Cambridge Assessment International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9618/43**

Paper 43 Computer Science **May/June 2022**

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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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 descriptors 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.

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.

Question	Answer	Marks

1(a)	1 mark per mark point
	• declaration of at least 1 array with appropriate identifier
	• … 11 elements (and appropriate data type(s))
	
	Example program code:
	Java
	`Public static String[][] FileData = new String[10][2];`
	
	VB.NET
	`Dim FileData(0 To 9, 0 To 1) As String`
	
	Python
	`FileData = [[""] *2 for i in range(11)] #string`
		2

Question	Answer	Marks

1(b)	1 mark per mark point to max 6
	• procedure declaration (and end)
	• Opening the text file (to read)
	• Looping 10 times // looping until end of file (e.g. 10 pairs of data)
	• Reading in **each pair** of lines …
	• … storing player name and score in data structure(s)
	• closing the file
	• Try and catch on file handling …
	• … with suitable output
	
	Example program code:
	Java
	`public static void ReadHighScores(){`
	`  String Filename = "HighScore.txt";`
	`  try{`
	`  FileReader F = new FileReader(Filename);`
	`  BufferedReader Reader = new BufferedReader(F);`
	`  for(Integer x = 0; x < 10; x++){`
	`  FileData[x][0] = Reader.readLine();`
	`  FileData[x][1] = Reader.readLine();`
	`  }`
	`  Reader.close();`
	`  }catch(FileNotFoundException ex){`
	`  System.out.println("No file found");`
	`  }`
	`  catch(IOException ex){`
	`  System.out.println("No file found");`
	`  }`
	`}`
		6

Question	Answer	Marks

1(b)	**Python**
	`def ReadHighScores():`
	`  Filename = "HighScore.txt"`
	`  File = open(Filename, 'r')`
	`  for x in range(0, 10):`
	`  FileData[x][0] = File.readline()[:3]`
	`  FileData[x][1] = File.readline()`
	`  File.close`
	
	VB.NET
	`Sub ReadHighScores()`
	`  Dim Textfile As String = "HighScore.txt"`
	`  Dim FileReader As New System.IO.StreamReader(textfile)`
	`  Dim DataEntered As Integer = 0`
	`  While FileReader.Peek <> -1 and DataEntered < 10`
	`  FileData(DataEntered, 0) = FileReader.ReadLine()`
	`  FileData(DataEntered, 1) = FileReader.ReadLine()`
	`  DataEntered = DataEntered + 1`
	`  End While`
	`  FileReader.Close()`
	`End Sub`	

Question	Answer	Marks

1(c)	1 mark per mark point
	• procedure heading and end
	• looping through all data structure elements
	• outputting player name, space, score. Each player must start on a new line
	
	Example program code:
	Java
	`public static void OutputHighScores(){`
	`  for(Integer x = 0; x < 11; x++){`
	`  System.out.println(FileData[x][0] + " " + FileData[x][1]);`
	`  }`
	`}`
	
	Python
	`def OutputHighScores ():`
	`  for x in range(0, 11):`
	`  Output = FileData[x][0] + " " + FileData[x][1]`
	`  print(Output)`
	
	VB.NET
	`Sub OutputHighScores ()`
	`  For x = 0 To 10`
	`  Console.WriteLine(FileData(x, 0) & " " & FileData(x,1))`
	`  Next`
	`End Sub`
		3

Question	Answer	Marks

1(d)(i)	1 mark per mark point
	• (Main program) calls `ReadHighScores()`
	• … **then** calls `OutputHighScores()`
	
	Example program code:
	Java
	`public static void main(String[] args){`
	`  ReadHighScores();`
	`  OutputHighScores();`
	`}`
	
	Python
	`ReadHighScores()`
	`OutputHighScore()`
	
	VB.NET
	`Sub Main()`
	`  ReadHighScores()`
	`  OutputHighScore()`
	`  Console.ReadLine()`
	`End Sub`
		2

Question	Answer	Marks
1(d)(ii)	1 mark for screenshot showing the 10 names and scores from the file (and one extra blank space may, or may not be included) e.g. FYI 10000 ABC 9092 KEL 8500 PAI 8203 BBB 7980 ACE 7246 GKL 7001 JSI 6490 EIF 6003 DIS 2000	**1**

