

## **MARK SCHEME for the May/June 2013 series**

### **9691 COMPUTING**

**9691/21**

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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Page 2	Mark Scheme	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2013	9691	21

- 1 (a) –easier to follow logic of problem  
–can focus on one part at a time  
–produces reusable code  
–easier to maintain  
–can debug a small section at a time [Max 2]

- (b) (i) –courseworkID/other comparable  
–integer/other sensible [2]

**(ii) PASCAL**

```

TYPE Assignment = RECORD
    CourseworkID : String[6];
    Subject : String[10];
    Title : String[10];
    DateSet : TDateTime;
    HandInDate : TDateTime;
    IsMarked : Boolean;
    DateReturned : TDateTime;
    Mark : Integer;
END;
```

**VB.NET / VB2005**

```

STRUCTURE Assignment
    DIM CourseworkID AS String
    DIM Subject AS String
    DIM Title AS String
    DIM DateSet AS Date
    DIM HandInDate AS Date
    DIM IsMarked AS Boolean
    DIM DateReturned AS Date
    DIM Mark AS Integer
END STRUCTURE
```

**VB6**

```

Type Assignment
    CourseworkID AS String * 6
    Subject AS String * 10
    Title AS String * 10
    DateSet AS Date
    HandInDate AS Date
    IsMarked AS Boolean
    DateReturned AS Date
    Mark AS Integer
End Type
```

Note: string lengths optional

Page 3	Mark Scheme	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2013	9691	21

## PYTHON

```
class Assignment :
    CourseworkID = ""
    Subject = ""
    Title = ""
    DateSet = datetime.date(1,1,1)
    HandInDate = datetime.date(1,1,1)
    IsMarked = False
    DateReturned = datetime.date(1,1,1)
    Mark = 0
```

### Marking guidelines:

1 mark for correct record header

1 mark for correct definition terminator

1 mark for all 3 dates declared correctly

- DateSet
- HandInDate
- DateReturned

1 mark for the following fields defined correctly for language

- Subject
- Title
- IsMarked
- Mark

[4]

(iii) 1

[1]

- (c) –uses/detect a marker written to the file ...  
 –... immediately after the last record  
 –when processing a variable length file  
 –records can be processed until the marker is reached  
 –returns a Boolean value

[Max 2]

- (d) Found ← FALSE  
 WHILE NOT EOF(MyAssignments) AND NOT FOUND DO  
   Read next Record  
   IF Assignment.Subject = "Physics"  
     THEN  
       Found ← TRUE  
     ENDIF  
 ENDWHILE;

### Marking guidelines:

–set record found to false

–while NOT EOF and record found is false

–read next record

–check subject field to see if it is the wanted one

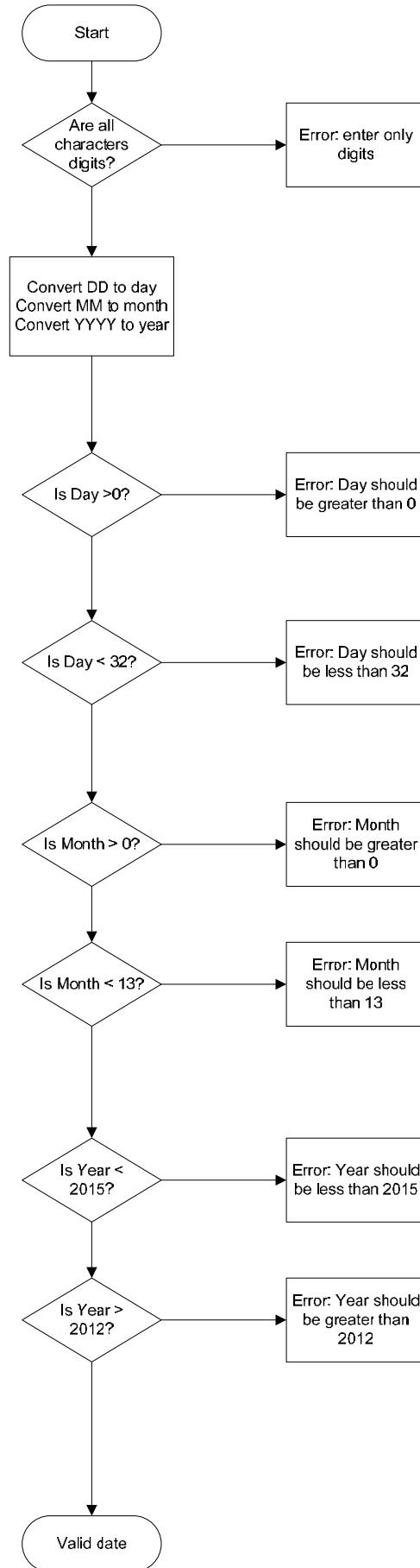
–if it is, set record found to true

[Max 4]

