(TheToys)
OutputToys(TheToys)
```

VB.NET

```
NumberToys = 0
Dim TheToys(15) As ToyRecord
TheToys = ReadData(TheToys)
OutputToys(TheToys)
```

Java

```
NumberToys = 0;
ToyRecord[] TheToys = new ToyRecord[16];
TheToys = ReadData(TheToys);
OutputToys(TheToys);
OutputToys(TheToys)
```

Java

```
NumberToys = 0;
ToyRecord[] TheToys = new ToyRecord[16];
TheToys = ReadData(TheToys);
OutputToys(TheToys);
```

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Question	Answer	Marks	Guidance
2(b)(iv)	1 mark for screenshot showing the toy data output	**1**	Ignore format

e.g.

```
Fire Station 3981 Expert Town
Theatre 4120 Expert Town
Riding Stable 1025 Medium Play
Hospital 1220 Medium Play
Super Car 235 Easy Play
Vintage Car 352 Easy Play
Tree House 5120 Expert Display
Car Park 1124 Medium Town
Flowers 1A 632 Medium Display
Castle 2045 Medium Play
Aeroplane large 2415 Medium Play
Aeroplane medium 1520 Easy Play
Motorbike large 1563 Medium Display
Cafe 2041 Medium Town
Shopping Mall 6512 Medium Town
Park 1352 Easy Play
```

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Question	Answer	Marks	Guidance
2(c)(i)	1 mark each • Function header taking array of `ToyRecord` and returning a populated array • Prompt to enter a difficulty level and reading as input … • … repeatedly until valid • Iterating through each element in array and comparing difficulty to input … • … appending those that match to the new array	**5**	Allow any input as long as equates to the 3 levels

Example program code
Python

```
def SearchToys(TheToys):
    SelectedToys = []
    Difficulty = -1
    while Difficulty < 1 or Difficulty > 3:
        Difficulty = int(input("Enter 1 for easy, 2 for medium and 3 for expert "))
    if Difficulty == 1:
        Choice = "Easy"
    elif Difficulty == 2:
        Choice = "Medium"
    else:
      Choice = "Expert"
    for Item in TheToys:
          if Item.Difficulty == Choice:
              SelectedToys.append(Item)
return SelectedToys
```

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Question	Answer	Marks	Guidance

VB.NET

```
Function SearchToys(TheToys)
    Dim SelectedToys(16) As ToyRecord
    Dim Difficulty As Integer = -1
    Dim Choice As String
    NumberSelected = 0

    While (Difficulty < 1 Or Difficulty > 3)
        Console.WriteLine("Enter 1 for easy, 2 for medium and 3 for expert ")
        Difficulty = Console.ReadLine()
    End While
    If Difficulty = 1 Then
        Choice = "Easy"
    ElseIf Difficulty = 2 Then
        Choice = "Medium"
    Else
        Choice = "Expert"
    End If


    For x = 0 To NumberToys - 1
        If TheToys(x).Difficulty = Choice Then
            SelectedToys(NumberSelected) = TheToys(x)
            NumberSelected = NumberSelected + 1
        End If
    Next
    Return SelectedToys
End Function
```

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Question	Answer	Marks	Guidance

Java

```
  public static ToyRecord[] SearchToys(ToyRecord[] TheToys){
          ToyRecord[] SelectedToys = new ToyRecord[16];
          Integer Difficulty = -1;
          String Choice = "";
          NumberSelected = 0;
          Scanner Scanner1 = new Scanner(System.in);
          while(Difficulty < 1 || Difficulty > 3){
              System.out.println("Enter 1 for easy, 2 for medium and 3 for expert ");
             try{
                     Difficulty = Integer.parseInt(Scanner1.nextLine());
             }catch(NumberFormatException ex){}
          }
          if(Difficulty == 1){
              Choice = "Easy";
          }else if(Difficulty == 2){
              Choice = "Medium";
          }else{
              Choice = "Expert";
          }
          for(Integer x = 0; x < NumberToys; x++){
              if((TheToys[x].Difficulty).equals(Choice)){
                SelectedToys[NumberSelected] = TheToys[x];
                NumberSelected++;
              }
           }

          return SelectedToys;
      }
```


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Question	Answer	Marks	Guidance
2(c)(ii)	1 mark each to max 3 • Procedure header taking array of type `ToyRecord`, opening and closing text file • Looping through array and formatting the data correctly • …writing each line to the file • Exception handling with suitable catch and output	3	

Example program code

Python

