CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the October/November 2014 series

9691 COMPUTING

9691/23 Paper 2 (Written Paper), maximum raw mark 75

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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CAMBRIDGE
International Examinations

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

1 mark for size
1 mark for data type (must be integer) **[2]**

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

(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

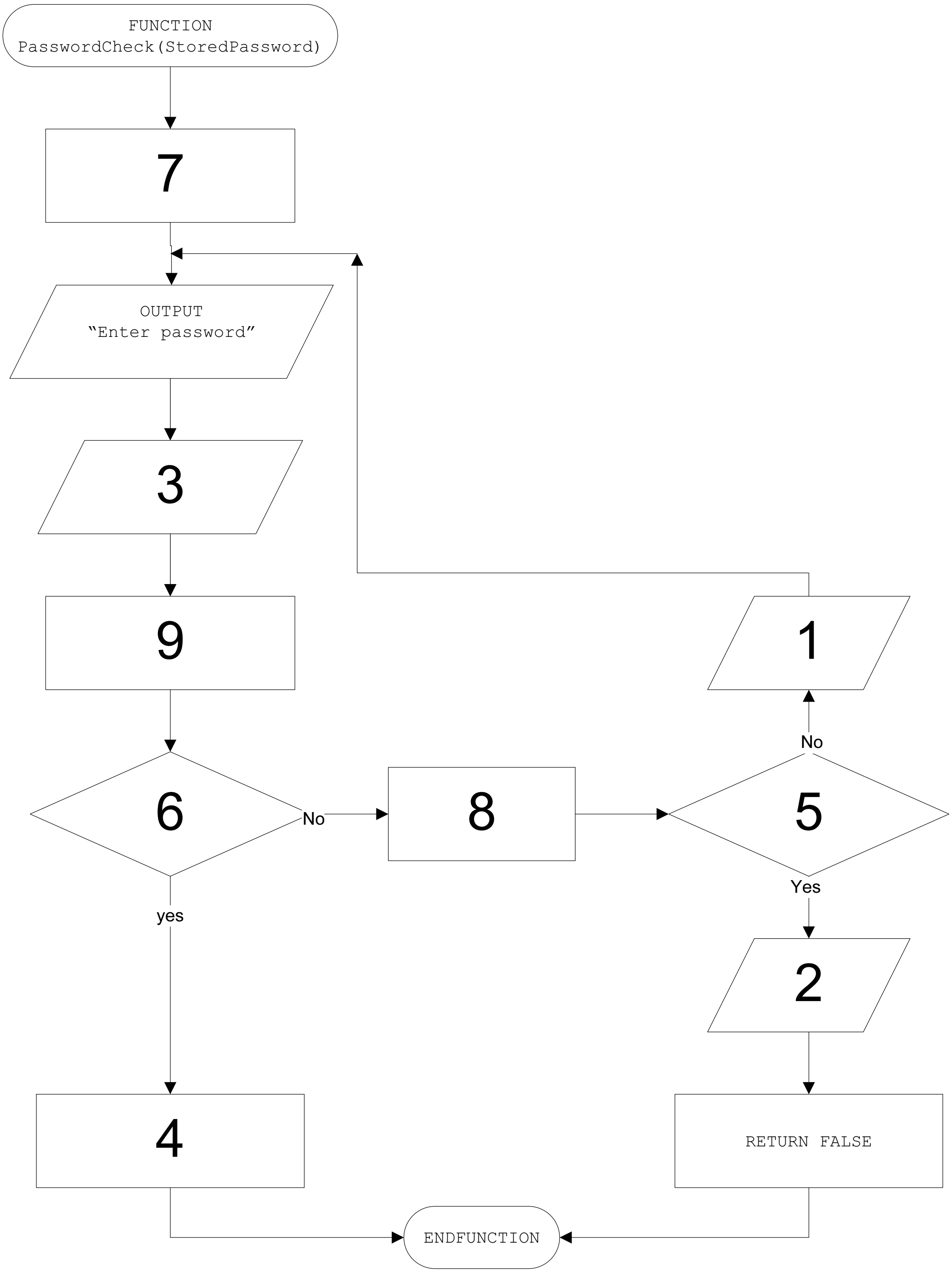
1 mark for each cell

[9]

(e) (i) – indentation
– meaningful identifiers
– initialising variables
– annotation
– parameters
– capitalisation of keywords
– modular structure **[3]**

(ii) – declaring variables/constants
– local variables **[1]**

2 (a)



FUNCTION
PasswordCheck(StoredPassword)
7
OUTPUT
"Enter password"
3
9
1
No
6
No
8
5
yes
Yes
2
4
RETURN FALSE
ENDFUNCTION

[9]

(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
```

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]**

4 (a) (i) for example: 0 & -1 // TRUE & FALSE // `'O'` & `'X'` **[1]**

(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 ← 0
NumberOfColourTiles ← 0
FOR a ← 1 TO 15
   FOR b ← 1 TO 10
      IF FloorDesign[a,b] = 'X'
         THEN
            NumberOfColourTiles ← NumberOfColourTiles + 1
         ELSE
            NumberOfWhiteTiles ← 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 >= 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]