CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the October/November 2015 series

9608 COMPUTER SCIENCE

9608/22 Paper 2 (Written Paper), maximum raw mark 75

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

   (ii) 7.5 [1]
      Accept: 7 ½

  (iii) FALSE [1]

  (iv) TRUE [1]

  (v) ERROR [1]

2 **(a)**

	Inputs		Output
Test Case	P	Q	X
1	1	1	**1**	[1]
2	1	0	**0**	[1]
3	0	1	**0**	[1]
4	0	0	**0**	[1]

  (b)

```
IF P = 1 AND Q = 1                      IF P = 0 OR Q = 0
   THEN                                    THEN
      X ← 1                                   X ← 0
   ELSE                                    ELSE
      X ← 0                                   X ← 1
ENDIF                                   ENDIF
```

Mark as follows:
Structure: IF – THEN – ELSE – ENDIF [1]

Condition: P = 1 AND Q = 1 [1]
Allow &/&& for the operator

Logic: X ← 1 (for TRUE) ⎫
              X ← 0 (for FALSE) ⎬ [1]

Check carefully for:
- other alternative correct algorithm
- a 'mirror copy' of the question paper algorithm – score 0

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3

```
            ┌─────────────────────┐
            │       START         │
            └─────────────────────┘
                      │
         ┌─────────────────────────┐
         │    INPUT                 │
         │    Amount(Due)           │
         │                          │
         │   ┌──────────────────┐   │
         │   │    CALL           │   │
         │   │ CalculatePoints(AmountDue) │
         │   └──────────────────┘   │
         │                          │
         │   PointsTotal =          │
         │   PointsTotal + NewPoints │
         └─────────────────────────┘
                      │
         ┌─────────────────────────┐
         │      PointsTotal         │
         │       > 500              │
         │        YES               │
         └─────────────────────────┘
                      │
         ┌─────────────────────────┐
         │    OUTPUT                │
         │  "Exchange points?"      │
         │                          │
         │    INPUT                 │
         │    Response              │
         └─────────────────────────┘
                      │
         ┌─────────────────────────┐
         │   Response = "YES"?      │
         │        YES               │
         │  PointsTotal =           │
         │  PointsTotal  - 500      │
         │                          │
         │  AmountDue = AmountDue - 1 │
         └─────────────────────────┘
                      │
         ┌─────────────────────────┐
         │    OUTPUT                │
         │ AmountsDue, PointsTotal  │
         └─────────────────────────┘
                      │
            ┌─────────────────────┐
            │       STOP          │
            └─────────────────────┘
```

START and STOP/END
to score

   A. CALCULATE
      points total

In general – accept
descriptive assignment
statements

Condition + at least one
label to score

   A. True/Tick

Allow yes/Yes/missing
quotes

[Max 6]

4 (a) The <u>combination</u> of suit and card number // the 'pair ' of numbers // the <u>pair</u> of random numbers ….   [1]
There will be duplicates/repeats//not all cards will be drawn   [1]

(b) (i) 32 // 33   [1]

   (ii) 27 // 28   [1]

   (iii) 08   [1]

   (iv) 12 // 13   [1]

(c) 1   [1]

(d) `DealCount <> 52 // NewCard = FALSE`
Allow: Inclusion of the WHILE   [1]

(e) Test has the card has already been drawn?   [1]
Set value TRUE for this card entry (in the array)/this card   [1]
Flags that this is the first time this card has been drawn // decides if another card
must be generated   [1]
Outputs the <u>new</u> card value   [1]

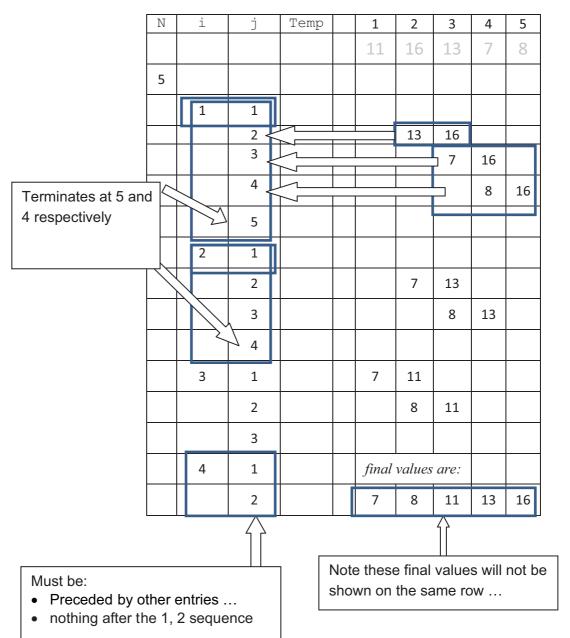   [Max 2]

(f) `CardPack ARRAY[1:4 , 1:13] OF/:/AS BOOLEAN`   [1]
Allow: parentheses

(g) *Pseudocode …*
(SELECT) CASE (OF) CardValue   + ENDCASE   [1]
      (CASE) 1:   CardName ← "Ace"   1 mark for any one correct   [1]
      (CASE) 11:   CardName ← "Jack"
      (CASE) 12:   CardName ← "Queen"
      (CASE) 13:   CardName ← "King"   (final three cases …)   [1]
      OTHERWISE (/ELSE) CardName ← CardValue   //
      (CASE) 2 TO 10: CardName ← CardValue)   [1]
ENDCASE // ENDSELECT

Note: Must be double quotes present and correct case

Visual Basic

```
Select Case CardValue
   Case 1
      CardName = "Ace"
   Case 11
      CardName = "Jack"
   Case 12
      CardName = "Queen"
   Case 13
      CardName = "King"
   Case Else // Case 2 to 10
      CardName = Str(CardValue) [4]
End Select
```
Allow: omission of Str

