

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the May/June 2015 series

9608 COMPUTER SCIENCE

9608/23

Paper 2 (Written Paper), maximum raw mark 75

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1 (a)

Identifier	Data Type	Description
HorseName	STRING	Name of the horse
NumberOfPreviousWins	INTEGER	Number of previous wins
RacePenaltyWeight	INTEGER / REAL / SINGLE	Penalty weight

[1]

(b) (i) Stepwise refinement // top-down design

[1]

(ii) INPUT HorseName
 INPUT NumberOfPreviousWins
 RacePenaltyWeight ← 0
 IF NumberOfPreviousWins = 1 OR NumberOfPreviousWins = 2
 THEN
 RacePenaltyWeight ← 4
 ENDIF
 IF NumberOfPreviousWins > 2
 THEN
 RacePenaltyWeight ← 8
 ENDIF
 OUTPUT HorseName, RacePenaltyWeight

Mark as follows:

(OUTPUT) + INPUT x 2 (1 mark)
 Two/three conditions in evidence correctly formed (1 mark)
 (penalise Assignment used for equals)
 Condition for penalty weight = 0 + assignment = 0 (1 mark)
 Other conditions X 2 + Assignment of 4 and 8 (1 mark)
 Final output of horse name + penalty weight (1 mark)

[5]

2 (a) (i) 7

[1]

(ii) 2
 9

[2]

(b) (i)

Input value	Output			Comment
	Fifty Dollar	Twenty Dollar	Ten Dollar	
70	1	1	0	Least possible number of notes
85	(0	0	0)	Error message
130	2	1	1	Least possible number of notes
600	(0	0	0)	Error message

Penalise any number entries on the 85 and 600 rows

[3]

(ii) INPUT **Amount**

IF Amount > 500

THEN

OUTPUT "Refused - amount too large"

ELSE

IF (**Amount MOD 10**) <> 0 / >0

THEN

OUTPUT "Refused - not a multiple of \$10"

ELSE

FiftyDollar ← Amount DIV 50

Temp ← **Amount MOD 50 //**

(Amount - 50 * FiftyDollar)

TwentyDollar ← **Temp DIV 20 //**

(Amount MOD 50) DIV 20

Temp ← **Temp MOD 20**

TenDollar ← Temp DIV 10

ENDIF

ENDIF

[max 5]

3 (i)

A	Width	in any order
B	Length	
C	JobID	
D	CustomerName	in any order
E	JobCost	

[5]

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- (ii) PROCEDURE CalculateJobCost
 (BYREF JobCost : INTEGER/CURRENCY/REAL,
 BYVALUE Length : INTEGER,
 BYVALUE Width : INTEGER)

mark as follows:

- | | | |
|------------------------------------|-----------|-----|
| identifier + data type × 3 | (3 marks) | |
| jobcost (only) BYREF | (1 mark) | |
| length, width (only) BYVALUE/BYREF | (1 mark) | [5] |

- 4 (a) (i) ERROR [1]
- (ii) parityerrorcheck [1]
- (iii) Binary Coded Decimal // Binary ▼ Coded ▼ Decimal [2]

- (b) (i) OPENFILE "DISPENSERS" FOR WRITE (1 mark)
- REPEAT** (1 mark)
- ```

OUTPUT "Enter dispenser code (XXXXX to end)"
INPUT DispenserCode
IF DispenserCode <> "XXXXX"
 THEN
 OUTPUT "Enter bank code ..."
 INPUT BankCode
 LineString ← CONCAT(DispenserCode, "▼",BankCode)
 // now write the new line to the file
 WRITEFILE ("DISPENSERS"), LineString
ENDIF
UNTIL DispenserCode = "XXXXX"
CLOSE ("DISPENSERS") // CLOSEFILE
OUTPUT "DISPENSERS file now created"

```
- (1 mark)
- (1 mark)
- (1 mark)
- (1 mark)
- [6]

- (ii) • Bank code/ Dispenser code is digit characters only  
 • Bank code is exactly 3 digits // Dispenser code is exactly 5 digits  
 • Range check on Bank code between 1 and 999  
 // range check on dispenser code between 1 and 99999

Note: If no reference made to either Bank code or Dispenser code MAX 1 [max 2]

- (iii) data of the existing 15 dispensers will be lost/overwritten [1]
- (iv) Append // Illustrated with program code statement [1]

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(c) *Mark as follows:*

- Variables declared/commented (at least X2) (1 mark)
- Input of 'ThisBank' with prompt (1 mark)
  
- File open statement (1 mark)
- File mode is 'Input' (1 mark)
- File close
  
- Loop (Not a FOR loop) (1 mark)
- Until all records considered
  
- Isolate LineBankCode (1 mark)
- Isolate LineDispenserCode
  
- Count initialised (1 mark)
- Count incremented (1 mark)
  
- Output – List of dispenser codes (1 mark)
- Output – dispenser count (1 mark)

[max 10]

