

APOLLO

A3 Databases SL

Computer Science
First assessment 2027
1 questions | mark schemes

3. (a) *Award [2] max*

Award [1] for stating a benefit and [1] for expansion

Provides data integrity;
Accurate and reliable data/primary and foreign keys prevent orphan data/enforce relationships;

Maintains data consistency;
Ensures data in one part of the database does not contradict data in another;

Allows data concurrency;
Multiple users can access data at the same time;

Reduces of data redundancy;
Uses normalization to ensure data is only stored once;

Allows for complex querying;
Uses a declarative/industry standard language;

(b) *Award [1] per point, up to [2] max*

Data volume growth (leading to performance issues);
Increased concurrency (an increase in users may lead to concurrency issues);
Complexity of queries (more sophisticated analysis use more resources);
Hardware limitations (single server becomes overloaded);
Load balancing on multiple servers;
Inefficient indexing (affecting time to search);

(c) *Award [3] max*

Award [1] for SELECT DISTINCT or GROUP BY

Award [1] for using LIKE

Award [1] for using the wildcard (any wildcard accepted) and therapy

```
SELECT DISTINCT PatientName FROM VISITS  
WHERE Treatment LIKE '%therapy%';
```

Alternative solution using group by:

```
SELECT PatientName FROM VISITS  
WHERE Treatment LIKE '%therapy%'  
GROUP BY PatientName
```

Alternative solution using a subquery and group by:

```
SELECT PatientName  
FROM (  
    SELECT PatientName  
    FROM VISITS  
    WHERE Treatment LIKE '%therapy%'  
) AS subquery  
GROUP BY PatientName;
```

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(d) *Award [5] max*

Award [1] for the PATIENT table with correct Primary Key

Award [1] for the DOCTOR table with correct Primary Key

Award [1] for PatID foreign key in the VISIT table

Award [1] for DocID foreign key in the VISIT table

Award [1] for VisitID or PatID/DocID/VisitDate composite key in the VISIT table

```
PATIENT(PatID, PatientName, PatientDOB)
DOCTOR(DocID, Doctor)
VISIT(VisitID, PatID, DocID, VistDate, Treatment)
```