ISDB Information Systems and Databases Assignment Scenario

A residential care home company has decided to set up a scheme to actively engage visitors in the care of their residents, in order to boost support to their elderly patients and make best use of their care staff whose numbers have been gradually declining because of Covid related issues. The basic premise is that visiting relatives can help with staff shortages by doing some of the work normally allocated to staff, eg serving meals and helping with leisure activities. This arrangement seems to have the backing of the residents and their families who appreciate that the care home is struggling to cope with the ever-increasing staff shortages.

All residents are now permitted one visitor who is the designated ‘primary visiting carer’ for that resident and can visit at any time, along with up to three other named visitors, whose visits are restricted to specific days of the week of their choosing. Basic details need to be recorded for each visitor, including to what level they have been vaccinated against Covid. The care home is insistent that for security reasons visitors can only visit on the days they have specified, and as a check, a list of the day’s ‘permitted visitors’ is kept in reception along with details of the person they are visiting.

Any registered visitor may volunteer to help with running leisure activities. This is being encouraged in order to expand the range of activities on offer and to cut down on external paid assistants who are employed to run them. The care home manager is appealing to the altruistic nature of relatives, but also thinks that she could incentivise them to help by allocating some kind of ‘bonus’ or small reward to the most ‘helpful’ visitor or to their related resident.

Activities are varied and range from card games to karate for the over 80’s. Residents are encouraged to try as many different things as they can to keep themselves mentally and physically active and to pursue each activity for at least a month. At the end of the month, they are asked to indicate whether they liked or disliked the activities, and this information is recorded so that the care home can offer something new if the resident was not happy with his/her choice. A check needs to be kept on the expenses incurred in running these activities as most involve some kind of outgoings in addition to any hired help. The care home has worked out the average cost of each activity on a ‘per head/per month’ basis and needs to monitor the number of residents taking up each activity, to stay within its ‘entertainment’ budget.

The care home director has asked you to think about designing a database to help with tracking all this information. This is an extract below from an interview with her, where she provides her initial thoughts:

*“We currently have 20 homes, but initially I’d really like to try this scheme out at our ‘Peaceful Haven’ home which is the largest. It could be a game changer, who knows? I’ve spoken to many of the visitors, and they’ve said they would like to help out - and to keep dementia at bay, our residents need to be kept busy. Some relatives have expressed interesting in running activities that we don’t currently offer, so I think we would be able to expand our current range and provide something for everyone. Ideally, I’d like to make one person responsible for a particular activity – a kind of ‘activity leader’, but he or she wouldn’t be required to attend every session that is run for that activity, just coordinate it in a general way. We need to know which resident is signed up for which monthly activity, and we also need to maintain a schedule of the dates that these activities are being run, and which visitors can help out at each session. There may be occasions where we get no volunteers and we might have to ring others to come in, ie those who have said they are interested in helping out with that activity, or we may just cancel the session if nobody can do it.*

*Anyhow, I hope you can find some decent database developer who can put this all together and provide us with some useful reports that can help our organisation run more efficiently. Obviously, it would be useful to see which are the most popular activities over time and how many sessions we have managed to staff with volunteers, who is an ‘award winning ‘volunteer etc. It will probably make it easier to check that we haven’t overspent in any area, and we could have a look at the individual history of a specific resident. I guess it would be easier to pick out visitor patterns and so on. I haven’t really thought much more about what a database system might generate, but I hope your developer can help me come up with some other useful and innovative ideas. I’ve been told that we should be doing more with our data to get a competitive edge and to be more efficient in these tough times. Hopefully the database will help with this.”*

*We’ve decided that all residents who have signed up for an activity will attend all the scheduled sessions for at least a month before deciding whether or not they want to change to something else. In the past we’ve found that residents who stick at something actually grow to like it. I feel that we could do more with the data that we collect, for example by working out some kind of ‘compatibility score’ between all residents (essentially the number of activities which a pair of residents both like). Those residents with the highest compatibility scores could then be ‘paired up’ so that they could keep themselves amused and enjoy each other’s company, thereby demanding less time from the care home staff.”*

APEX USERNAME: **GB\_A938\_SQL\_S91**

1)ASSUMPTIONS/BUSINESS RULES:

1-Many relatives can visit many patients.

2-Database will be for relatives and patients only not including staff.

3-Weekly budget shouldn’t pass 1000£.

4-Award winning Volunteer will be chosen through a query on the activity rating by the patients.

5-One activity must have only one activity leader.