```
def WriteToys(TheToys):
      try:
         TheFile = open("SelectedToys.txt", 'w')
         for Item in TheToys:
             LineToWrite = Item.ToyName + "," + str(Item.NumberBricks) + "," + Item.Difficulty + "," +
Item.Category + "\n"
             TheFile.write(LineToWrite)
          TheFile.close()
      except:
          print("Cannot write to file")
```

VB.NET

```
  Sub WriteToys(TheToys)
       Dim TextToWrite As String = ""
       Try
           Dim FileWriter As New System.IO.StreamWriter("SelectedToys.txt")
           For x = 0 To NumberSelected - 1
               TextToWrite = TheToys(x).ToyName & "," & TheToys(x).NumberBricks & "," &
  TheToys(x).Difficulty & "," & TheToys(x).Category
               FileWriter.WriteLine(TextToWrite)
           Next
           FileWriter.Close()
       Catch ex As Exception
           Console.WriteLine("Cannot open or read from file")
       End Try
   End Sub
```

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Question	Answer	Marks	Guidance

	Java
	`public static void WriteToys(ToyRecord[] TheToys){`
	`String TextToWrite = "";`
	`File TheFile = new File("SelectedToys.txt");`
	`try{`
	`FileWriter FW = new FileWriter(TheFile, true);`
	`for(Integer x = 0; x < NumberSelected;x++){`
	`TextToWrite = TheToys[x].ToyName + "," + TheToys[x].NumberBricks + "," + TheToys[x].Difficulty + "," + TheToys[x].Category + "\n";`
	`FW.write(TextToWrite);`
	`}`
	`FW.close();`
	`} catch(IOException ex){`
	`System.out.println("File not found, cannot write.");`
	`}`
	`}`		

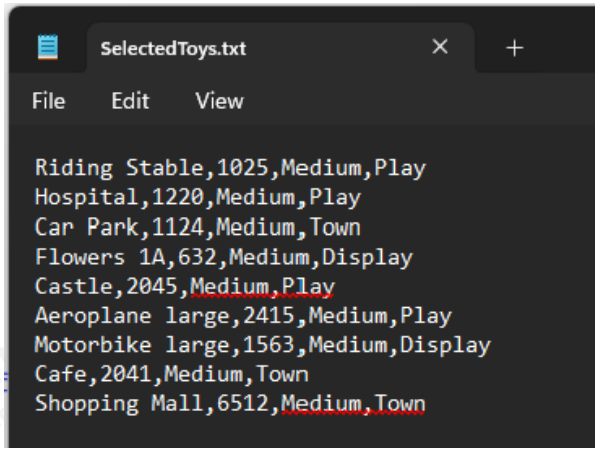
2(c)(iii)	1 mark each • Calling `SearchToys()` with populated array and storing return array • Calling `WriteToys()` with returned array	**2**	

	Example program code
	Python
	`SelectedToys = []`
	`SelectedToys = SearchToys(TheToys)`
	`WriteToys(SelectedToys)`
	
	VB.NET
	`Dim SelectedToys(15) As ToyRecord`
	`SelectedToys = SearchToys(TheToys)`
	`WriteToys(SelectedToys)`
	
	Java
	`ToyRecord[] SelectedToys = new ToyRecord[16];`
	`SelectedToys = SearchToys(TheToys);`
	`WriteToys(SelectedToys);`		

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Question	Answer	Marks	Guidance
2(c)(iv)	1 mark for screenshot of text file with correct name and content	1	Ignore format, check content

e.g.



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Question	Answer	Marks	Guidance
3(a)(i)	1 mark each • Class declaration (and end) with attributes • Constructor header (and end) • … taking 2 parameters … • … assigning parameters to attributes	4	

Example program code

Python