Question	Answer	Marks

1(e)(i)	1 mark per mark point
	• Read in a username and score
	• Validate username input (3-characters, or just selecting the first 3 characters if there **are** definitely 3 characters)
	• Validate score input (integer (cast) between 1 and 100 000 inclusive)
	
	Example program code:
	Java
	`public static void main(String[] args){`
	`  Scanner scanner = new Scanner(System.in);`
	`  ReadHighScores();`
	`  OutputHighScores();`
	`  String Username = "ABCD"`
	`  do{`
	`  System.out.println("Enter your Username");`
	`  Username = scanner.nextLine();`
	
	`  }while(Username.length != 3)`
	
	`  String Score = "-1";`
	`  do{`
	`  System.out.println("Enter your score");`
	`  Score = scanner.nextLine();`
	
	`  }while(Integer.parseInt(Score) < 1 || Integer.parseInt(Score) > 100000);`
	`}`
	
	Python
	`Username = "ABCD"`
	`while len(Username) != 3:`
	`  Username = input("Enter your Username")`
	
	`score = -1`
	`while Score < 1 or Score > 100000:`
	`  Score = int(input("Enter score"))`
		3

Question	Answer	Marks

1(e)(i)	**VB.NET**
	`Console.WriteLine("Enter Username")`
	`Username = "ABCD"`
	`While Username.length <> 3`
	`  Username = Console.ReadLine()`
	`End While`
	`Score = -1`
	`While Score < 1 Or Score > 100000`
	`  Console.WriteLine("Enter score")`
	`  Score = Console.ReadLine()`
	`End While`	

Question	Answer	Marks

1(e)(ii)	1 mark per mark point
	• procedure declaration (and close where appropriate) taking 1 string and 1 integer parameter
	• looping through each array element
	• … finding the position to input the score
	• storing the array data in the correct position
	• storing the name **and** score in the correct position
	
	Example program code:
	Java
	`public static void Arrange(String Username, String Score){`
	`  String Temp1; String Temp2; String Second1; String Second2;`
	`  for(Integer x = 0; x < 10; x++){`
	`  if (Integer.parseInt(Score) > Integer.parseInt(FileData[x][1])){`
	`  Temp1 = FileData[x][0];`
	`  Temp2 = FileData[x][1];`
	`  FileData[x][0] = Username;`
	`  FileData[x][1] = Score;`
	`  for(Integer Count = x+1; Count < 10; Count++){`
	`  second1 = FileData[count][0];`
	`  second2 = FileData[count][1];`
	`  FileData[Count][0] = Temp1;`
	`  FileData[Count][1] = Temp2;`
	`  Temp1 = Second1;`
	`  Temp2 = Second2;`
	`  x = 11;`
	`  }`
	`  }`
	`  }`
	`}`
		5

Question	Answer	Marks

1(e)(ii)	**Python**
	`def Arrange(Username, Score):`
	`  for x in range(0, 10):`
	`  if Score > FileData[x][1]:`
	`  Temp1 = FileData[x][0]`
	`  Temp2 = FileData[x][1]`
	`  FileData[x][0] = Username`
	`  FileData[x][1] = Score`
	`  Count = x+1`
	`  while(Count < 10):`
	`  Second1 = FileData[Count][0]`
	`  Second2 = FileData[Count][1]`
	`  FileData[Count][0] = Temp1`
	`  FileData[Count][1] = Temp2`
	
	`  Temp1 = Second1`
	`  Temp2 = Second2`
	`  Count = Count + 1`
	`  break;`	

Question	Answer	Marks

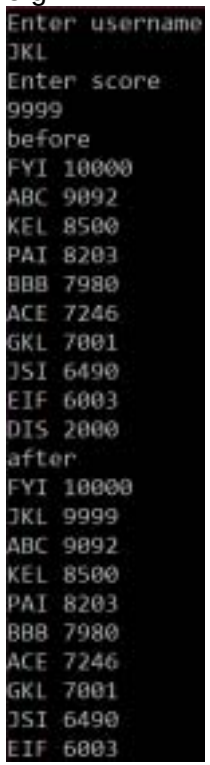
1(e)(ii)	**VB.NET**
	`Sub Arrange(Username, Score)`
	`  Dim Temp1 As String`
	`  Dim Temp2 As String`
	`  Dim Second1 As String`
	`  Dim Second2 As String`
	`  For x = 0 To 9`
	`  If Score > Integer.Parse(FileData(x, 1)) Then`
	`  Temp1 = FileData(x, 0)`
	`  Temp2 = FileData(x, 1)`
	
