

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

**MARK SCHEME for the May/June 2015 series**

**9608 COMPUTER SCIENCE**

**9608/21**

Paper 2 (Written Paper), maximum raw mark 75

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.

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1 (a)

Identifier	Data Type	Description
RaceHours	INTEGER	The hours part of the race time
RaceMinutes	INTEGER	the minute part of the race time
RaceSeconds	INTEGER // REAL	the seconds part of the race time
RaceTime	INTEGER // REAL	the race time in seconds

3 × (meaningful name + data type) [3]

(b) (i)

Identifier	Data Type	Description
PersonalBestTime	INTEGER/REAL	Personal best time in seconds

meaningful name + data type [1]

(ii) Mark as follows:

- Declarations/comments for variables – at least 2
- Input (+ prompts) for hours, minutes, seconds
- Input (+ prompt) of personal best time
- Correct calculation of `RaceTimeInSeconds` (don't allow use of 'x' for '\*\*')
- Output `RaceTimeInSeconds`
- Correct logic and output message for < personal best
- Correct logic and output message for > personal best
- Correct logic and output message for = personal best

[max 7]

- (c) (i)
- Choosing data/values...
  - Test every possible 'logic path' through the code  
// with knowledge of the structure/code

*Ignore any reference to normal/boundary/extreme ...* [2]

- (ii)
- `PersonalBest` column labelled
  - Test number 1 message: "Equals personal best time"/or similar
  - Test 2/Test 3 – data for better performance ...
  - Described with suitable message
  - Test 2/Test 3 – data for worse performance ...
  - Described with suitable message

[6]

- 2 (a) (i) Displays the menu (choices)  
Repeats the prompt and input ...  
...the input is a number between 1 and 4 // Checks number is between 1 and 4

*"within range" is not enough* [3]

- (ii) ...the input number is validated [1]

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(b) (i) 3 [1]

(ii) Previous design repeated indefinitely // (new design) limits number of attempts

Penalise "Program terminates/closes" [1]

(c) IF Choice = 1 THEN (CALL) ReadFile (1)  
 IF Choice = 2 THEN OUTPUT "Add Customer code" (1)  
 IF Choice = 3 THEN OUTPUT "Search Customer code" (1)  
 IF Choice = 4 THEN END (1)

**alternative answer:**

*mark as follows:*

CASE OF Choice // Select CASE Choice 1 mark  
 1: (CALL) ReadFile 1 mark (allow CASE = 1)  
 2: OUTPUT "Add Customer code" 1 mark  
 3: OUTPUT "Search Customer code" 1 mark  
 4: END  
 ENDCASE

Output strings must match [max 3]

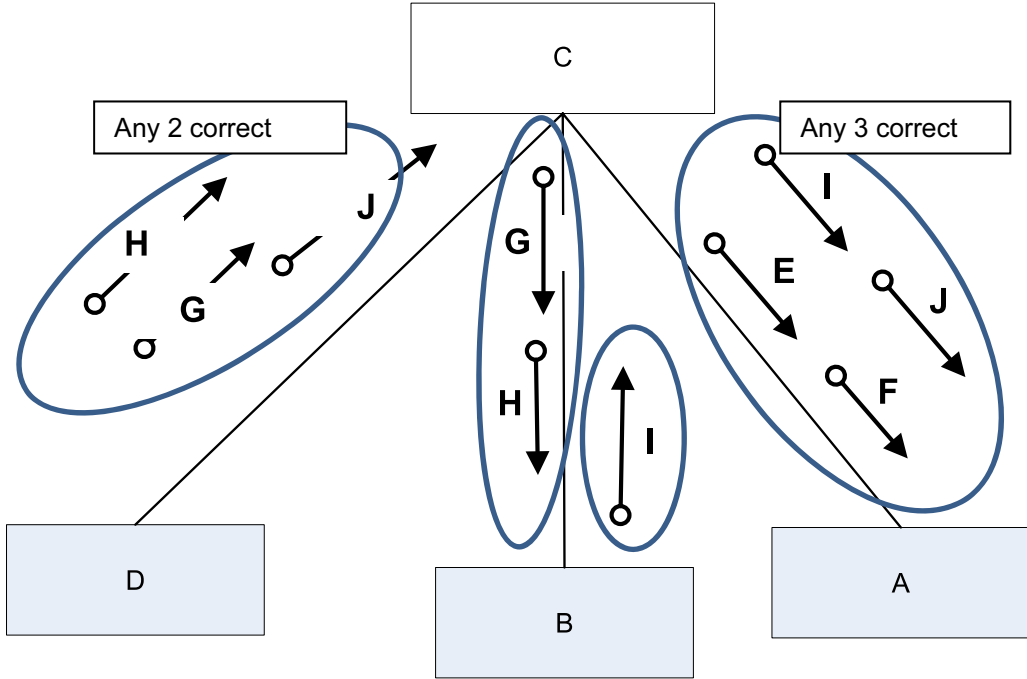
(d) Mark as follows:

- Choice / NoOfAttempts declared/commented as integer  
 Must appear within the 'main' program  
 Allow: different identifier names
- Constant i assigned a value 3
- There is an 'outer' loop to repeatedly display the menu
- Input 'choice' variable
- Three IF statements (or equivalent) for processing menu choices 1, 2 and 3  
*Note: they must be correctly formed as 'nested' or 'independent'*
- Choice 1 calls procedure ReadFile
- Choice 2 outputs "Add Customer Code"  
 + Choice 3 outputs "Search Customer Code"
- Outer loop terminates correctly with 'Choice = 4' //or equivalent
- Procedure DisplayMenu shows the four menu options
- Procedure ReadFile is present ...  
 and contains a single output message 'Read file code' [max 8]

3 (a) Control box – C // Produce insurance quotation [1]

D // Input customer details + A // Send quotation letter is correct positions [1]

(b)



Data items	
E	CustomerName
F	CustomerEmail
G	Model
H	Age
I	PolicyCharge
J	PolicyNumber

[4]

```

4 (i) FOR NoOfThrows ← 1 TO 20 / 0 TO 19
      1 1
      INPUT Player1Throw (2)
      INPUT Player2Throw (1)
      IF Player1Throw > Player2Throw
        THEN
          Player1Total ← Player1Total + 1 (1)
      ENDIF
      IF Player2Throw > Player1Throw
        THEN
          Player2Total ← Player2Total + 1
      ENDIF
    ENDFOR (1)

    IF Player1Total > Player2Total
      THEN
        OUTPUT "Player1 is the winner"
      ELSE
        OUTPUT "Player2 is the winner"
    END

```

[5]

(ii) Player scores equal // if Player1Total = Player2Total // there is no winner // a draw [1]

- 5 (a) • 1D Array // List [1]  
 • INTEGER [1]

(b) (i)

x	DayNumber	OUTPUT
0	1	
	2	
1	3	5/6/2015
	4	
2	5	7/6/2015
	6	
3	7	9/6/2015
		3

Note: 'x' and 'output' entries must be on or below the relevant 'DayNumber' entry  
 Mark as above

[4]

- (ii) • ... Sales for the first seven days (1)
- ... the number of days on which the total sales were 10 or over (1)
- Outputs the corresponding dates (1)
- Output the final value/total (of x) (1) [max 3]

(c) (i) 2 [1]

(ii)

Tick Cross	Explanation (if invalid)
X // ✓	2 <sup>nd</sup> parameter should be CHAR // accept just tick
X	Three parameters/should be 2 parameters
✓	

[3]

(d) OPENFILE "DISCOUNT\_DATES" FOR **WRITE / WRITING** (1)  
 INPUT **NextDate** (1)  
 WHILE NextDate <> "XXX"  
   INPUT Discount  
   **NextLine** = CONCAT(NextDate, " ", Discount) (1)  
   WRITEFILE "DISCOUNT\_DATES", NextLine  
**ENDWHILE** (1)  
 OUTPUT "File now created"  
 CLOSEFILE [4]

(e) (i) Sensible Identifier + Data Type + Description (1 + 1 + 1)

For example:

ThisDate	STRING/DATE	date 'entered by user'
Found	BOOLEAN	flag to indicate ThisDate is 'present in the file'
NextLine	STRING	a single line 'from the text file'
NextDate	STRING/DATE	date 'from next line in the file'
NextDiscount	STRING	the discount value from NextLine
ThisMonth	INTEGER	the month part of the date (input or from file)
MyStreamReader	STREAMREADER	references DISCOUNT_DATES file

Reject 'generic' reserved words

Allow **one** instance variable to store output string(s)

Allow **one** instance of month/day/year number e.g. ThisMonth shown above [3]

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(ii) *Mark as follows:*

Open file statement (1)  
File read statement for line text – `NextLine` (1)  
File close statement (1)