2)ER Diagram

Diagram, engineering drawing

Description automatically generated

3) ENTITY SPECIFICATION FORMS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: Residents  Entity description: Stores details of all residents in the Care Home. | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| residentID | NUMBER(4) | pk |  | 1000 |
| firstname | VARCHAR2(15) | nn |  | ELIZABETH |
| lastname | VARCHAR2(15) | nn |  | CROW |
| illness | VARCHAR2(10) | nn |  | Dementia |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: Visitors  Entity description: Stores details of all visitors. | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| visitorID | NUMBER(3) | pk |  | 100 |
| v\_fname | VARCHAR2(15) | nn |  | JONH |
| v\_lname | VARCHAR2(15) | nn |  | CROW |
| contactNo | NUMBER(11) | nn |  | 078323455677 |
| vaccination\_Status | VARCHAR2(2) | nn | Input limited to 0D(no vaccine)  1D(one-dose)  2D(2-doses)  3D(2+booster) | 3D |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: Activities  Entity description: Stores information about the activities on the care home ,type and location. | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| activityID | VARCHAR2(4) | pk | 3 letters, one number. | AAA1 |
| activityname | VARCHAR2(15) | nn |  | THEATRE |
| activity\_type | VARCHAR2(8) | nn | Indoor,Outdoor | Outdoor |
| activity\_location | VARCHAR2(8) | nn | Postcode | WC2N 4AU |
| activitydate | DATE | nn | dd-mm-yyyy | 02-02-2022 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: Activity\_Rota  Entity description: Keeps track of attendance per activity, date, time and duration . | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| rotaID | VARCHAR2(2) | pk |  | AA |
| activityID | VARCHAR2(4) | fk | 3 letters, one number. | AAA1 |
| residentID | NUMBER(4) | fk |  | 1000 |
| visitorID | NUMBER(3) | fk |  | 001 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: VisitorsLog  Entity description: Keeps daily record of relatives visiting patients in the Care Home. | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| logID | NUMBER(5) | pk |  | 10000 |
| visitorID | NUMBER(3) | fk |  | 001 |
| visiting\_date | DATE | nn | dd-mm-yyyy | 03-03-2022 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: ActivityExpenses  Entity description: Stores information about the expenses of each activity ,weekly budget and maximum number of participants. | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| expensesID | VARCHAR2(5) | pk | 3 letters, two number. | AAA01 |
| activityID | VARCHAR2(4) | fk | 3 letters, one number. | AAA1 |
| w\_budget | NUMBER(4) | nn | Currency £ | 500 |
| price\_per\_participant | NUMBER(3) | nn | Currency £ | 30 |
| max\_no\_Of\_participants | NUMBER(2) | nn |  | 16 |
| nr\_of\_times | NUMBER(2) | nn |  | 1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: V\_Interests  Entity description: Keeps information on the activities which the visitor are interested in. | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| v\_interestsID | VARCHAR2(4) | pk |  | VAAA |
| activityID | VARCHAR2(4) | fk | 3 letters, one number. | AAA1 |
| visitorID | NUMBER(3) | fk |  | 100 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: R\_Interests  Entity description: Keeps information on the activities which the visitor are interested in. | | | |  |
| Attribute | Data type and width | Status  pk/fk/nn | Validation | Example of input and any other relevant info |
| interestsID | VARCHAR2(4) | pk |  | RAAA |
| activityID | VARCHAR2(4) | fk | 3 letters, one number. | AAA1 |
| residentID | NUMBER(4) | fk |  | 1000 |
| activityRating | NUMBER(2) | nn | 1-10 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity Name: ActLeader  Entity description: Stores the activity leader. | | | |  |
| Attribute | Data type and width | Status  Pk/fk/nn | Validation | Example of input and any other relevant info |
| leaderID | VARCHAR2(6) | pk | 4 letters,2 numbers | AAAA01 |
| activityID | VARCHAR2(4) | fk | 3 letters, one number. | AAA1 |
| visitorID | NUMBER(3) | fk |  | 100 |

**Sql Table Creation Scripts**

**Residents Table**

CREATE TABLE RESIDENTS

( RESIDENTID NUMBER(4,0),

FIRSTNAME VARCHAR2(15),

LASTNAME VARCHAR2(15),

ILLNESS VARCHAR2(10),

CONSTRAINT PK\_RESIDENTS\_RESIDENTID PRIMARY KEY (RESIDENTID) )

**Visitors Table**

CREATE TABLE VISITORS

( VISITORID NUMBER(3,0),

V\_FNAME VARCHAR2(15),

V\_LNAME VARCHAR2(15),

CONTACTNO NUMBER(11,0),

VACCINATION\_STATUS VARCHAR2(2),

CONSTRAINT PK\_VISITORS\_VISITORID PRIMARY KEY (VISITORID)

)

**Activities Table**

CREATE TABLE ACTIVITIES

( ACTIVITYID VARCHAR2(4),

ACTIVITYNAME VARCHAR2(15),

ACTIVITY\_TYPE VARCHAR2(8),

ACTIVITY\_LOCATION VARCHAR2(8),

ACTIVITYDATE DATE,

CONSTRAINT PK\_AVTIVITIES\_ACTIVITYID PRIMARY KEY (ACTIVITYID)