	`  FileData(x, 0) = Username`
	`  FileData(x, 1) = Score.ToString`
	`  For Count = x + 1 To 9`
	`  Second1 = FileData(Count, 0)`
	`  Second2 = FileData(Count, 1)`
	`  FileData(Count, 0) = Temp1`
	`  FileData(Count, 1) = Temp2`
	`  Temp1 = Second1`
	`  Temp2 = Second2`
	`  x = 10`
	`  Next`
	`  End If`
	`  Next`
	`End Sub`	

Question	Answer	Marks

1(e)(iii)	1 mark per mark point
	• Calling sorting procedure with correct parameters
	• Outputting the array before and after procedure call
	
	Example program code:
	Java
	`public static void main(String[] args){`
	`  Scanner scanner = new Scanner(System.in);`
	`  ReadHighScores();`
	`  OutputHighScores();`
	`  System.out.println("Enter your Username");`
	`  String Username = scanner.nextLine();`
	`  String Score = "-1";`
	`  do{`
	`  System.out.println("Enter your score");`
	`  Score = scanner.nextLine();`
	`  }while(Integer.parseInt(Score) < 0 || Integer.parseInt(Score) > 100000);`
	`  arrange(Username, Score);`
	`  OutputHighScores();`
	`}`
	
	Python
	`ReadHighScores()`
	`OutputHighScore()`
	`Username = input("Enter your Username")`
	`Score = -1`
	`while Score < 0 or Score > 100000:`
	`  Score = int(input("Enter score"))`
	`Arrange(Username, Score)`
	`OutputHighScore()`
		2

Question	Answer	Marks

1(e)(iii)	**VB.NET**
	`OutputHighScore()`
	`Username = Console.ReadLine()`
	`Score = -1`
	`While(score < 0 or Score > 100000)`
	`    Score = Console.ReadLine()`
	`End While`
	`Arrange(Username, Score)`
	`OutputHighScore()`	

1(e)(iv)	1 mark for screenshot. JKL, 9999 entered. After shows JKL in the second position. e.g.  	**1**

Question	Answer	Marks

1(f)	1 mark per mark point to max 4
	• procedure header and end (where appropriate) **and** opening the file `NewHighScore.txt` to write
	• Closing the file
	• Looping through all 10 array values …
	• … writing the username, then the score
	• Exception handling **and** appropriate output
	
	Example program code:
	Java
	`public static void WriteTopTen(){`
	`  String Filename = "NewHighScore.txt";`
	`  try{`
	`  FileWriter F = new FileWriter(Filename);`
	`  BufferedWriter Out = new BufferedWriter(F);`
	`  for(Integer x = 0; x < 10; x++){`
	`  Out.write(FileData[x][0] + "\n");`
	`  Out.write(FileData[x][1] + "\n");`
	`  }`
	`  Out.close();`
	`  } catch(Exception e){`
	`  System.err.println("No file");`
	`  }`
	`}`
	
	Python
	`def WriteTopTen():`
	`  Filename = " NewHighScore.txt"`
	`  Filename = open(Filename, 'w')`
	`  for x in range(0, 10):`
	`  Filename.write(str(FileData[x][0]) + '\n')`
	`  Filename.write(str(FileData[x][1]) + '\n')`
	`  Filename.close`
		4

Question	Answer	Marks

1(f)	**VB.NET**
	`Sub WriteTopTen()`
	`  Dim Filename As String = " NewHighScore.txt"`
	`  Dim NewFile As New System.IO.StreamWriter(Filename)`
	`  For x = 0 To 9`
	`  NewFile.WriteLine(FileData(x, 0))`
	`  NewFile.WriteLine(FileData(x, 1))`
	`  Next`
	`  NewFile.Close()`
	`End Sub`	

