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

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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 <u>prompt and input</u> …
…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 <u>validated</u>   [1]

(b) (i) 3

   (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 <u>as integer</u>
  Must appear within the 'main' program
  Allow: different identifier names

- <u>Constant</u> `i` assigned a value 3

- There is an 'outer' loop to <u>repeatedly display the menu</u>

- 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

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

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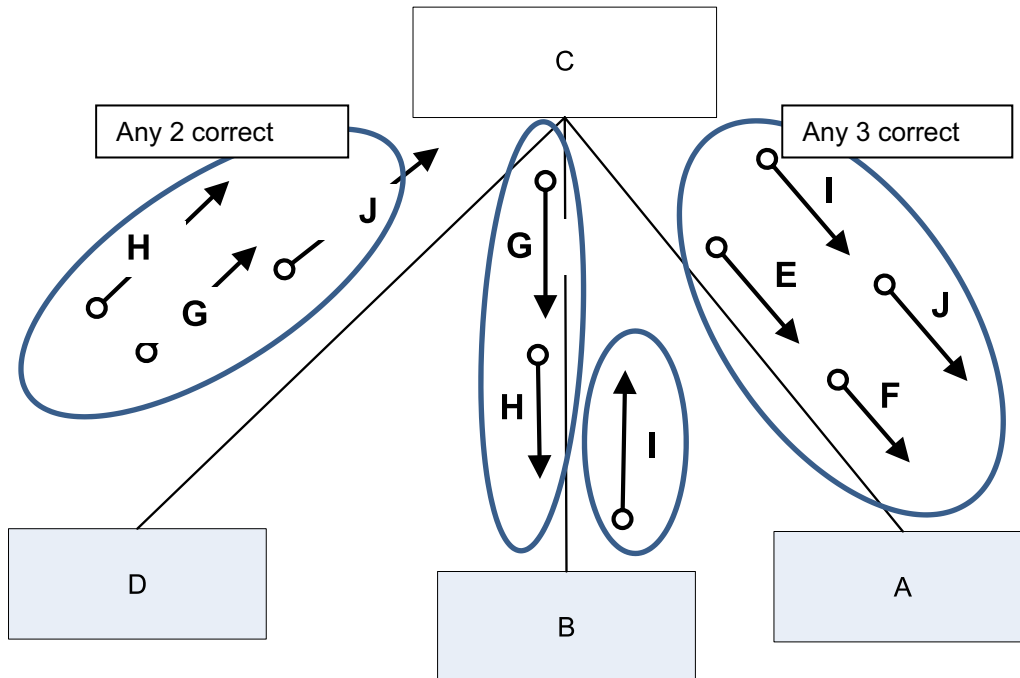
Data items	
E	CustomerName
F	CustomerEmail
G	Model
H	Age
I	PolicyCharge
J	PolicyNumber

[4]

4 (i)
```
FOR NoOfThrows ← 1 TO 20 / 0 TO 19
         1              1                              (2)
    INPUT Player1Throw
    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 <u>first seven days</u> (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

(c) **(i)** 2 [1]

(ii)

Tick Cross	Explanation (if invalid)
X // ✓	2nd 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)** <u>Sensible</u> 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]

(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 <u>EOF or 'found'</u> (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]

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.Write("Time in hours ... ") : RaceHours = Console.ReadLine
    Console.Write("Time in minutes... ") : RaceMinutes = Console.ReadLine
    Console.Write("Time in seconds ... ")
    RaceSeconds = Console.ReadLine
    Console.Write("Personal best in seconds ... ")
    PersonalBest = Console.ReadLine
    RaceTimeInSeconds = RaceHours*60*60 + RaceMinutes*60 + RaceSeconds
    Console.Write(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")
```

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

Pascal …

```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
```

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.Write("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()
```

```
        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.
```

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:
```

```
     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 ;

until Found = True or EOF(TheFile) ;

close(TheFile) ;

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