)

**Activity\_Rota Table**

CREATE TABLE ACTIVITY\_ROTA

( ROTAID VARCHAR2(2),

ACTIVITYID VARCHAR2(4),

RESIDENTID NUMBER(4,0),

VISITORID NUMBER(3,0),

CONSTRAINT PK\_ACTIVITY\_ROTA\_ROTAID PRIMARY KEY (ROTAID))

ALTER TABLE ACTIVITY\_ROTA

ADD CONSTRAINT FK\_ACTIVITY\_ROTA\_RESIDENTID

FOREIGN KEY (RESIDENTID)

REFERENCES RESIDENTS(RESIDENTID)

ALTER TABLE ACTIVITY\_ROTA

ADD CONSTRAINT FK\_ACTIVITY\_ROTA\_ACTIVITYID

FOREIGN KEY (ACTIVITYID)

REFERENCES ACTIVITIES(ACTIVITYID)

ALTER TABLE ACTIVITY\_ROTA

ADD CONSTRAINT FK\_ACTIVITY\_ROTA\_VISITORID

FOREIGN KEY (VISITORID)

REFERENCES VISITORS(VISITORID)

**VisitorsLog Table**

CREATE TABLE VISITORSLOG

( LOGID NUMBER(5,0),

VISITORID NUMBER(3,0),

VISITING\_DATE DATE,

RESIDENTID NUMBER(4,0),

CONSTRAINT PK\_VISITORSLOG\_LOGID PRIMARY KEY (LOGID)

)

ALTER TABLE VISITORSLOG

ADD CONSTRAINT FK\_VISITORSLOG\_RESIDENTID

FOREIGN KEY (RESIDENTID)

REFERENCES RESIDENTS (RESIDENTID)

ALTER TABLE VISITORSLOG

ADD CONSTRAINT FK\_ VISITORSLOG\_VISITORID

FOREIGN KEY (VISITORID)

REFERENCES VISITORS(VISITORID)

**ActivityExpenses Table**

CREATE TABLE ACTIVITYEXPENSES

( EXPENSESID VARCHAR2(5),

ACTIVITYID VARCHAR2(4),

W\_BUDGET NUMBER(4,0),

PRICE\_PER\_PARTICIPANT NUMBER(3,0),

MAX\_NO\_OF\_PARTICIPANTS NUMBER(2,0),

NR\_OF\_TIMES NUMBER(2,0),

CONSTRAINT CK\_ACTIVITYEXPENSES\_W\_BUDGET CHECK (w\_budget<=1000),

CONSTRAINT PK\_ACTIVITYEXPENSES\_EXPENSESID PRIMARY KEY (EXPENSESID)

)

ALTER TABLE ACTIVITYEXPENSES

ADD CONSTRAINT FK\_ACTIVITYEXPENSES\_ACTIVITYID

FOREIGN KEY (ACTIVITYID)

REFERENCES ACTIVITIES (ACTIVITYID)

**Visitor Interests Table**

CREATE TABLE V\_INTERESTS

( V\_INTERESTSID VARCHAR2(4),

ACTIVITYID VARCHAR2(4),

VISITORID NUMBER(3,0),

CONSTRAINT PK\_V\_INTERESTS\_V\_INTERESTID PRIMARY KEY (V\_INTERESTSID)

)

ALTER TABLE V\_INTERESTS

ADD CONSTRAINT FK\_V\_INTERESTS\_ACTIVITYID

FOREIGN KEY (ACTIVITYID)

REFERENCES ACTIVITIES (ACTIVITYID)

ALTER TABLE V\_INTERESTS

ADD CONSTRAINT FK\_V\_INTERESTS\_VISITORID

FOREIGN KEY (VISITORID)

REFERENCES VISITORS(VISITORID)

**Residents Interests Table**

CREATE TABLE R\_INTERESTS

( INTERESTSID VARCHAR2(4),

ACTIVITYID VARCHAR2(4),

RESIDENTID NUMBER(4,0),

ACTIVITYRATING NUMBER(2,0),

CONSTRAINT CK\_R\_INTERESTS\_ACTIVITYRATING CHECK (activityRating<=10),

CONSTRAINT PK\_R\_INTERESTS\_INTERESTID PRIMARY KEY (INTERESTSID)

)

ALTER TABLE R\_INTERESTS

ADD CONSTRAINT FK\_R\_INTERESTS\_ACTIVITYID

FOREIGN KEY (ACTIVITYID)

REFERENCES ACTIVITIES (ACTIVITYID)

ALTER TABLE R\_INTERESTS

ADD CONSTRAINT FK\_R\_INTERESTS\_RESIDENTID

FOREIGN KEY (RESIDENTID")