Question	Answer	Marks

2(a)	1 mark per mark point
	• Class `Balloon` declaration (and end where appropriate)
	• declaration of 3 attributes as private with suitable data types
	• constructor header (and end) with **two** parameters …
	• … initialising colour and defence item to parameters
	• … initialising health to 100
	
	Example program code:
	Java
	`class Balloon{`
	`  private Integer Health;`
	`  private String Colour;`
	`  private String DefenceItem;`
	
	`  public Balloon(String PDefenceItem, String PColour){`
	`    Colour = PColour;`
	`    DefenceItem = PDefenceItem;`
	`    Health = 100;`
	`  }`
	
	`  public static void main(String[] args){`
	`  }`
	`}`
	
	Python
	`class Balloon:`
	`#Health as integer`
	`#Colour as string`
	`#DefenceItem as string`
	`def __init__(self, PDefenceItem, PColour):`
	`    self.__Health = 100`
	`    self.__Colour = PColour`
	`    self.__DefenceItem = PDefenceItem`
		5

Question	Answer	Marks

2(a)	**VB.NET**
	`Class balloon`
	`  Private Health As Integer`
	`  Private Colour As String`
	`  Private DefenceItem As String`
	
	`  Public Sub New(PDefenceItem, PColour)`
	`  Health = 100`
	`  Colour = PColour`
	`  DefenceItem = PDefenceItem`
	`  End Sub`
	`End Class`	

2(b)	1 mark per mark point
	• get header and close with no parameter …
	• … returning defence item attribute
	
	Example program code:
	Java
	`public String GetDefenceItem(){`
	`  return DefenceItem;`
	`}`
	
	Python
	`def GetDefenceItem(self):`
	`  return self.__DefenceItem`
	
	VB.NET
	`Public Function GetDefenceItem()`
	`  Return DefenceItem`
	`End Function`
		2

Question	Answer	Marks

2(c)	1 mark per mark point
	• procedure header and close taking 1 parameter …
	• … adding **parameter** value to health attribute
	
	Example program code:
	Java
	`public void ChangeHealth(Integer Change){`
	`  Health = Health + Change;`
	`}`
	
	Python
	`def ChangeHealth(self, Change):`
	`  self.__Health = self.__Health + Change`
	
	VB.NET
	`Public Sub ChangeHealth(Change)`
	`  Health = Health + Change`
	`End Sub`
		2

Question	Answer	Marks

2(d)	1 mark per mark point
	• method header and close **and** checking if health attribute is <= 0
	• Returning TRUE if health attribute <= 0 **and** returning FALSE otherwise
	
	Example program code:
	Java
	`public Boolean CheckHealth(){`
	`  if(Health <= 0){`
	`  return true;`
	`  }else{`
	`  return false;`
	`  }`
	`}`
	
	Python
	`def CheckHealth(self):`
	`  if self.__Health <= 0:`
	`  return True`
	`  else:`
	`  return False`
	
	VB.NET
	`Function CheckHealth()`
	`  If Health <= 0 Then`
	`  Return True`
	`  Else`
	`  Return False`
	`  End If`
	`End Function`
		2

Question	Answer	Marks

2(e)	1 mark per mark point
	• take as input defence method **and** colour (2 strings)
	• instantiating new balloon object with identifier `Balloon1` …
	• … with both input values as parameters
	
	Example program code:
	
	Java
	`public static void main(String[] args){`
	`  Scanner scanner = new Scanner(System.in);`
	`  System.out.println("Enter balloon defence method");`
	`  String Method = scanner.nextLine();`
	`  System.out.println("Enter the balloon colour");`
	`  String Colour = scanner.nextLine();`
	`  Balloon Balloon1 = new Balloon(Method, Colour);`
	`}`
	
	Python
	`Method = input("Enter balloon defence method ")`
	`Colour = input("Enter the balloon colour ")`
	`Balloon1 = Balloon(Method, Colour)`
	
	VB.NET
	`Sub Main()`
	`  Console.WriteLine("Enter balloon defence method")`
	`  Dim Method As String = Console.ReadLine`
	`  Console.WriteLine("Enter the balloons colour")`
	`  Dim Colour As String = Console.ReadLine`
	`  Dim Balloon1 As Balloon = New Balloon(Method, Colour)`
	`End Sub`
		3

