

**A-level**

**COMPUTER SCIENCE**

**Paper 2**

**7517/2**

**Insert**

**FIGURE 1 for use in answering Question 4**

**FIGURE 3 for use in answering Question 5**

**TABLE 1 for use in answering Question 6**

**FIGURE 4 for use in answering Question 6**

**[Turn over]**



**FIGURE 3**

**Facility(FacilityID, Description, MaxPeople, PricePerHour)  
FacilityForSport(Sport, FacilityID)  
Booking(FacilityID, BookingDate, StartTime, EndTime, CustomerID)  
Customer(CustomerID, Forename, Surname, EmailAddress)**

**[Turn over]**

**TABLE 1****Standard AQA assembly language instruction set**

LDR Rd, <memory ref>	<b>Load the value stored in the memory location specified by &lt;memory ref&gt; into register d.</b>
STR Rd, <memory ref>	<b>Store the value that is in register d into the memory location specified by &lt;memory ref&gt;.</b>
ADD Rd, Rn, <operand2>	<b>Add the value specified in &lt;operand2&gt; to the value in register n and store the result in register d.</b>
SUB Rd, Rn, <operand2>	<b>Subtract the value specified by &lt;operand2&gt; from the value in register n and store the result in register d.</b>
MOV Rd, <operand2>	<b>Copy the value specified by &lt;operand2&gt; into register d.</b>
CMP Rn, <operand2>	<b>Compare the value stored in register n with the value specified by &lt;operand2&gt;.</b>
B <label>	<b>Always branch to the instruction at position &lt;label&gt; in the program.</b>
B <condition> <label>	<b>Branch to the instruction at position &lt;label&gt; if the last comparison met the criterion specified by &lt;condition&gt;.</b> <b>Possible values for &lt;condition&gt; and their meanings are:</b> EQ: equal to            NE: not equal to GT: greater than      LT: less than

AND Rd, Rn, <operand2>	<b>Perform a bitwise logical AND operation between the value in register n and the value specified by &lt;operand2&gt; and store the result in register d.</b>
ORR Rd, Rn, <operand2>	<b>Perform a bitwise logical OR operation between the value in register n and the value specified by &lt;operand2&gt; and store the result in register d.</b>
EOR Rd, Rn, <operand2>	<b>Perform a bitwise logical XOR (exclusive or) operation between the value in register n and the value specified by &lt;operand2&gt; and store the result in register d.</b>
MVN Rd, <operand2>	<b>Perform a bitwise logical NOT operation on the value specified by &lt;operand2&gt; and store the result in register d.</b>
LSL Rd, Rn, <operand2>	<b>Logically shift left the value stored in register n by the number of bits specified by &lt;operand2&gt; and store the result in register d.</b>
LSR Rd, Rn, <operand2>	<b>Logically shift right the value stored in register n by the number of bits specified by &lt;operand2&gt; and store the result in register d.</b>
HALT	<b>Stops the execution of the program.</b>

**[Turn over]**

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**LABELS:** A label is placed in the code by writing an identifier followed by a colon (:). To refer to a label, the identifier of the label is placed after the branch instruction.

### **Interpretation of <operand2>**

**<operand2> can be interpreted in two different ways, depending on whether the first character is a # or an R:**

- **# – use the decimal value specified after the #, eg #25 means use the decimal value 25**
- **R<sub>m</sub> – use the value stored in register m, eg R6 means use the value stored in register 6**

**The available general-purpose registers that the programmer can use are numbered 0–12**

**[Turn over]**

**FIGURE 4**

```
CMP R2, #0
BEQ exit
MOV R0, #0
MOV R3, #1
moveleft:
    LSL R2, R2, #1
    LSL R3, R3, #1
    CMP R2, R1
    BLT moveleft
    BEQ mainloop
    LSR R2, R2, #1
    LSR R3, R3, #1
mainloop:
    CMP R1, R2
    BLT skip
    ADD R0, R0, R3
    SUB R1, R1, R2
skip:
    AND R4, R3, #1
    CMP R4, #1
    BEQ skipshiftR2
    LSR R2, R2, #1
skipshiftR2:
    LSR R3, R3, #1
    CMP R3, #0
    BNE mainloop
exit:
    HALT
```

**END OF SOURCE MATERIAL**



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**IB/M/CD/Jun21/7517/2/E3**