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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Marks</th>
</tr>
</thead>
</table>
| 1(a)(i)  | 1 mark for appropriate variable name, 1 mark for appropriate data type, 1 mark for appropriate use. Many correct answers, they must be meaningful. These are examples only.  
  - HireTotal, integer, running total of money taken (for the day)  
  - HoursHired, real, running total of hours hired for the day  
  - Returned, real, hour and fraction of hour when next returned | 3 |
| 1(a)(ii) | 1 mark for appropriate constant name, 1 mark for appropriate value. Many correct answers, they must be meaningful. These are examples only.  
  - HourPrice, 20.00  
  - HalfHourPrice 12.00 | 2 |
| 1(b)     | 1 mark for validation check, all checks must be different, 1 mark for the reason and 1 mark for the test data. The only inputs for task 1 can be length of hire, money taken, time of hire and time of return. There are many possible correct answers these are examples only.  
  Validation check  
  Reason  
  Test data  | 6 |
|          | – range check for time of hire  
  – cannot be hired before 10:00 returned after 17:00  
  – 12:00, 19:00  |  |
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(c)</td>
<td>– any loop for 10 boats</td>
</tr>
</tbody>
</table>

**Four from:**
- Initialisation
- check HoursHired against MaxHoursHired...
  ... store the BoatNumber
  ... update MaxHoursHired if greater
- check if HoursHired = 0 ...
  ... if so add 1 to NumberBoatsUnused
- update daily totals (for hours and money)
- output report with messages (including totals for hours and money, and number of boats unused and the most used boat).

**Example:**

```plaintext
MaxHoursHired ← 0
TotalHoursHired ← 0
TotalMoney ← 0
NumberBoatsUnused ← 0
FOR BoatNumber ← 1 to 10
    TotalMoney ← TotalMoney + Money(BoatNumber)
    TotalHoursHired ← TotalHoursHired + HoursHired(BoatNumber)
    IF HoursHired(BoatNumber) = 0
        THEN NumberBoatsUnused ← NumberBoatsUnused + 1
    ENDIF
    IF HoursHired(BoatNumber) > MaxHoursHired
        THEN
            MostUsed ← BoatNumber
            MaxHoursHired ← HoursHired(BoatNumber)
        ENDIF
NEXT BoatNumber
PRINT "Boats were hired for ", TotalHoursHired, " hours"
PRINT "Total amount of money taken was ", TotalMoney
PRINT NumberBoatsUnused, " boats were not used"
Print "Boat number ", MostUsed, " was used most"
```
<table>
<thead>
<tr>
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<th>Answer</th>
<th>Marks</th>
</tr>
</thead>
</table>
| 1(d)     | Maximum 4 marks in total for question part  
  e.g. **Explanation** (may include reference to program statements)  
  – check all boats for  
  – … return time < current time // current booking slot available or return time > current time// current booking slot not available  
  – keep a running total of those available  
  – display number of boats  
  **Example:**  
  FOR BoatNumber ← 1 to 10 loop to check for all boats  
  IF ReturnTime(BoatNumber) <= CurrentTime check return time against current time  
  THEN BoatsAvailable ← BoatsAvailable + 1 keep a running total  
  ENDIF  
  NEXT BoatNumber  
  PRINT "Number of boats available ", BoatsAvailable display number of boats | 4 |
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1 mark for each, there may be other solutions, award full marks for any working solution</td>
<td>6</td>
</tr>
</tbody>
</table>

any six from:
- initialise total (outside loop)
- Input number of numbers (outside loop with validation)
- Loop using input value
- Input number (inside loop)
- Update Total (inside loop)
- Calculate average
- Print average and total (outside loop)

Sample algorithm:
```plaintext
INPUT NumberCount
Total ← 0
FOR Count ← 1 TO NumberCount
    INPUT Number
    Total ← Total + Number
NEXT
Average ← Total/NumberCount
PRINT Total, Average
```
### Question 3

1 mark for each correct line, max 3 marks.

<table>
<thead>
<tr>
<th>Data Structure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>A collection of related data.</td>
</tr>
<tr>
<td>Array</td>
<td>A value that can change whilst a program is running.</td>
</tr>
<tr>
<td>Table</td>
<td>A value that never changes whilst a program is running.</td>
</tr>
<tr>
<td>Variable</td>
<td>A series of elements of the same data type.</td>
</tr>
</tbody>
</table>

### Question 4

2 marks for identification, 1 mark for description, 1 mark for reason.

**Identification:**

```plaintext
CASE ...
  ... OF ... OTHERWISE ...
  (ENDCASE) or
  ... OF ...
  (OTHERWISE) ...
  ENDCASE
```

**Description:**

- a statement that allows for multiple selections // not any of the above

**Reason:**

- to simplify pseudocode/ make pseudocode more understandable etc.
## Question 5(a)

<table>
<thead>
<tr>
<th></th>
<th>Accept</th>
<th>Reject</th>
<th>Count</th>
<th>Sack</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>50.4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>3</td>
<td>50.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>50.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>50.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>50.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>50.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>50.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>50.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>50.6</td>
<td></td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

(1 mark)  (1 mark)  (1 mark)  (1 mark)  (1 mark)  (1 mark)  (1 mark)  

## Question 5(b)

- Change to Is Count = 50?
- Remove IS Sack > 50.5?
<table>
<thead>
<tr>
<th>Question</th>
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</tr>
</thead>
<tbody>
<tr>
<td>6(a)</td>
<td>- 1 mark for each field suitable name, 1 mark for appropriate data type and appropriate data sample. The following are examples there are many different correct answers. - Engine Number, text, 21012 - Class, text, P6 - Service Date, date, 4/3/2017</td>
<td>6</td>
</tr>
<tr>
<td>6(b)</td>
<td>- Engine Number // Correct field number</td>
<td>1</td>
</tr>
<tr>
<td>6(c)</td>
<td>Field: Engine Number, Class, Service Date</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Table: TRAIN, TRAIN, TRAIN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sort:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Show:</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>or:</td>
<td>(1 mark)</td>
</tr>
</tbody>
</table>