Question	Answer	Marks

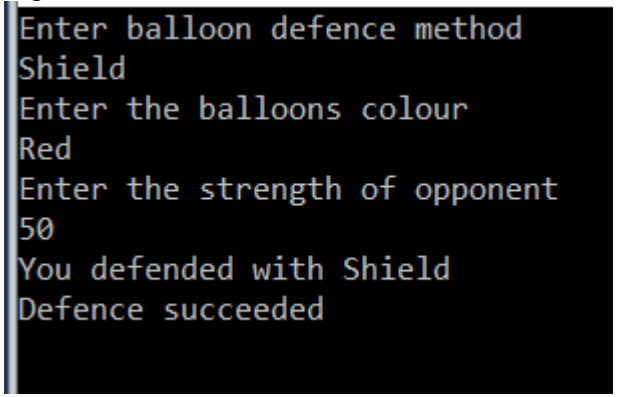
2(f)	1 mark per mark point to max 8
	• function header (and end where appropriate) **and** taking balloon object as parameter
	• Inputting strength
	• Calling `ChangeHealth` method for the parameter object …
	• … with the input as a subtraction
	• outputting the defence item for the parameter object …
	• … using `GetDefenceItem()`
	• Calling `CheckHealth()`for the parameter object …
	• … outputting **appropriate** message if `TRUE` is returned (no health remaining)
	• … outputting **appropriate** message if `FALSE` is returned (health remaining).
	• Returning the **updated** balloon object
	
	Example program code:
	Java
	`public Balloon Defend(Balloon My Balloon){`
	`  System.out.println("Enter the strength of opponent");`
	`  Scanner scanner = new Scanner(System.in);`
	`  Integer Strength = Integer.parseInt(scanner.nextLine());`
	`  MyBalloon.ChangeHealth(-Strength);`
	`  if(MyBalloon.CheckHealth() == true){`
	`  System.out.println("Defence failed");`
	`  }else {`
	`  System.out.println("Defence succeeded");`
	`  }`
	`  return MyBalloon;`
	`}`
		8

Question	Answer	Marks

2(f)	**Python**
	`def Defend(MyBalloon):`
	`  Strength = int(input("Enter the strength of opponent"))`
	`  MyBalloon.VhangeHealth(-Strength)`
	`  print("You defended with ", str(MyBalloon.GetDefenceItem()))`
	`  if(MyBalloon.CheckHealth() == True):`
	`  print("Defence failed")`
	`  else:`
	`  print("Defence succeeded")`
	`  return MyBalloon`
	
	VB.NET
	`Function Defend(MyBalloon)`
	`  Console.WriteLine("Enter the strength of opponent")`
	`  Dim Strength As Integer = Console.ReadLine`
	`  MyBalloon.ChangeHealth(-Strength)`
	`  Console.WriteLine("You defended with " & MyBalloon.GetDefenceItem)`
	`  If (MyBalloon.CheckHealth() = True) Then`
	`  Console.WriteLine("Defence failed")`
	`  Else`
	`  Console.WriteLine("Defence succeeded")`
	`  End If`
	`  Return MyBalloon`
	`End Function`	

Question	Answer	Marks

2(g)(i)	1 mark each
	• calling `Defend` with balloon object …
	• … and stores return value over object
	
	Example program code:
	
	Java
	`Balloon1 = Defend(Balloon1);`
	
	Python
	`Balloon1 = Defend(Balloon1)`
	
	VB.NET
	`Balloon1 = Defend(Balloon1)`
		2

2(g)(ii)	1 mark for screenshot with: Shield, Red and 50 input Output stating their defence item was Shield Output says health is not 0 (in some manner) e.g.  	**1**

Question	Answer	Marks

3(a)	1 mark per mark point
	• Declaring variables: head pointer, tail pointer and number of items all initialised as 0 (integer)
	• `QueueArray` declared as 1D array as string with 10 elements
	
	Example program code:
	Java
	`public static void main(String[] args){`
	`  String[] QueueArray = new String[10];`
	`  Integer QueueHeadPointer = 0;`
	`  Integer QueueTailPointer = 0;`
	`  Integer NumberOfItems = 0;`
	`}`
	