- 2 (a) (IsMarked = 'Y') OR (IsMarked = 'N')  
 1 mark for OR  
 1 mark for the expressions (accept without brackets)

[2]

(b)



Page 5	Mark Scheme	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2013	9691	21

*Marking guidelines:*

- 1 mark for checking that all characters are digits
- 1 mark for checking string length
- 1 mark for process of extracting substrings DD, MM, YYYY
- 1 mark for checking DD (1-31)
- 1 mark for checking MM (1-12)
- 1 mark for checking YYYY (2013-2014)
- 1 mark for “invalid date”
- 1 mark for “valid date”

[Max 5]

- (c) (i) 31122014 – borderline [1]  
16062013 – normal

- (ii) –you cannot tell which of the three components in invalid [1]

(iii) *Marking guidelines:*

- 1 mark for one with invalid DD only
- 1 mark for one with invalid MM only
- 1 mark for one with invalid YYYY only

[3]

- (d) (HandInDate > DateSet) AND (HandInDate > CurrentDate)

1 mark for AND

1 mark for correct expressions (accept without brackets)

[2]

- (e) Valid ← FALSE  
IF DateReturned >HandInDate  
THEN  
IF DateReturned <= CurrentDate  
THEN  
IF (Mark >= 0) AND (Mark <= 100)  
THEN Valid ← TRUE  
ENDIF  
ENDIF  
ENDIF

*Marking guidelines:*

- 1 mark for nested IFs or ELSEIFs
- 1 mark for correct number of ENDIF(s)
- 1 mark for DateReturned>HandInDate  
and DateReturned<=CurrentDate
- 1 mark for process mark checked
- 1 mark for “valid” and “invalid” correctly reported or assigned

[Max 4]

<b>Page 6</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>GCE AS/A LEVEL – May/June 2013</b>	<b>9691</b>	<b>21</b>

(f) (i)

Count	Mark	Mark<40	Output
<b>0</b>			
	<b>28</b>		
		<b>True</b>	
<b>1</b>			
	<b>55</b>		
		<b>False</b>	
	<b>70</b>		
		<b>False</b>	
	<b>12</b>		
		<b>True</b>	
<b>2</b>			
			<b>2</b>

*1 mark for each column*

[4]

(ii) –gives the number of assignments with a mark less than 40/failed

[1]

(iii) –indentation

–sensible variable names

–keywords in capitals

[2]

(iv) –comments/annotation

[1]

(v) –any pseudocode example with a useful comment

[1]

(vi) **Count** ← 0

**WHILE NOT EOF()**

**FILEREAD next assignment record**

**IF Mark < 40**

**THEN**

**COUNT ← Count + 1**

**ENDIF**

**ENDWHILE**

*1 mark for initialising count & FILEREAD & IF statement correctly copied (bold code above)*

*1 mark for WHILE NOT EOF() in correct place*

*1 mark for ENDWHILE in correct place*

[3]

(vii) –no

–don't know length of file/how many records

[2]

Page 7	Mark Scheme	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2013	9691	21

- 3 (a) –at the beginning/before any modules [1]
- (b) –difficult to find where variable value was changed  
–makes re-use of modules more difficult  
–two threads running simultaneously could try to modify the value [Max 1]
- (c) –within the module/subroutine/block in which it is declared [1]
- (d) a suitable number, e.g. –1 (not any value between 0 and 100 inclusive)  
reason: this mark is a dummy/rogue value [1]

(e) **PASCAL**

```
VAR Marks : ARRAY[1..30] OF INTEGER;
    i : INTEGER;
```

```
FOR i := 1 to 30 DO
BEGIN
    Marks[i] := -1;
END;
```

**VB.NET / VB2005**

```
Dim Marks(30) AS Integer
DIM i AS Integer
```

```
For i = 1 to 30
    Marks(i) = -1
NEXT i
```

**VB6**

```
DIM Marks(30) AS INTEGER
DIM i AS Integer
```

```
FOR i = 1 TO 30
    Marks(i) = -1
NEXT i
```

**PYTHON**

```
Marks = []
```

```
for i in range(0, 30) :
    Marks.append(-1)
```

*Marking guidelines:*

*1 mark for correct array declaration*

*1 mark for correct FOR loop*

*1 mark for assigning the value given in (d) to each element*

*1 mark for LOOPEND / declaration end*

[4]

