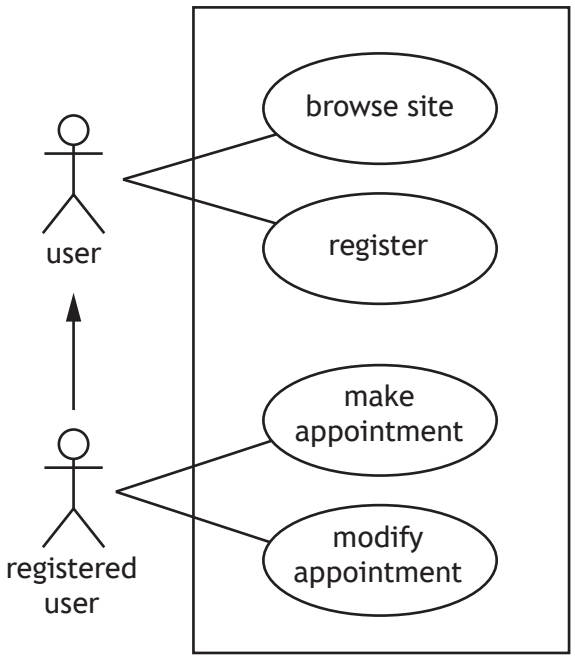
8. Hair by Harvey is a hair salon. A team of developers is creating a database-driven website to allow customers to book appointments for treatments at the salon. **MARKS**

(a) Part of the booking process requires a new customer to register before making an appointment. When registering, customers must provide their full name and contact telephone number.

(i) Name the type of feasibility study that is highlighted in the requirements for this part of the booking system. Justify your answer. **1**

(ii) Part of the use case diagram for the website is shown.



Describe the relationship between the actors in this diagram. **1**

(b) The attributes in each of the four entities required in the booking system are listed below.

Customer (cLastName, cFirstName, contactNumber, customerID)

Appointment (appDate, appTime, customerID*, stylistID*, treatmentID*)

Stylist (stylistID, sLastName, sFirstName, ratePerHour)

Treatment (treatmentID, description, price)

When making an appointment, a customer must select the type of treatment required but can choose a particular stylist or leave the attribute `stylistID` in the entity `Appointment` blank for the details to be assigned later.

Draw an entity-relationship diagram to represent the tables in the booking system. You should indicate:

- the name of each entity and relationship
- whether each entity is strong or weak
- whether relationship participation is mandatory or optional
- the cardinality of each relationship. **4**

8. (continued)

(c) Once the tables have been created correctly, sample test data is stored in the tables.

The incomplete SQL query shown below will be used to display the full name of all the stylists who have provided at least three hair colouring treatments in the months of April and May 2022.

```
SELECT sLastName, sFirstName
FROM Appointment, Treatment, Stylist
WHERE description = "Hair colouring"
AND appDate [ A ] '2022-04-01' AND '2022-05-31'
AND Appointment.stylistID = Stylist.stylistID
AND Appointment.treatmentID = Treatment.treatmentID
GROUP BY sLastName, sFirstName
[ B ] ;
```

State the missing operator and clause labelled **A** and **B**. **2**

(d) A query to list the customers who are due to be treated by the stylists with `stylistID` 2, 5 or 7 is being designed.

One possible design of this query is shown.

<table>
<tr><td>Fields(s)/ calculations</td><td colspan="4">Customer last name, customer first name, contact number</td></tr>
<tr><td>Table(s) quer(-ies)</td><td colspan="4">Customer</td></tr>
<tr><td rowspan="3">Search criteria</td><td rowspan="3">C</td><td rowspan="3">Inner query</td><td>Fields(s)/ calculations</td><td>customerID</td></tr>
<tr><td>Table(s)</td><td>Appointment</td></tr>
<tr><td>Search criteria</td><td>D</td></tr>
</table>

(i) State the missing search criteria labelled **C**. **1**

(ii) The missing search criteria labelled **D** applies to a subquery.

Describe how the logical operator `IN` could be used in the implementation of the search criteria for the subquery. **1**

[Turn over

8. (continued)

(e) Test data in the `Customer` and `Appointment` tables is shown below.

Customer			
cLastName	**cFirstName**	**contactNumber**	**customerID**
Smith	John	01632774488	1
Ali	Muhammad	01632776655	2
McMillan	Arthur	07709223344	3
Doherty	Lesley	07141189100	4

Appointment				
appDate	**appTime**	**customerID**	**stylistID**	**treatmentID**
2022-01-10	09:00:00	1		1
2022-31-12	09:00:00	2	1	1
2022-02-01	16:00:00	2	2	1
2022-01-10	14:00:00	1	3	2

The test plan for the database includes the following query.

Query	**Expected output**

`SELECT cFirstName, cLastName`
`FROM Customer, Appointment`
`WHERE Customer.customerID =`
`Appointment.customerID`
`AND stylistID NOT LIKE "*";`	

State the expected output of this query and explain your answer. **2**

8. (continued)

(f) Once developed, all aspects of the website will be tested.

The test plan for the completed website includes the persona and test case described below.

Persona	Test Case
Lesley is a 27-year-old who likes to make regular bookings to have her hair coloured every 12 weeks.	Log on to the system using customer ID 4. Make a booking for a hair colouring treatment on 22nd July 2022 and a follow-up booking 12 weeks later.

Some screen shots resulting from this section of testing are shown below.

introductory screen

appointment date

treatment

(i) Name and describe the type of testing illustrated above. **2**

(ii) Explain whether the solution shown is fit for purpose. **1**