Input of the required date – `ThisDate` (1)

Isolate `NextDate` from `NextLine` (1)  
Isolate `NextDiscount` from `NextLine` (1)

IF statement comparing the two dates (1)  
Uses Boolean variable `Found` to flag when found (1)

Post/pre condition loop iterate through the file (1)  
Test for EOF or 'found' (1)

*Note: These must follow some correct logic to score ...*

Output 'No discount on this date' **and** Output 'This is a discount date') (1)  
Output (when date not found) 'Date not found' (1)

Accept 'any' identifier names [max 7]

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## APPENDIX Programming Solutions

### Question 1 (b) (ii)

#### Visual Basic ...

```

Dim RaceHours As Integer
Dim RaceMinutes As Integer
Dim RaceSeconds As Integer
Dim RaceTimeInSeconds As Integer
Dim PersonalBest As Integer

Console.WriteLine("Time in hours ... ") : RaceHours = Console.ReadLine
Console.WriteLine("Time in minutes... ") : RaceMinutes = Console.ReadLine
Console.WriteLine("Time in seconds ... ")
RaceSeconds = Console.ReadLine
Console.WriteLine("Personal best in seconds ... ")
PersonalBest = Console.ReadLine
RaceTimeInSeconds = RaceHours*60*60 + RaceMinutes*60 + RaceSeconds
Console.WriteLine(RaceTimeInSeconds)
If RaceTimeInSeconds < PersonalBest Then
    Console.WriteLine("New personal best time")
Else
    If RaceTimeInSeconds = PersonalBest Then
        Console.WriteLine("Equals personal best time")
    Else
        Console.WriteLine("Below personal best")
    End If
End If

```

#### Python ...

```

# RaceHours          - Integer
# RaceMinutes        - Integer
# RaceSeconds        - Integer
# RaceTimeInSeconds - Integer
# PersonalBest       - Integer

RaceHours = int(input("Time in hours ... "))
RaceMinutes = int(input("Time in minutes... "))
RaceSeconds = int(input("Time in seconds ... "))
PersonalBest = int(input("Personal best in seconds ... "))

RaceTimeInSeconds = RaceHours*60*60 + RaceMinutes*60 + RaceSeconds

if RaceTimeInSeconds < PersonalBest:
    print("New personal best time")
elif RaceTimeInSeconds == PersonalBest:
    print("Equals personal best time")
else:
    print("Below personal best")

```



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**Programming Solutions**  
**Question 1 (b) (ii) – contd.**

**Pascal ...**

```

var RaceHours      : Integer ;
var RaceMinutes   : Integer ;
var RaceSeconds   : Integer ;
var RaceTimeInSeconds : Integer ;
var PersonalBestTime : Integer ;

begin
Writeln('Time in hours ... ') ; readln(RaceHours) ;
Writeln('Time in minutes... ') ; readln(RaceMinutes) ;
Writeln('Time in seconds ... ') ;
readln(RaceSeconds) ;
Writeln('Personal best in seconds ... ') ;

Readln(PersonalBest) ;
RaceTimeInSeconds := RaceHours*60*60 + RaceMinutes*60 + RaceSeconds ;
Writeln(RaceTimeInSeconds) ;

If RaceTimeInSeconds < PersonalBestTime Then
  WriteLn('New personal best time')
Else
  If RaceTimeInSeconds = PersonalBest Then
    WriteLn('Equals personal best time')
  Else
    WriteLn('Personal best time is unchanged) ;

Readln;
End

```

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## Programming Solutions

### Question 2 (d)

#### Visual Basic ...

```

Dim Choice As Integer
Dim NoOfAttempts As Integer
CONST i = 3
Do
    Call DisplayMenu()
    NoOfAttempts = 0
    Do
        Console.WriteLine("Enter choice (1..4) ")
        Choice = Console.ReadLine
        NoOfAttempts = NoOfAttempts + 1
        Loop Until (Choice >= 1 And Choice <= 4) Or NoOfAttempts = i

    If Choice = 1 Then Call ReadFile()
    If Choice = 2 Then Console.WriteLine("Add customer code")
    If Choice = 3 Then Console.WriteLine("Search customer code")
    Loop Until Choice = 4

Sub DisplayMenu()
    Console.WriteLine()
    Console.WriteLine("1. Read customer file")
    Console.WriteLine("2. Add customer")
    Console.WriteLine("3. Search for a customer")
    Console.WriteLine("4. End")
    Console.WriteLine()
End Sub

Sub ReadFile()
    Console.WriteLine("Read file code")
End Sub

