

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

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

### **9608 COMPUTER SCIENCE**

**9608/21**

Paper 2 (Written Paper), maximum raw mark 75

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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]

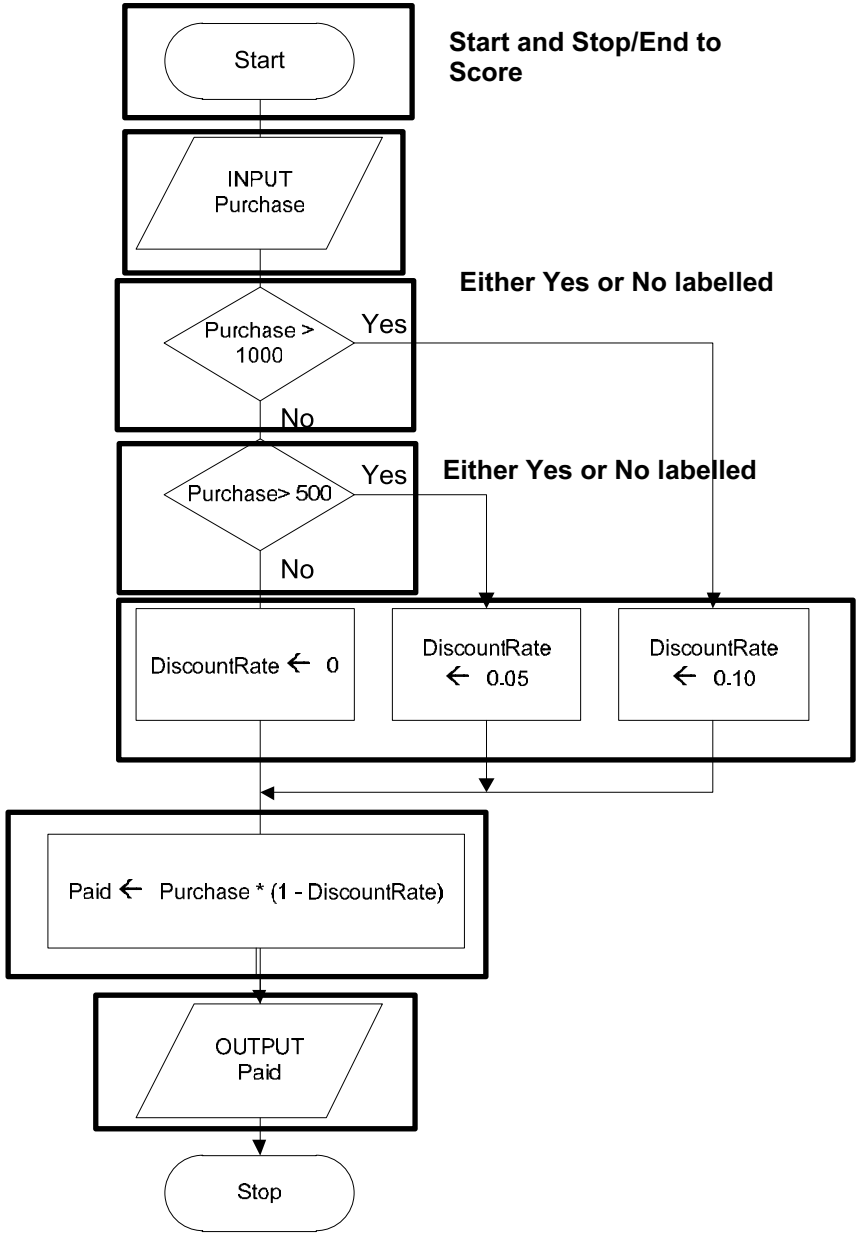
*Logic:*     OutZ ← FALSE (when condition true)}  
               OutZ ← TRUE (when condition false)} [1]

*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.WriteLine("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]