

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

**MARK SCHEME for the October/November 2015 series**

**9608 COMPUTER SCIENCE**

**9608/23**

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 (i) 40 [1]
- (ii) 314.2(0) [1]
- (iii) 16 // ERROR as identifier Z has not been declared [1]
- (iv) TRUE [1]
- 2 (i) (Single) software program [1]  
 Features for:  
 program editor/writing/editing  
 translation // interpreter/compiler  
 testing program code // observe outputs } 2 points to score [1]
- (ii) Syntax checking (on entry)  
 Structure blocks (e.g. IF structure and loops begin/end highlighted)  
 General prettyprint features  
 Automatic indentation  
 Highlights any undeclared variables  
 Highlights any unassigned variables  
 Commenting out/in of blocks of code  
 Visual collapsing / highlighting of blocks of code  
 Single stepping  
 Breakpoints  
 Variable/expressions report window [MAX 3]

3 (a)

Test Case	Inputs		Output	
	InA	InB	OutZ	
1	TRUE	TRUE	<b>FALSE</b>	[1]
2	TRUE	FALSE	<b>TRUE</b>	[1]
3	FALSE	TRUE	<b>TRUE</b>	[1]
4	FALSE	FALSE	<b>TRUE</b>	[1]

(b) IF InA = TRUE AND InB = TRUE  
 THEN  
     OutZ ← FALSE  
 ELSE  
     OutZ ← TRUE  
 ENDIF

*Mark as follows*

*Structure:* IF - THEN - ELSE - ENDIF [1]

*Condition:* InA = TRUE AND InB = TRUE [1]

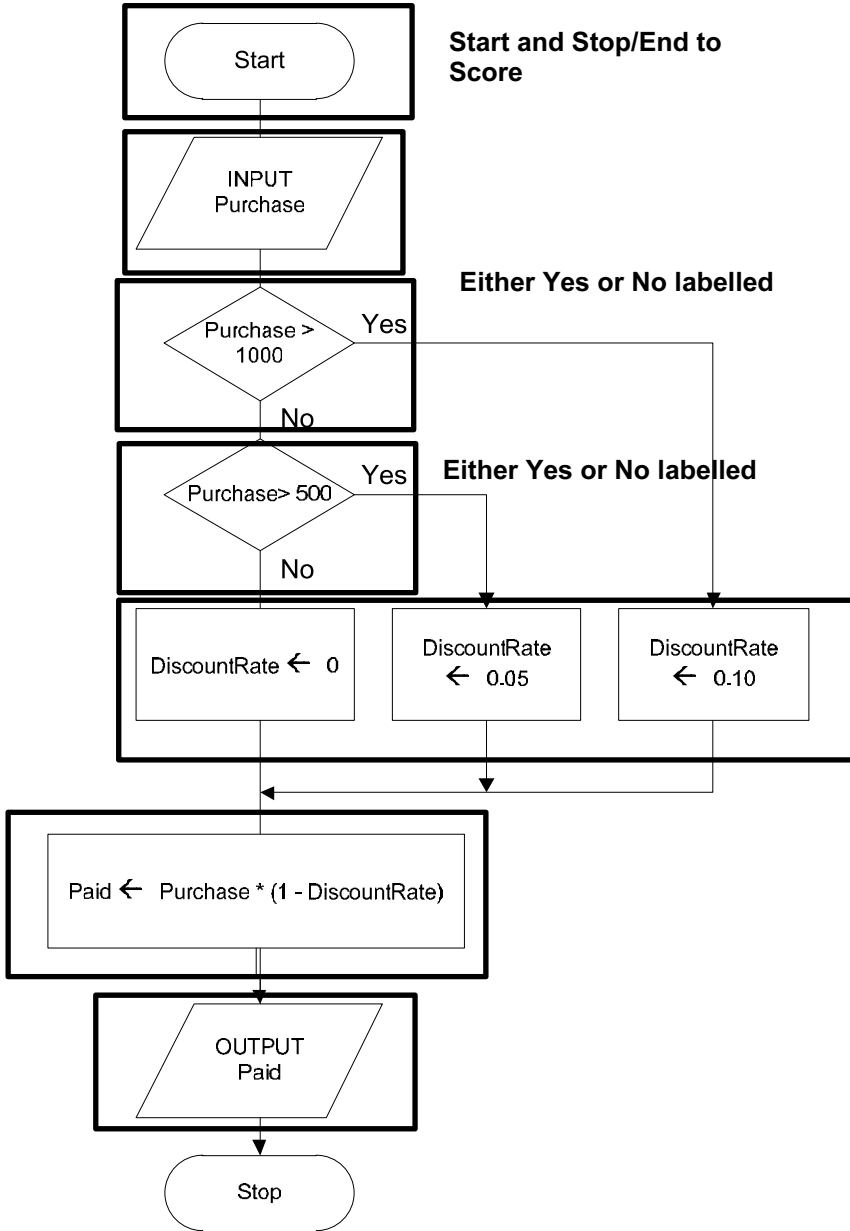
*Logic:*     OutZ ← FALSE (when condition true)}  
               OutZ ← TRUE (when condition false)} [1]

