

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

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MARK SCHEME for the October/November 2014 series

9691 COMPUTING

9691/21

Paper 2 (Written Paper), maximum raw mark 75

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1 (a) DIM Tally[1 : 4] OF INTEGER

1 mark for size

1 mark for data type (must be integer)

(b) (i) PROCEDURE InitialiseArrayCounts

DECLARE i : INTEGER

FOR i ← 1 TO 4

 Tally[i] ← 0

ENDFOR

ENDPROCEDURE

1 mark for declaration/local variable

1 mark for loop 1 to 4

1 mark for array element set to 0

PROCEDURE InputStudentChoices

REPEAT

INPUT Choice

 Tally[Choice] ← Tally[Choice] + 1

UNTIL Choice = 0

ENDPROCEDURE

1 mark for replacing CASE statement with single array element assignment

[4]

(ii) Football

Accept f.t. from (b)(i) (if array elements not numbered 1 to 4)

[1]

(c) PROCEDURE OutputTallyChart

 OUTPUT "1 Cricket "

 OutputTally(Tally[1])

 OUTPUT "2 Football "

 OutputTally(Tally[2])

 OUTPUT "3 Tennis "

 OutputTally(Tally[3])

 OUTPUT "4 Swimming "

 OutputTally(Tally[4])

ENDPROCEDURE

2 marks for all 4 array elements correct. 1 mark for 3 correct.

PROCEDURE OutputTally(SportCount : INTEGER)

IF SportCount > 0 // 1 mark

THEN

FOR i ← 1 TO SportCount // 1 mark

 OUTPUT ` `

ENDFOR // 1 mark

ENDIF

OUTPUT NEWLINE // 1 mark

ENDPROCEDURE

[6]

(d)

Type of test data	Example test data	Justification
Normal	e.g. 1 or greater	Check correct number of bars output
Boundary	0	0 is smallest possible value And no bars should be output
Extreme	e.g. 2000	How is the procedure going to deal with a large number, more than bars fit on a line

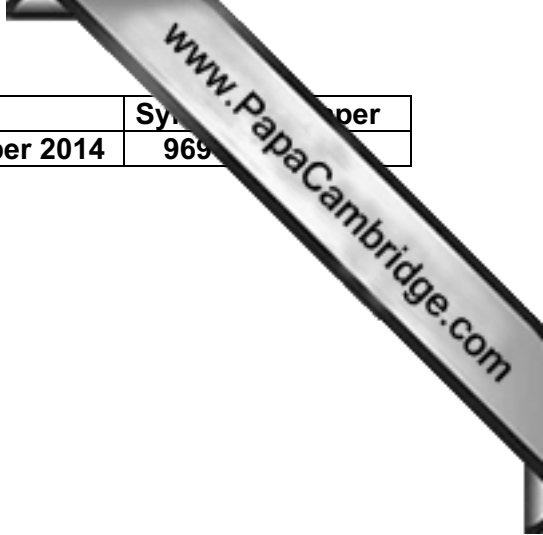
1 mark for each cell

[9]

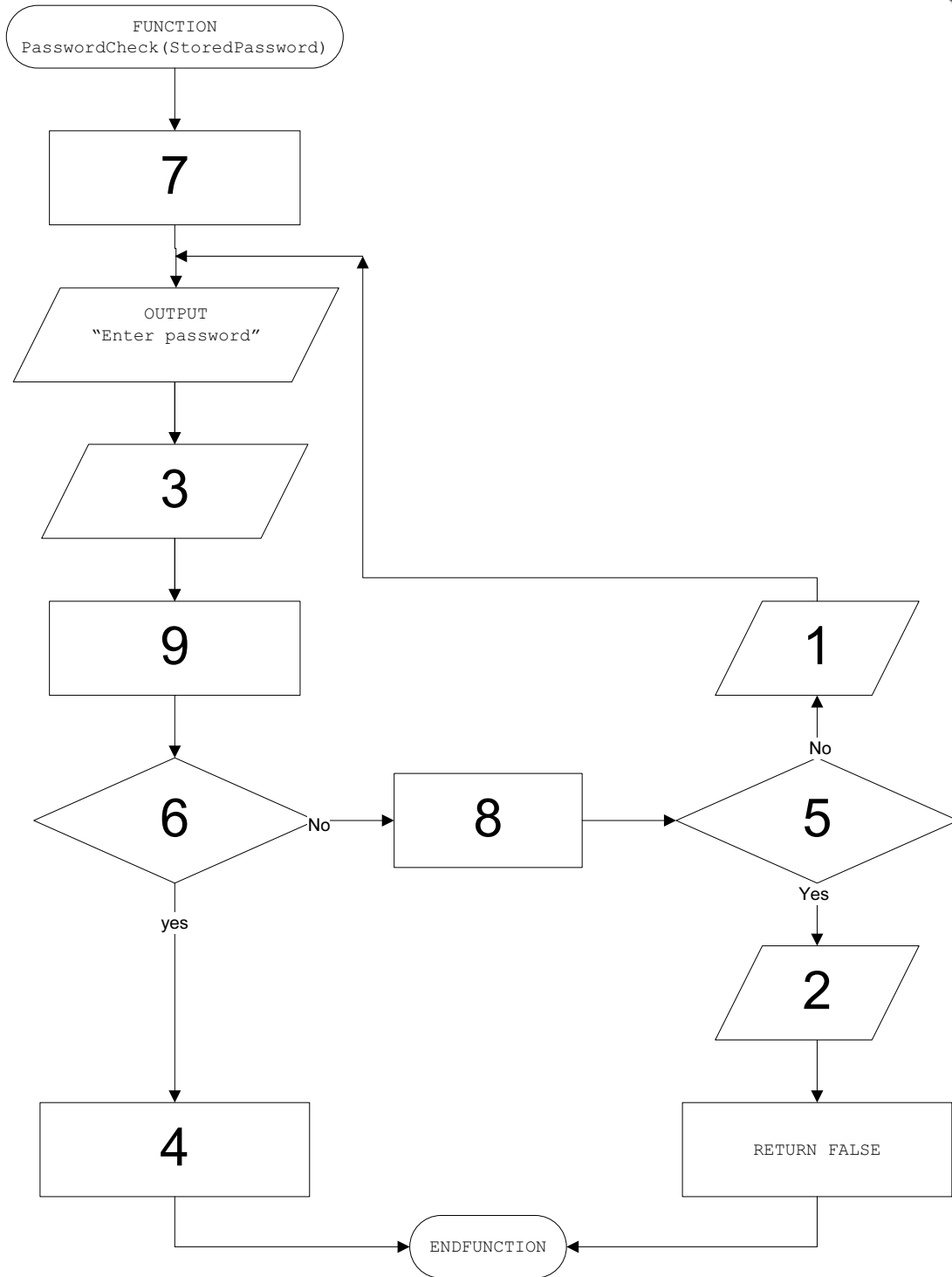
- (e) (i) – indentation
– meaningful identifiers
– initialising variables
– annotation
– parameters
– capitalisation of keywords
– modular structure
- (ii) – declaring variables/constants
– local variables