```

#### Python ...

```

def DisplayMenu():
    print()
    print("1. Read customer file")
    print("2. Add customer")
    print("3. Search for a customer")
    print("4. End")
    print()

def ReadFile():
    print("Read file code")

if __name__ == "__main__" :
    # Choice - Integer
    # NoOfAttempts - Integer

    Choice = 0
    while Choice !=4:
        DisplayMenu()

```

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```

Choice = int(input"Enter choice (1..4) :")
NoOfAttempts = 1
while (Choice < 1 or Choice >4) and NoOfAttempts < 3:
    Choice = int(input"Enter choice (1..4) :")
    NoOfAttempts = 1
if Choice == 1:
    ReadFile()
elif Choice == 2:
    print("Add customer code")
elif Choice == 3:
    print("Print customer code")

```

## Programming Solutions

### Question 2 (d) – contd.

#### *Pascal ...*

```

var Choice      : Integer ;
var NoOfAttempts : Integer ;
const i = 3 ;

procedure DisplayMenu ;
begin
    WriteLn();
    WriteLn('1. Read customer file') ;
    WriteLn('2. Add customer') ;
    WriteLn('3. Search for a customer');
    WriteLn('4. End') ;
    WriteLn() ;
End ;

Procedure ReadFile ;
begin
    WriteLn('Read file code');
End ;

begin

repeat
    DisplayMenu() ;
    NoOfAttempts := 0 ;
    repeat
        Writeln('Enter choice (1..4)') ; ReadLn(Choice) ;
        NoOfAttempts := NoOfAttempts + 1 ;
    Until ((Choice >= 1) And (Choice <= 4)) Or (NoOfAttempts = i);

    If Choice = 1 Then ReadFile() ;
    If Choice = 2 Then writeln('Add customer code');
    If Choice = 3 Then WriteLn('Search customer code') ;
Until Choice = 4 ;

end.

```

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## Programming Solutions

### Question 5 (ii)

#### *Visual Basic ...*

```

Dim ThisDate As String : Dim NextDate As String
Dim FileString As String
Dim Found As Boolean

FileOpen(1, "D:DISCOUNT_DATES.txt", OpenMode.Input)
    or equivalent for a 'StreamReader' solutions

Console.Write("Date to find (DD/MM/YYYY)..")
ThisDate = Console.ReadLine
Found = False
Do
    FileString = LineInput(1)
    NextDate = Left(FileString, 10)
    If NextDate = ThisDate Then
        Found = True
        ' length is 15 when shows TRUE
    If Len(FileString) = 15 Then
        Console.WriteLine("This is a discount date")
    Else
        Console.WriteLine("No discount on this date")
    End If
    End If
Loop Until Found = True Or EOF(1)

FileClose(1)

If Found = False Then
    Console.WriteLine("Date not found")
End If

```

#### *Python ...*

```

MyFile = open("c:\DISCOUNT_DATES.txt", "r")
ThisDate = input("Next date ... (XXX to end)")

Found = 0
while Found == 0:
    NextLine = MyFile.readline()
    if not NextLine:
        break

    FileDate = NextLine[0:10]
    DiscountIndicator = NextLine[11:]

    if FileDate == ThisDate:
        Found = 1
        print (ThisDate, DiscountIndicator)

MyFile.close()
if Found == 0:

```

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```
print ("This date was not found")
```

**Note:** Found could be Boolean to give:

Found = False

while not Found:

## **Programming Solutions**

### **Question 5 (ii) – contd.**

#### ***Pascal ...***

```
var ThisDate    : String ;
var NextDate    : String ;
var TheFile     : Text   ;
var FileString  : String ;
var Found       : Boolean ;

begin
assign(TheFile, 'k:\DISCOUNT_DATES.txt') ;
reset(TheFile) ;

writeln('Date to find (DD/MM/YYYY)..') ;
readln(ThisDate) ;
Found := False ;

repeat
  readln(TheFile, FileString) ;
  NextDate := copy(FileString,1, 10) ;

  If NextDate = ThisDate then
    begin
      Found := True ;
      { length is 15 when shows TRUE }
      if length(FileString) = 15 then
        writeln('This is a discount date')
      else
        writeln('No discount on this date')
      end ;
    end ;

until Found = True or EOF(TheFile) ;

close(TheFile) ;

if Found = False then writeln('Date not found') ;
```