```
class TheObject:
    def __init__(self, pType, pAmount):
        self.ObjectType = pType #string
        self.Amount = pAmount #integer
```

VB.NET

```
Class TheObject
    Public ObjectType As String
    Public Amount As Integer
    Sub New(pType, pAmount)
        ObjectType = pType
        Amount = pAmount
    End Sub
End Class
```

Java

```
class TheObject{
    public String Type;
    public Integer Amount;

    public TheObject(String pType, Integer pAmount){
        ObjectType = pType;
        Amount = pAmount;
    }
 }
```

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Question	Answer	Marks	Guidance
3(a)(ii)	1 mark each • Class header (and end) and attributes including array • Constructor taking 1 parameter and storing in `NumberSpaces`… • … initialising empty objects to 100 spaces in `BoardArray` • Get method with no parameter, returning attribute	4	

Example program code

Python

```
class Path:
    def __init__(self, pNumberSpaces):
        self._BoardArray = [] #100 TheObject
        self._NumberSpaces = pNumberSpaces #int
        for Number in range(100):
            self._BoardArray.append(TheObject("",-1))
    def GetNumberSpaces(self):
        return self.__NumberSpaces
```

VB.NET

```
  Class Path
      Private BoardArray(99) As TheObject
      Private NumberSpaces As Integer

      Sub New(pNumberSpaces)
          For x = 0 To 99
              BoardArray(x) = New TheObject("", -1)
          Next
          NumberSpaces = pNumberSpaces
      End Sub

      Function
          GetNumberSpaces()
          Return NumberSpaces
      End Function
  End Class
```

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Question	Answer	Marks	Guidance

Java

```
class Path{
    private static TheObject[] BoardArray = new TheObject[100];
    private static Integer NumberSpaces;

    public Path(Integer pNumberSpaces){
        for(Integer x = 0; x < pNumberSpaces; x++){
            BoardArray[x] = new TheObject("",-1);
        }
      NumberSpaces = pNumberSpaces;
  }

  public Integer GetNumberSpaces(){
      return NumberSpaces;
  }
}
```

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Question	Answer	Marks	Guidance
3(a)(iii)	1 mark each • Method header taking array as parameter • If more elements, returning `FALSE` • (otherwise) storing parameter elements in array and returning `TRUE`	3	

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Question	Answer	Marks	Guidance

Example program code

Python

```
    def InitialiseData(self, TheArray):
        ALength = len(TheArray)
        if ALength > self.__NumberSpaces:
            return False
        for x in range(len(TheArray)):
            self.__BoardArray[x] = TheArray[x]
        return True
```

VB.NET

```
  Function InitialiseData(TheArray())
      Dim ALength As Integer = TheArray.Length
      If ALength > NumberSpaces Then
          Return False
      End If

      For x = 0 To ALength - 1
          BoardArray(x) = TheArray(x)
      Next
      Return True
  End Function
```

Java

```
  public boolean InitialiseData(TheObject[] TheArray){
          Integer ALength = TheArray.length;

          if(ALength > NumberSpaces){
              return false;
          }
          for(Integer x = 0; x < NumberSpaces;
              x++){ BoardArray[x] = TheArray[x];

          }
            return true;
      }
```

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Question	Answer	Marks	Guidance
3(a)(iv)	1 mark each • Method header and returning string • Creating string of all not null path objects type and amount	2	

Example program code

Python

```
def ReturnPath(self):
    ReturnString = ""
    for x in range(self.__NumberSpaces):
        TempString = self.__BoardArray[x].ObjectType + "-" + str(self.__BoardArray[x].Amount) + " "
        ReturnString = ReturnString + TempString
    return ReturnString
```

VB.NET