5 (a) (i)

N	i	j	Temp		1	2	3	4	5
					11	16	13	7	8
5									
	1	1							
		2			13	16			
		3				7	16		
		4					8	16	
		5							
	2	1							
		2				7	13		
		3					8	13	
		4							
	3	1			7	11			
		2				8	11		
		3							
	4	1			*final values are:*				
		2			7	8	11	13	16

Terminates at 5 and 4 respectively

Must be:
- Preceded by other entries …
- nothing after the 1, 2 sequence

Note these final values will not be shown on the same row …

[8]

(ii) To sort / to order/put in ascending order the items (in the array) [1]

(iii) There were no swaps on the last pass / on pass 4 [1]

(b)

Identifier	Data Type	Description
Num		
N	INTEGER	The number of numbers in the list
i	INTEGER	Loop counter // The number of 'passes' up through the list
j	INTEGER	The <u>index</u> // position in the array
Temp	INTEGER	Description must imply/states the 'swapping' operation

Mark as follows:
INTEGER × 4 [1]
One mark per description [4]

6 (a) (i) 12 [1]

    (ii) 'L' [1]
       Note: quotes are optional – must be upper case L

(b) (i)

Identifier	Data Type	Description	
InputString	STRING	The string value input by the user	
i	INTEGER	<u>Loop</u> counter // (index) position of an individual character	[1]
j	INTEGER	Number of characters in / length of InputString	[1]
NextChar	CHAR//CHARACTER	(Single) character within InputString / from string input by the user	[1]
NewString	STRING	The string formed/made/created//output Allow: if "by the user" added	[1]

Note: Correct (identifier + the data type + description) needed to score

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(ii)
```
// main program
INPUT MyString
ChangedString ← RemoveSpaces(MyString)     ①
OUTPUT ChangedString

                              ①
// function definition
FUNCTION RemoveS....s(InputString : STRING)
RETURNS STRING           ①             }  ①
    DECLARE i            :/AS INTEGER
    DECLARE j            :/AS INTEGER
    DECLARE  NextChar    :/AS CHAR      }  ①
    DECLARE  NewString   :/AS STRING

    NewString = ""  ①

    j  ← CharacterCount(InputString)
    FOR i  ← 1 TO j
        NextChar ← OneChar(InputString, i)
        IF NextChar <> " "
            THEN
            // the & character joins together two strings
            NewString  ← NewString & NextChar
        ENDIF
    ENDFOR
           ①             ①   only awarded if follows
                                 the previous mark

RETURN           NewString //
RemoveSpaces ← NewString
ENDFUNCTION
```

[Max 7]

7 (a) (i) 165 [1]

(ii) "YES" Quotes optional [1]

(iii) 9 [1]

(iv) 83 [1]

(b) (i) Use of correct identifiers only to score

Declaration/Commenting of variables

```
MyMessage As String
EncryptString As String
i As Integer
NextNum As Integer
```
<u>At least two</u> `variables` **correctly documented**   [1]

Input of string …
    Correct syntax (for both prompt and assignment) and …
    Uses the `MyMessage` **identifier**   [1]

`EncryptString` **set to 'empty string'**   [1]
    Note: Must suggest 'empty' string

For loop …
    `FOR – NEXT` **keywords** // (Python) correct indentation   [1]
    Correct start/end boundaries   [1]
        Note: the end boundary must use the language length
            function/method //alternative Python syntax

    Isolate single character   [1]
    Use of language functions to calculate new number and ….
    Assigned to `NextNum`   [1]

    Conversion of `NextNum` to a character and concatenated
    to `EncryptString`   [1]

    Correct syntax for output of `EncryptString`   [1]

                                [MAX 8]

SAMPLE CODE

PYTHON
```
MyMessage = input("Enter message : ")
EncryptString = ""
for i in range(0, len(MyMessage)) :
    NextNum = ord(MyMessage[i]) + 3
    EncryptString = EncryptString + chr(NextNum)
print(EncryptString)
```

Alternative solution:
```
MyMessage = input("Enter message : ")
EncryptString = ""
for NextChar in MyMessage :
    NextNum = ord(NextChar) + 3
    EncryptString = EncryptString + chr(NextNum)
print(EncryptString)
```

VB

```
Dim MyMessage, EncryptString As String
Dim NextNum, i As Integer
Console.Write("Enter message : ")          Alternatives:
MyMessage = Console.ReadLine()             GetChar(MyMessage, i)
EncryptString = ""                         MyMessage.Substring(i, 1)
For i = 1 To Len(MyMessage)
    NextNum = Asc(Mid(MyMessage, i, 1)) + 3
    EncryptString = EncryptString +//& Chr(NextNum)
Next
Console.WriteLine(EncryptString)
```

Allow: Use of InputBox and MsgBox

Alternative solution :
```
Dim MyMessage, EncryptString As String
Dim NextNum, i As Integer
Console.Write("Enter message : ")
MyMessage = Console.ReadLine()
EncryptString = ""
For i = 0 To Len(MyMessage) - 1
    NextNum = Asc(MyMessage.Chars(i)) + 3
    EncryptString = EncryptString + Chr(NextNum)
Next
Console.WriteLine(EncryptString)
```

PASCAL
```
var
    MyMessage, EncryptString : string;
    NextNum, i : integer;
begin
    write('Enter message : ');
    readln(MyMessage);
    EncryptString := '';
    for i := 1 to length(MyMessage) do
    begin
        NextNum := ord(MyMessage[i]) + 3;
        EncryptString := EncryptString + chr(NextNum);
    end;
    writeln(EncryptString);
end.
```

(ii) For each/every character …. [1]

A replacement character is 'calculated' from its <u>ASCII</u> value // or by example … [1]