<b>Page 8</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>GCE AS/A LEVEL – May/June 2013</b>	<b>9691</b>	<b>21</b>

**(f) PASCAL**

```

VAR Marks : ARRAY[1..30] OF INTEGER;
    AvMark : REAL;
    Count, Total, i : INTEGER;

BEGIN
    . . . . .
    Total := 0;
    Count := 0;
    FOR i := 1 to 30 DO
    BEGIN
        IF Marks[i] > -1 THEN
        BEGIN
            Count := Count + 1;
            Total := Total + Marks[i];
        END;
    END;
    AvMark := Total/Count;
END.

```

**VB.NET / VB2005**

```

Dim Marks(30) AS Integer
. . . . .
Dim Count AS Integer
Dim Total AS Integer
Dim i AS Integer
Dim AvMark AS Double

Total = 0
Count = 0
For i = 1 To 30 Then
    If Marks(i) > -1
        Count = Count + 1
        Total = Total + Marks(i)
    End IF
Next i
AvMark = Total/Count

```



<b>Page 9</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>GCE AS/A LEVEL – May/June 2013</b>	<b>9691</b>	<b>21</b>

**VB6**

```

DIM Marks(30) AS INTEGER
. . . . .
DIM Count AS INTEGER
DIM Total AS INTEGER
DIM i AS INTEGER
DIM AvMark AS DOUBLE

Total = 0
Count = 0
FOR i = 1 TO 30
  IF Marks(i) > -1 THEN
    Count = Count + 1
    Total = Total + Marks(i)
  END IF
NEXT i
AvMark = Total/Count

```

**PYTHON**

```

Marks = []
. . . . .
Total = 0
Count = 0
AvMark = 0

for i in range(0, 30) :
  if Marks[i] > -1 :
    Count = Count + 1
    Total = Total + Marks[i]
AvMark = Total/Count

```

*Marking guidelines:*

- 1 mark for initialisation of total and marks count*
- 1 mark for fully functioning loop*
- 1 mark for ignoring the elements with the initial value*
- 1 mark for incrementing count correctly*
- 1 mark for totalling and dividing and assigning the result to AvMark* [5]

**(g) (i)** Procedure returns 0, 1 or many values, function always returns 1 value [1]

**(ii)** It returns one value, AvMark [1]

**(h) (i)** 34 [1]

**(ii)** 80 [1]

**(iii) PASCAL**

```

FUNCTION CalculateRounded(AvMark : REAL) : INTEGER;
VAR Rounded : INTEGER;
BEGIN
  Rounded := TRUNC(AvMark + 0.5);

```

<b>Page 10</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>GCE AS/A LEVEL – May/June 2013</b>	<b>9691</b>	<b>21</b>

```
CalculateRounded := Rounded;
END;
```

### **VB.NET / VB2005**

```
Function CalculateRounded(ByVal AvMark AS Double) AS
Integer
    Dim Rounded As Integer
    Rounded = INT(AvMark + 0.5)
    CalculateRounded = Rounded // or: Return Rounded
End Function
```

### **VB6**

```
Function CalculateRounded(AvMark AS Double) AS Integer
    Dim Rounded AS Integer
    Rounded = INT(AvMark + 0.5)
    CalculateRounded = Rounded
End Function
```

Note: data type optional for parameter

### **PYTHON**

```
def CalculateRounded(AvMark) :
    Rounded = int(AvMark + 0.5)
    return Rounded
```

*Marking guidelines:*

- 1 mark for function heading including return data type if applicable*
- 1 mark for parameter including data type if applicable*
- 1 mark for calculation*
- 1 mark returning value*

[Max 4]

- 4 (a)**
- sound output
  - voice recognition
  - facility to enlarge characters
  - facility to change font
  - facility to change colours
  - less information on any one screen

[Max 3]

- (b) (i)** When:  
–during compilation/interpretation/translation//while code is written in an IDE  
How:  
–the compiler/interpreter/IDE checks that the rules of the language are being followed

[2]

- (ii)** When:  
–when unexpected results occur  
How:  
–dryrun/trace/white-box/debugging

[2]