	Python
	`QueueArray = ['','','','','','','','','',''] #string`
	`QueueHeadPointer = 0 #integer`
	`QueueTailPointer = 0 #integer`
	`NumberOfItems = 0 #integer`
	
	VB.NET
	`Sub Main()`
	`  Dim QueueArray(0 To 9) As String`
	`  Dim QueueHeadPointer As Integer = 0`
	`  Dim QueueTailPointer As Integer = 0`
	`  Dim NumberOfItems As Integer = 0`
	`End Sub`
		2

Question	Answer	Marks

3(b)	1 mark per complete statement (5)
	1 mark for function heading and end, dealing with ByRef
	1 mark for remainder of function correct and following the logic
	
	Pseudocode:
	`FUNCTION Enqueue(BYREF QueueArray[] : STRING, BYREF HeadPointer : Integer, BYREF TailPointer : Integer, NumberItems : INTEGER, DataToAdd : STRING) RETURNS BOOLEAN`
	`  IF NumberItems = 10 THEN`
	`  RETURN FALSE`
	`  ENDIF`
	`  QueueArray[TailPointer] ← DataToAdd`
	`  IF TailPointer >= 9 THEN`
	`  TailPointer ← 0`
	`  ELSE`
	`  TailPointer ← TailPointer + 1`
	`  ENDIF`
	`  NumberItems ← NumberItems + 1`
	`  RETURN TRUE`
	`ENDFUNCTION`
	
	Example program code:
	Java
	`public static Boolean Enqueue(String DataToAdd){`
	`  if(NumberOfItems == 10){`
	`  return false;`
	`  }`
	`  QueueArray[QueueTailPointer] = DataToAdd;`
	`  if(QueueTailPointer >= 9){`
	`  QueueTailPointer = 0;`
	`  }else{`
	`  QueueTailPointer = QueueTailPointer + 1;`
	`  }`
	`  NumberOfItems = NumberOfItems + 1;`
	`  return true;`
	`}`
		7

Question	Answer	Marks

3(b)	**Python**
	`def Enqueue(Queue, Head, Tail, NumItems, InputData):`
	`  if NumItems >= 10:`
	`  return (False, Queue, Head, Tail, NumItems)`
	`  Queue[Tail] = InputData`
	`  if Tail >= 9:`
	`  Tail = 0`
	`  else:`
	`  Tail = Tail + 1`
	`  NumItems = NumItems + 1`
	`  return (True, Queue, Head, Tail, NumItems)`
	
	VB.NET
	`Function Enqueue(ByRef Queue() As String, ByRef Head As Integer, ByRef Tail As Integer,`
	`  ByRef NumItems As Integer, ByRef InputData As String)`
	`  If NumItems = 10 Then`
	`  Return False`
	`  End If`
	`  Queue(Tail) = InputData`
	`  If Tail >= 9 Then`
	`  Tail = 0`
	`  Else`
	`  Tail = Tail + 1`	

Question	Answer	Marks

3(c)	1 mark per mark point to max 6
	• Function header and end
	• checking if queue is empty …
	• … returning False
	• If not empty accessing **and** returning item at head pointer
	• … incrementing head pointer …
	• … changing head pointer to 0 if it's more than 9 after incrementing
	• … decrement number of items
	
	Example program code:
	Java
	`public static String Dequeue(){`
	`  if(NumberOfItems == 0){`
	`  return "FALSE";`
	`  }else{`
	`  String ReturnValue = QueueArray[QueueHeadPointer];`
	`  QueueHeadPointer = QueueHeadPointer + 1;`
	`  if(QueueHeadPointer >= 9){`
	`  QueueHeadPointer = 0;`
	`  }`
	`  NumberOfItems = NumberOfItems – 1;`
	`  return ReturnValue;`
	`  }`
	`}`
	
	Python
	`def Dequeue(Queue, Head, Tail, NumItems):`
	`  if NumItems == 0:`
	`  return (false, Queue, Head, Tail, NumItems)`
	`  else:`
	`  ReturnValue = Queue(Head)`
	`  Head = Head + 1`
	`  if Head >= 9:`
	`  Head = 0`
	`  NumItems = NumItems - 1`
	`  return(ReturnValue, Queue, Head, Tail, NumItems)`
		6