```
Function ReturnPath()
    Dim ReturnString As String = ""
    Dim TempString As String = ""
    For x = 0 To NumberSpaces - 1
        TempString = BoardArray(x).ObjectType & "-" & (BoardArray(x).Amount).ToString + " "
        ReturnString = ReturnString + TempString
    Next

    Return ReturnString
End Function
```

Java

```
public String ReturnPath(){
    String ReturnString = "";
    String TempString = "";
    for(Integer x = 0; x < NumberSpaces; x++){
        TempString = BoardArray[x].ObjectType + "-" + BoardArray[x].Amount + " ";
        ReturnString = ReturnString + TempString;
    }
    return ReturnString;
}
```

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Question	Answer	Marks	Guidance
3(a)(v)	1 mark each • Method header (and end) taking one parameter and returning array element at parameter	1	Accept returning the integer or integer –1. Solution does not need to check if valid index.

Example program code

Python

```
def GetPathObject(self, TheIndex):
        if(TheIndex >= NumberSpaces - 1):
            TheIndex = self.__NumberSpaces - 1
        return self.__BoardArray[TheIndex]
```

VB.NET

```
Function GetPathObject(TheIndex)
    If (TheIndex >= NumberSpaces - 1) Then
        TheIndex = NumberSpaces - 1
    End If
    Return BoardArray(TheIndex)
End Function
```

Java

```
public TheObject GetPathObject(Integer TheIndex){
        if(TheIndex >= NumberSpaces - 1){
            TheIndex = NumberSpaces - 1;
        }
        return BoardArray[TheIndex];
}
```

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GradeMax

Question	Answer	Marks	Guidance
3(b)(i)	1 mark each • Creating 5 objects of type `TheObject` • …with correct values … • … and storing in `ArrayOfObjects` • Creating new instance of Pathwith 5 elements • Calling `InitialiseData` for the path with `ArrayOfObjects` • Outputting the path using return path	**6**	

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GradeMax

Question	Answer	Marks	Guidance

Example program code

Python

```
ArrayOfObjects = []
ArrayOfObjects.append(TheObject("Money",50))
ArrayOfObjects.append(TheObject("Experience",100))
ArrayOfObjects.append(TheObject("Money",200))
ArrayOfObjects.append(TheObject("Money",20))
ArrayOfObjects.append(TheObject("Experience",30))
Path1 = Path(5)
Path1.InitialiseData(ArrayOfObjects)
print(Path1.ReturnPath())
```

VB.NET

```
Dim ArrayOfObjects(4) As TheObject
ArrayOfObjects(0) = New TheObject("Money", 50)
ArrayOfObjects(1) = New TheObject("Experience", 100)
ArrayOfObjects(2) = New TheObject("Money", 200)
ArrayOfObjects(3) = New TheObject("Money", 20)
ArrayOfObjects(4) = New TheObject("Experience", 30)
Dim Path1 As Path = New Path(5)
Path1.InitialiseData(ArrayOfObjects)
Console.WriteLine(Path1.ReturnPath())
```

Java

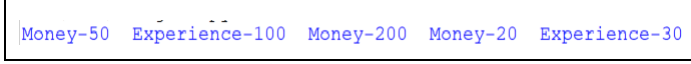
```
TheObject[] ArrayOfObjects = new TheObject[5];
ArrayOfObjects[0] = new TheObject("Money",50);
ArrayOfObjects[1] = new TheObject("Experience",100);
ArrayOfObjects[2] = new TheObject("Money",200);
ArrayOfObjects[3] = new TheObject("Money",20);
ArrayOfObjects[4] = new TheObject("Experience",30);
Path Path1 = new Path(5);
Path1.InitialiseData(ArrayOfObjects);
System.out.println(Path1.ReturnPath());
```

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GradeMax

Question	Answer	Marks	Guidance
3(b)(ii)	1 mark for screenshot showing the path	1	

e.g.



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