

MARK SCHEME for the October/November 2012 series

9691 COMPUTING

9691/21

Paper 2 (Written Paper), maximum raw mark 75

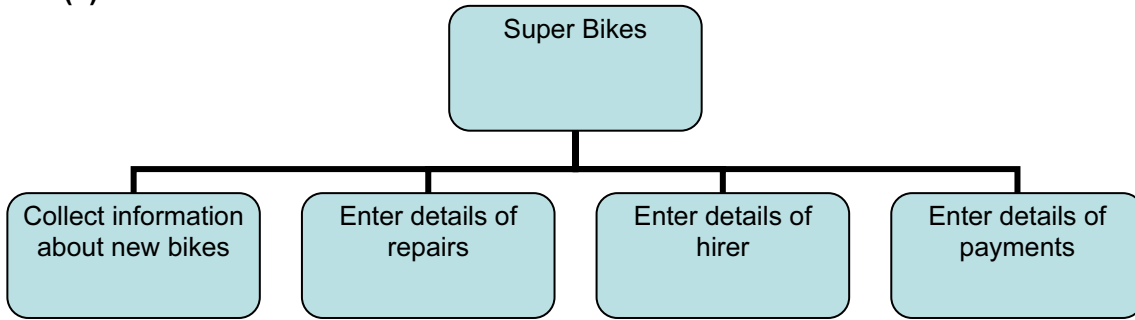
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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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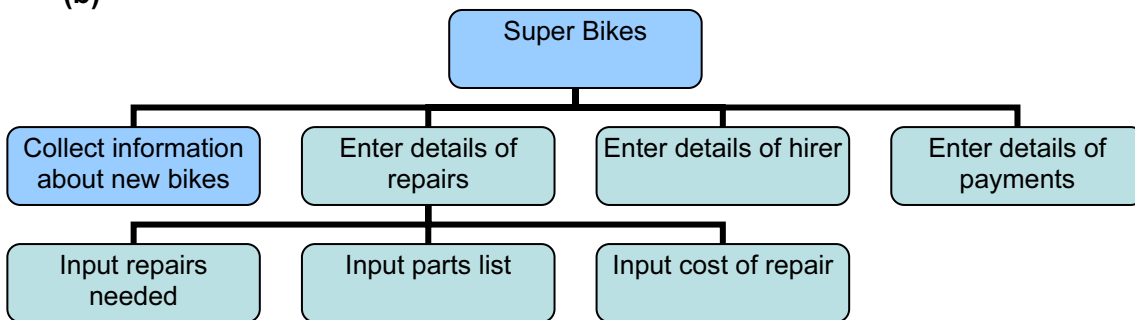
1 (a)



1 mark for left 2 blocks, 1 mark for right 2 blocks

[2]

(b)



1 mark for 3 blocks under Repairs

[1]

- (c) – to enable modular testing/maintenance/debugging
 – to enable different blocks to be worked on by different staff
 – easier to understand // reduce complexity

[2]

- (d) – the scope
 – of a variable is the range of statements for which it is valid
 – normally within a subprogram
 – enables the same identifier to be used for different purposes without conflict

[2]

- (e) – OR
 – OR

[2]

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(f) (i) e.g. Pascal

```

1  VAR BikeIDValid : BOOLEAN;
2  BikeIDValid := TRUE;
3  IF length(BikeID) <> 6
4    THEN BikeIDValid := FALSE;
5  IF NOT((Right(BikeID,2)>='00')
6    AND (Right(BikeID,2)<='99'))
7    THEN BikeIDValid := FALSE;
8  IF LEFT(BikeID,4) <> 'BIKE'
9    THEN BikeIDValid := FALSE;
10 IF BikeIDValid
11   THEN WriteLn('valid')
12   ELSE WriteLn('invalid');
```

e.g. VB 2005

```

1  BOOLEAN BikeIDValid
2  BikeIDValid = TRUE
3  IF LEN(CarReg) <> 6 THEN
4    BikeIDValid = FALSE
5  END IF
6  IF NOT(MID(BikeID,5,2)>="00"
7    AND MID(BikeID,5,2)<="99") THEN
8    BikeIDValid = FALSE
9  END IF
10 IF MID(BikeID,1,4) <> "BIKE" THEN
11   BikeIDValid = FALSE
12 END IF
13 IF BikeIDValid THEN
14   Console.WriteLine("valid")
15 ELSE
16   Console.WriteLine("invalid")
17 END IF
```

e.g. C#

```

1  bool bikeIDValid = true;
2  if (bikeID.Length != 6)
3  {
4    bikeIDValid := false;
5  }
6  if (!(bikeID.Substring(5,2)>="00"
7    && (bikeID.Substring(5,2)<="99"))
8  {
9    bikeIDValid := false;
10 }
11 if (bikeID.Substring(1,4) != "BIKE")
12 {
13   bikeIDValid := false;
14 }
15 if (bikeIDValid)
16 {
17   Console.WriteLine("valid");
18 }
19 else
20 {
21   Console.WriteLine("invalid");
22 }
```