Question	Answer	Marks

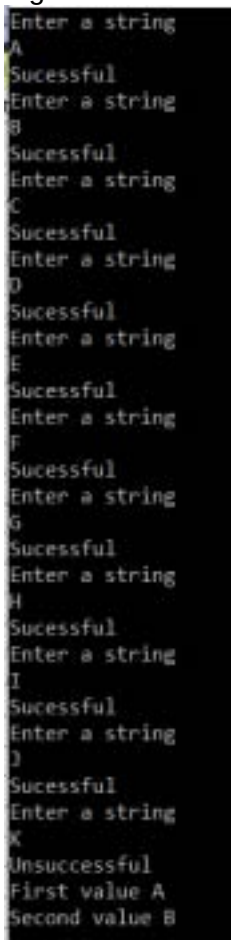
3(c)	**VB.NET**
	`Function Dequeue(ByRef QueueArray() As String, ByRef QueueHeadPointer As Integer, ByRef QueueTailpointer As Integer, ByRef NumberOfItems As Integer)`
	
	`  If NumberOfItems = 0 Then`
	`  Return "False"`
	`  Else`
	`  Dim ReturnValue = QueueArray(QueueHeadPointer)`
	`  QueueHeadPointer = QueueHeadPointer + 1`
	`  If QueueHeadPointer >= 9 Then`
	`  QueueHeadPointer = 0`
	`  End If`
	`  NumberOfItems = NumberOfItems - 1`
	`  Return ReturnValue`
	`  End If`
	
	`End Function`	

Question	Answer	Marks

3(d)(i)	1 mark per mark point
	
	• Taking 11 inputs…
	• … calling Enqueue with each of the 11 inputs …
	• … outputting an appropriate message if added or not added
	• Calling Dequeue twice …
	• … outputting return value each time
	
	Example program code:
	Java
	`public static void main(String args[]){`
	`  String InputString;`
	`  for(Integer x = 0; x < 11; x++){`
	`  System.out.println("Enter a string");`
	`  Scanner scanner = new Scanner(System.in);`
	`  InputString = scanner.nextLine();`
	`  if(Enqueue(InputString)){`
	`  System.out.println("Successful");`
	`  }else{`
	`  System.out.println("Unsuccessful");`
	`  }`
	`  }`
	`  System.out.println(Dequeue());`
	`  System.out.println(Dequeue());`
	`}`
		5

Question	Answer	Marks

3(d)(i)	**Python**
	`for x in range(0, 11):`
	`    InputString = input("Enter a string")`
	`    ReturnValue, QueueArray, QueueHeadPointer, QueueTailPointer, NumberOfItems =`
	`     Enqueue(QueueArray, QueueHeadPointer, QueueTailPointer, NumberOfItems, InputString)`
	`    if ReturnValue == True:`
	`        print("Successful")`
	`    else:`
	`        print("Unsuccessful")`
	`ReturnValue, QueueArray, QueueHeadPointer, QueueTailPointer, NumberOfItems =`
	`  Dequeue(QueueArray, QueueHeadPointer, QueueTailPointer, NumberOfItems)`
	`print(ReturnValue)`
	`ReturnValue, QueueArray, QueueHeadPointer, QueueTailPointer, NumberOfItems =`
	`  Dequeue(QueueArray, QueueHeadPointer, QueueTailPointer, NumberOfItems)`
	`print(ReturnValue)`
	VB.NET
	`For x = 0 To 10`
	` Console.WriteLine("Enter a string")`
	` InputString = Console.ReadLine`
	` If(Enqueue(QueueArray, QueueHeadPointer, QueueTailPointer, NumberOfItems, InputString))`
	`Then`
	`   Console.WriteLine("Successful")`
	` Else`
	`   Console.WriteLine("Unsuccessful")`
	` End If`
	`Next`
	`Console.WriteLine(Dequeue)`
	`Console.WriteLine(Dequeue)`	

Question	Answer	Marks
3(d)(ii)	1 mark for showing inputs and outputs: A – J input and successful. K input and unsuccessful. Output: A, B e.g.  	**1**