[3]

[1]



2 (a)



[9]

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(b) FUNCTION FindPassword(ThisUserID : STRING) RETURNS STRING
// 1 mark

```

DECLARE Found : BOOLEAN
OPENFILE FOR INPUT
Found ← FALSE
WHILE NOT EOF AND Found = FALSE // 2 marks
    FILEREAD next record
    IF UserID = ThisUserID // 1 mark
        THEN
            Found ← TRUE // 1 mark
        ENDIF
    ENDWHILE
IF Found = TRUE // 1 mark
    THEN
        RETURN EncryptedPassword // 1 mark
    ELSE
        RETURN Error code // 1 mark
    ENDIF
CLOSEFILE
ENDFUNCTION

```

[8]

Alternative part:

```

IF Found = False // 1 mark
    THEN
        RETURN Error code // 1 mark
    ELSE
        RETURN EncryptedPassword // 1 mark
    ENDIF

```

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- 3 (a) (i) Mark as follows:
1 mark for a heading
1 mark for input boxes with units
1 mark for text output box with description
1 mark for button "calculate" or similar
Accept console mode design [4]
- (ii) 1 mark for explanation that fits design of (a)(i). [1]
- (b) (RoomWidth >=100) AND (RoomWidth < 1000)
1 mark for each bracketed part
1 mark for AND [3]
- (c) (i) 3 [1]
- (ii) RoomWidth MOD 30 > 0 // RoomWidth MOD 30 != 0 [1]
- (iii) e.g. Pascal
- ```
TilesForWidth := RoomWidth DIV 30;
IF RoomWidth MOD 30 > 0
 THEN TilesForWidth := TilesForWidth + 1;
TilesForLength := RoomLength DIV 30;
IF RoomLength MOD 30 > 0
 THEN TilesForLength := TilesForLength + 1;
TilesRequired := TilesForWidth * TilesForLength * 1.1; // +10%
```
- 1 mark for calculating tiles for length  
1 mark for calculating tiles for width  
1 mark for rounding up when needed  
1 mark for multiplying TilesForWidth and TilesForLength  
1 mark for adding 10% of total tiles required [5]

|        |                                                            |          |
|--------|------------------------------------------------------------|----------|
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4 (a) (i) for example: 0 & -1 // TRUE & FALSE // 'O' & 'X'

(ii) e.g. Pascal

```
VAR FloorDesign: ARRAY[1..35, 1..35] OF CHAR; // 2 marks
(1 mark for correct dimensions, 1 mark for data type to match assignment below)
FOR i := 1 TO 35 DO // 1 mark
 FOR j := 1 TO 35 DO // 1 mark
 FloorDesign[i,j] := 'O'; // 1 mark
```

[5]

(b) NumberOfWhiteTiles  $\leftarrow$  0

NumberOfColourTiles  $\leftarrow$  0

FOR a  $\leftarrow$  1 TO 15

FOR b  $\leftarrow$  1 TO 10

IF FloorDesign[a,b] = 'X'

THEN

NumberOfColourTiles  $\leftarrow$  NumberOfColourTiles + 1

ELSE

NumberOfWhiteTiles  $\leftarrow$  NumberOfWhiteTiles + 1

ENDIF

ENDFOR

ENDFOR

Mark as follows:

*1 mark for initialisation*

*1 mark for loops with correct ranges*

*1 mark for correct nesting*

*1 mark for testing array element*

*1 mark for updating count of coloured tiles*

*1 mark for calculating number of white tiles (counting or subtracting)*

[6]

5 (a)

| a  | x   | $a \geq x$ |
|----|-----|------------|
| 13 |     |            |
|    | 8   |            |
|    |     | TRUE       |
| 5  |     |            |
|    | 4   |            |
|    |     | TRUE       |
| 1  |     |            |
|    | 2   |            |
|    |     | FALSE      |
|    | 1   |            |
|    |     | TRUE       |
| 0  |     |            |
|    | 0.5 |            |

Output: 1 1 0 1

1 mark for each correct column

1 mark for correct output, in this order.

[4]

(b) converts denary number to binary // converts 13 to binary

[1]