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e.g. Python

```

1     bikeID = input()
2     bikeIDValid = True
3     if len(bikeID) != 6:
4         bikeIDValid = False
5     if ((bikeID[4:6] >='00') & (bikeID[4:6] <= '99')) != True:
6         bikeIDValid = False
7     if bikeID[0:4]!='BIKE':
8         bikeIDValid = False
9     if bikeIDValid:
10        print ('valid')
11    else:
12        print ('invalid')
```

1 mark for length check (6 characters exactly)

1 mark for correct separating 1st four characters

1 mark for testing first four characters are BIKE

1 mark for separating last two characters

1 mark for testing last two characters are digits

1 mark for initialising Boolean value

1 mark for changing Boolean value if error

1 mark for suitable message

1 mark for meaningful variable names used

1 mark for correct use of specified programming language

1 mark for indentation

[10]

- (ii) – 2nd to 4th characters are lower case letters // first 4 characters are Bike not BIKE
– in above example at line number 8 (Pascal), 10 (VB), 11 (C#)

[2]

- (g) (i) white box

[1]

- (ii) Alpha testing

Who – issue of software to a restricted number of testers within the company

When – it may not be completely finished and could have faults // before beta testing

Purpose – to find faults // to check the logic // to see if it works

[3]

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2 (a)

Row	Position	Row<=30	Position <=3	BikePlace				
				[1,1]	[1,2]	[1,3]	[2,1]	[2,2]
1	1	TRUE	TRUE	BIKE34				
	2		TRUE		BIKE56			
	3		TRUE			BIKE70		
	4		FALSE					
2	1		TRUE				BIKE51	
	2		TRUE					BIKE19

[6]

(b) (i) e.g. Pascal

```

FOR Row := 1 TO 30 DO
  BEGIN
    FOR Position := 1 TO 3 DO
      BEGIN
        READLN(BikeID)
        BikePlace[Row,Position] := BikeID;
      END;
    END;
  END;

```

e.g. VB 2005

```

FOR Row = 1 TO 30
  FOR Position = 1 TO 3
    BikeID = CONSOLE.READLINE()
    BikePlace(Row,Position) = BikeID
  NEXT
NEXT

```

e.g. C#

```

for (int row = 1; row<= 30; row++)
{
  for (int position=1; position<=3; position++)
  {
    bikeID = Console.ReadLine();
    bikePlace[row,position] = bikeID;
  }
}

```

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e.g. Python

```
for row in range (1,31):
    for position in range (1,4):
        bikeID = input()
        bikePlace[row,position] = bikeID
```

1 mark for correct FOR loops

1 mark for correctly nested loops

1 mark for input in correct place

1 mark for correct lower and upper boundaries for outer loop

1 mark for correct lower and upper boundaries for inner loop

1 mark for assignment to correct array element

**1 mark for indentation*

Check that FOR and assignment statements are properly formed depending on the programming language

** = language independent marks*

[7]

- (ii) – any word in the vocabulary of a programming language
– which can only have the meaning defined in that language

[2]

- (iii) *Any two examples from (i) above (1 mark each)*
e.g. FOR, TO, NEXT, DO, BEGIN, END, int
follow through

[2]

(c) (i) 0 (zero)

[1]

(ii) Run-time error

[1]

- (iii) – check the value of the bracket before the division takes place // write error trapping code
– if bracket = 0 arrange for a message to be output // exception code
Accept answers in code

[2]

- (d) – lists the contents of variables
– at specific points in the program // at breakpoints
– allowing their contents to be compared with expected values

[2]

- 3 – date
– suitable report title
– company name (Super Bikes)
– income and repairs grouped by BikeID
– tabulated or other suitable layout
– headings/labels (must contain income, bike, number of times hired, repairs)
– well spaced out (making use of whole frame)
(if clearly a screen design do not give this mark)

[7]

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4 (a)

Field Name	Data Type	Size of Field (bytes)
BikeID	String/alphanumeric/text	6
BikeType	String/alphanumeric/text	10-20
DateBought	Date/integer/real/string	8 (accept 10, 12)
NeedsRepair	Boolean	1

Give a tick for each correct cell. Marks are half the number of ticks (round up) [4]

(b) $(6 + 20 + 8 + 1)$

* 90 / 1024

* 1.1 (or equivalent)

=approx 3.4 KB

1 mark per row above [4]

(c) e.g. Pascal

```
TYPE HireBike = RECORD
    BikeID: String[6];
    BikeType: String[10];
    DateBought: TDateTime;
    NeedsRepair: Boolean;
END;
```

e.g. VB 2005

```
STRUCTURE HireBike
    DIM BikeID AS String
    DIM BikeType AS String
    DIM DateBought AS Date
    DIM NeedsRepair AS Boolean
END STRUCTURE
```

e.g. C#

```
struct hireBike
{
    public string bikeID, bikeType;
    public dateTime dateBought;
    public bool needsRepair;
}
```

1 mark for correct record structure

1 mark for each field [5]

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- (d) (i) – a function returns a value
– there is no value to be returned from this subroutine [2]
- (ii) – Parameter passed by value:
– A local copy of the data is used
– Parameter passed by reference:
– the memory location of the data is used [4]
- (iii) – filename
– BikeRecord [1]