*Alternative answer (worth 3 marks):*

OutZ ← NOT(InA AND InB)

OutZ ← NOT InA OR NOT InB

4



Start and Stop/End to Score

[MAX 6]

[Total: 6]

Either Yes or No labelled

Either Yes or No labelled

[MAX 6]

5 (a)

Identifier	Data type	Description	
YearCount	INTEGER	Loop counter /// Age of the car	[1]
PurchasePrice	INTEGER	Purchase price of the car	[1]
CurrentValue	REAL // CURRENCY <b>Allow: SINGLE</b> <b>Refuse: DOUBLE</b>	The changing depreciated value	[1]

Must have correct identifier + Data type + Description to score

(b) OUTPUT "Enter Purchase price"  
INPUT PurchasePrice  
CurrentValue ← PurchasePrice [1]  
YearCount ← 1  
WHILE **YearCount** < 9 AND **CurrentValue** >= 1000 [2]  
    Note: Penalise: inclusion of \$  
    IF **YearCount** = 1 [1]  
        THEN  
            CurrentValue ← CurrentValue \* (1 - 40/100)  
        ELSE  
            CurrentValue ← **CurrentValue** \* 0.8 [1]  
        ENDIF  
    OUTPUT YearCount, CurrentValue  
    **YearCount** ← **YearCount** + 1 [1]  
ENDWHILE

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- 6 (a) Combination of staff and task number // the pair of numbers // the pair of random numbers [1]  
 //there will be duplicates /repeats//some staff tasks will not be generated [1]
- (b) (i) 04 // 03 [1]  
 (ii) 27 // 28 [1]  
 (iii) 20 [1]  
 (iv) 11 / 12 [1]
- (c) (i) Zero [1]  
 (ii) Completed <> 60 // NewStaffTask = FALSE [1]  
 Allow: Inclusion of the WHILE  
 (iii) Determines whether this combination of StaffNum and TaskNum has been completed [1]  
 Assigns value TRUE if not already generated [1]  
 Flags that this is the first time this staff + task has been selected/to exit the loop [1]  
 Outputs the new staff + task number [1]
- [MAX 3]
- (iv) TaskGrid : ARRAY[1:5, 1:12] OF BOOLEAN  
 1 mark | 1 mark [2]

(d) **Pseudocode ...**

(SELECT) CASE (OF) + ENDCASE using StaffNo  
 1 mark                      1 mark

(CASE) 1: StaffName ← "Sadiq"	1	
(CASE) 2: StaffName ← "Smith"		
(CASE) 3: StaffName ← "Ho"		
(CASE) 4: StaffName ← "Azmah"		
(CASE) 5: StaffName ← "Papadopolis"		
(all four cases ...)	1	

