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Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the May/June 2015 series

9608 COMPUTER SCIENCE

9608/22 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]

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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:

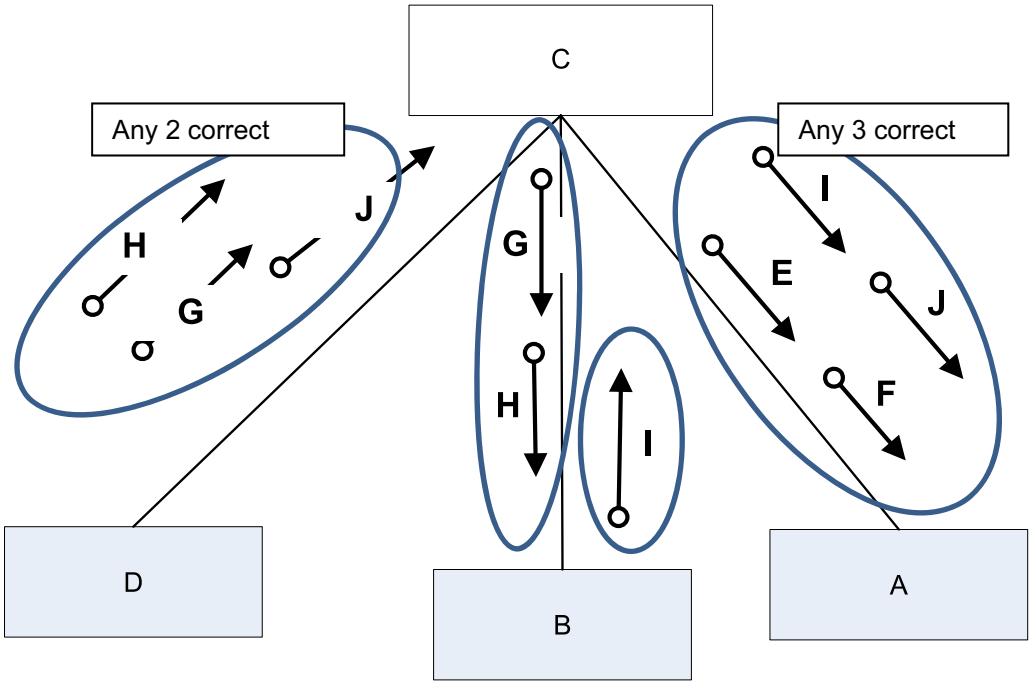
- `Choice / NoOfAttempts` declared/commented as integer
  Must appear within the 'main' program
  Allow: different identifier names
- Constant `i` assigned a value 3
- There is an 'outer' loop to repeatedly display the menu
- Input 'choice' variable
- Three `IF` statements (or equivalent) for processing 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]

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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]

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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]

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(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 // ✓	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) 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 <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]

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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.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")
```

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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.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()
```

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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 ;

until Found = True or EOF(TheFile) ;

close(TheFile) ;

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

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