*Visual Basic ...*

```

Dim DispenserRecord As String
Dim DispenserCode As String : Dim Bank As String
Dim DispenserCount As Integer
Dim ThisBank As String
FileOpen(1, "C:\DISPENSERS.txt", OpenMode.Input)

Console.WriteLine()
Console.Write("Which bank ..(Three digit code)? ")
ThisBank = Console.ReadLine

DispenserCount = 0
Do
 DispenserRecord = LineInput(1)
 DispenserCode = Left(DispenserRecord, 5)
 Bank = Mid(DispenserRecord, 7, 3)

 If Bank = ThisBank Then
 DispenserCount = DispenserCount + 1
 Console.WriteLine(DispenserCode)
 End If
Loop Until EOF(1)
FileClose(1)

Console.WriteLine()
Console.WriteLine("There are " & DispenserCount & " dispensers
for this bank")

```

|               |                                                           |                 |              |
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*Python ...*

```
DispenserLine - String
DispenserCode - String
Bank - String
DispenserCount - Integer
ThisBank - String

MyFile = open("c:\DISPENSERS.txt", "r")

ThisBank = input("Which bank ..(Three digit code)? ")

DispenserCount = 0
while 1:
 DispenserLine = MyFile.readline()
 if not DispenserLine:
 break
 DispenserCode = DispenserLine[0:5]
 # slices chars 0,1,2,3,4
 Bank = DispenserLine[6:9] # slices chars 6,7,8

 if Bank == ThisBank:
 DispenserCount = DispenserCount + 1
 print(DispenserCode)

MyFile.close()
print
print("There are " + str(DispenserCount)
" dispensers for this bank")
```

*Pascal ...*

```
var DispenserRecord : String ;
var DispenserCode : String ;
var Bank : String ;
var DispenserCount : Integer ;
var ThisBank : String ;
var TheFile : Text ;

begin
assign(TheFile, 'K:\DISPENSERS.txt') ;
reset(TheFile) ;

WriteLn() ;
Write('Which bank ..(Three digit code)? ') ;
Readln(ThisBank) ;
C
DispenserCount := 0 ;
repeat
 readln(TheFile, DispenserRecord) ;
 DispenserCode := Copy(DispenserRecord,1, 5) ;
 Bank := copy(DispenserRecord, 7, 3) ;

 If Bank = ThisBank Then
 begin
 DispenserCount := DispenserCount + 1 ;
```

|               |                                                           |                 |              |
|---------------|-----------------------------------------------------------|-----------------|--------------|
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```

 Writeln(DispenserCode)
 end ;

 until EOF(TheFile) ;
 close(TheFile) ;

writeln() ;
writeln('Dispenser count: ', DispenserCount) ;

readln ;
end.

```

- 5 (a) (i)**
- Set of data items have a common name (1 mark)
  - Items are referenced using a subscript/index (1 mark)
  - Accept: all data items are of the same data type (1 mark) [max 2]
- (ii)** 24 [1]
- (iii)**
- The total number of amplifiers 'produced' by workers 1, 2 and 3/three workers (1 mark)
  - on day 2\_ (1 mark) [2]

(b)

| WorkerNum | DayNum | WorkerAverage | OUTPUT        | WorkerTotal |    |    |
|-----------|--------|---------------|---------------|-------------|----|----|
|           |        |               |               | 1           | 2  | 3  |
| 1         |        |               |               | 0           |    |    |
| 2         |        |               |               |             | 0  |    |
| 3         |        |               |               |             |    | 0  |
| 1         | 1      |               |               | 10          |    |    |
|           | 2      |               |               | 21          |    |    |
|           | 3      |               |               | 31          |    |    |
|           | 4      |               |               | 45          |    |    |
| 2         | 1      |               |               |             | 20 |    |
|           | 2      |               |               |             | 36 |    |
|           | 3      |               |               |             | 60 |    |
|           | 4      |               |               |             | 80 |    |
| 3         | 1      |               |               |             |    | 9  |
|           | 2      |               |               |             |    | 20 |
|           | 3      |               |               |             |    | 33 |
|           | 4      |               |               |             |    | 50 |
| 1         |        | 2.25          |               |             |    |    |
| 2         |        | 2             |               |             |    |    |
| 3         |        | 1.25          | INVESTIGATE 3 |             |    |    |

[8]



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- (c) (i) WorkerNum : INTEGER (1 mark)  
DayNum : INTEGER (1 mark)  
WorkerTotal : ARRAY OF INTEGER  
(1 mark) (1 mark)  
WorkerAverage : REAL (1 mark) [max 4]

- (ii) PROCEDURE AnalyseProductionData (NumDays : INTEGER, NumWorkers : INTEGER)

```

FOR WorkerNum ← 1 TO 3
 WorkerTotal [WorkerNum] ← 0
ENDFOR

FOR WorkerNum ← 1 TO 3
 FOR DayNum ← 1 TO 4
 WorkerTotal [WorkerNum] ← WorkerTotal [WorkerNum] +
 ProductionData [WorkerNum, DayNum]
 ENDFOR
ENDFOR

FOR WorkerNum ← 1 TO 3
 WorkerAverage = WorkerTotal [WorkerNum] / (4)*
 DailyHoursWorked [WorkerNum]
 IF WorkerAverage < 2
 THEN
 OUTPUT "Investigate" WorkerNum
 ENDIF
ENDFOR

ENDPROCEDURE

```

*Mark as follows:*

All '3's changed to NumWorkers

All '4's changed to NumDays

WorkerAverage '4' changed to NumDays [3]

- (iii) (CALL) AnalyseProductionData (7, 13) [1]