ENDCASE // ENDSELECT [4]

**Visual Basic**

```

Select Case StaffNo
  Case 1
    StaffName = "Sadiq"
  Case 2
    StaffName = "Smith"
  Case 3
    StaffName = "Ho"
  Case 4
    StaffName = "Azmah"
  Case 5
    StaffName = "Papadopolis"
End Select

```

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- 7 (a) (i) CAT [1]  
Ignore any opening + closing quotes
- (ii) 13 [1]
- (iii) 83 [1]
- (iv) 15 [1]

- (b) *Input of string ...*
- Correct syntax (for both prompt and assignment) }  
Uses MyString identifier } [1]
- StringTotal set to 0 [1]
- FOR loop:*
- FOR - NEXT keywords // (Python) correct indentation [1]  
Correct start and /end boundaries [1]  
Note: the end boundary must use the language length  
function/method // alternative Python syntax
- Isolate single character number [1]
- Followed by the use of Asc (VB) // Ord ( Python) }  
Assigned to NextNum } [1]
- Added to StringTotal [1]
- Correct syntax for the output of the string and number [1]

[MAX 6]

*Python ...*

```
MyString = input('key in string')

StringTotal = 0
for i in range (0, len(MyString)):
    NextNum = ord(MyString[i])
    StringTotal = StringTotal + NextNum

print(MyString, StringTotal)
```

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*Visual Basic...*

```

Dim MyString As String
Dim StringTotal As Integer
Dim i As Integer
Dim NextNum As Integer

Console.Write("key in string")
MyString = Console.ReadLine
StringTotal = 0
For i = 1 To Len(MyString) // MyString.Length
    NextNum = Asc(Mid(MyString, i, 1))
    StringTotal = StringTotal + NextNum
Next

Console.WriteLine(MyString & " " & Str(StringTotal))

```

*Pascal ...*

```

VAR MyString      : String ;
VAR StringTotal  : Integer ;
VAR i            : Integer ;
VAR NextNum      : Integer ;
VAR SingleChar   : Char;

begin
    Writeln('key in string');
    readln(MyString) ;
    StringTotal := 0 ;

    For i := 1 To Length(MyString) do
        begin
            SingleChar := MyString[i] ;
            NextNum := Ord(SingleChar) ;
            StringTotal := StringTotal + NextNum ;
        end ;

    Writeln(MyString, StringTotal) ;

    ReadLn() ;
End.

```

- (c) Used to provide an integrity/verification check [1]  
Used as a checksum [1]  
The total can be recalculated by the receiving software [1]  
If any of the characters have been incorrectly transmitted the recalculated total and transmitted total will not match [1]  
[**MAX 2**]



8 (a) r [1]  
Ignore inclusion of any quotes

(b) (i) 2 [1]  
Ignore inclusion of any quotes for part (i), (ii) and (iii)

(ii) + [1]

(iii) 7 [1]

(c) (i)

N1	N2	N3	N4	BottomAnswer	Op	TopAnswer	OUTPUT
2	5	3	8	40	-	1	1/40

[2]

(ii)

N1	N2	N3	N4	BottomAnswer	Op	TopAnswer	OUTPUT
3	4	1	4	16	+	16	1

[2]

(iii)

N1	N2	N3	N4	BottomAnswer	Op	TopAnswer	OUTPUT
7	9	2	3	27	+	39	
						12	
							1 12/27

[3]

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- (d) (i) Adaptive (maintenance) [1]
- (ii) Allow more than two fractions to be added [1]  
 Numerator/denominator more than 1 digit [1]  
 Multiply and division also possible [1]  
 Allow brackets [1]  
 Give answer as decimal number [1]  
 Lowest possible denominator [1]  
 Trap any fraction which has a zero numerator [1]  
 Allow the input of vulgar fraction(s) [1]

[MAX 3]