REFERENCES RESIDENTS (RESIDENTID)

**Activity Leader Table**

CREATE TABLE ACTLEADER

( LEADERID VARCHAR2(6),

ACTIVITYID VARCHAR2(4),

VISITORID NUMBER(3,0),

CONSTRAINT PK\_ACTLEADER\_LEADERID PRIMARY KEY (LEADERID)

)

ALTER TABLE ACTLEADER

ADD CONSTRAINT FK\_ACTLEADER\_ACTIVITYID

FOREIGN KEY (ACTIVITYID)

REFERENCES ACTIVITIES (ACTIVITYID)

ALTER TABLE ACTLEADER

ADD CONSTRAINT FK\_ACTLEADER\_VISITORID

FOREIGN KEY (VISITORID)

REFERENCES VISITORS(VISITORID)

**Sample data**

INSERT INTO ACTIVITYEXPENSES VALUES

('AAA02','AAA2',700,50,7,2)

INSERT INTO V\_INTERESTS VALUES

('VAAA','AAA1',100)

INSERT INTO R\_INTERESTS VALUES

('RAA3','AAA6',1000,5)

INSERT INTO VISITORS VALUES

(103,’Giana’,’Duncan’,07013165817,’2D’)

INSERT INTO RESIDENTS VALUES

(1000,’Muhammad’,’Coleman’,’Dementia’)

INSERT INTO ACTIVITIES VALUES

(‘AAA3’,’Painting’,’Indoor’,’SE240JW,’20-April-2022’)

INSERT INTO ACTIVITY\_ROTA VALUES

(‘A1’,’AAA1’,1000,100)

INSERT INTO VISITORSLOG VALUES

(1,100,’10-April-2022’,1003)

INSERT INTO ACTLEADER VALUES

('AAAA07','AAA7',106)

SQL QUERY SCRIPTS

SELECT VISITORID,RESIDENTID FROM VISITORSLOG

WHERE VISITING\_DATE='10-APRIL-2022'

This query shows all the visitors and the residents they visited on the 10th of April 2022.

|  |  |
| --- | --- |
| **VISITORID** | **RESIDENTID** |
| 103 | 1003 |
| 104 | 1006 |
| 105 | 1005 |
| 100 | 1000 |
| 102 | 1002 |

SELECT activityid,count(\*) ACTIVITYID FROM R\_INTERESTS

WHERE ACTIVITYRATING>8

group by activityid

This query shows which activities have been rated over 8 and how many times.

|  |  |
| --- | --- |
| **ACTIVITYID** | **ACTIVITYID** |
| AAA2 | 5 |
| AAA3 | 3 |
| AAA1 | 1 |
| AAA5 | 2 |
| AAA6 | 1 |

select visitorid from actleader

where activityid='AAA2'

This query is to find the visitor id that leades activity AAA2 which is the most rated by the residents.

|  |
| --- |
| **VISITORID** |
| 101 |

SELECT\* FROM VISITORS

WHERE VISITORID=101

This query provides data over the visitor that runs the activity that gets most rated.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **VISITORID** |  | **V\_FNAME** | **V\_LNAME** | **CONTACTNO** | **VACCINATION\_STATUS** |
| 101 |  | Nora | Ross | 7850118543 | 2D |

SELECT RESIDENTID

FROM R\_INTERESTS

WHERE ACTIVITYID='AAA3';

This query show which residents are interested in the same activities,in this case activity ‘AAA3’

|  |
| --- |
| **RESIDENTID** |
| 1001 |
| 1002 |
| 1006 |
| 1010 |
| 1004 |
| 1005 |
| 1008 |

select\*from activityexpenses

where activityID='AAA1'

This query shows information about activity with ID AAA1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EXPENSESID** | **ACTIVITYID** | **W\_BUDGET** | **PRICE\_PER\_PARTICIPANT** | **MAX\_NO\_OF\_PARTICIPANTS** | **NR\_OF\_TIMES** |
| AAA01 | AAA1 | 450 | 50 | 9 | 1 |

SELECT RESIDENTID,ACTIVITYID

FROM R\_INTERESTS

GROUP BY RESIDENTID,ACTIVITYID

order by activityid

This query shows all the activites the residents are interested in in order.

|  |  |
| --- | --- |
| **RESIDENTID** | **ACTIVITYID** |
| 1000 | AAA1 |
| 1001 | AAA1 |
| 1002 | AAA1 |
| 1003 | AAA1 |
| 1004 | AAA1 |
| 1005 | AAA1 |
| 1006 | AAA1 |
| 1007 | AAA1 |
| 1008 | AAA1 |
| 1002 | AAA2 |
| 1003 | AAA2 |
| 1004 | AAA2 |
| 1005 | AAA2 |
| 1009 | AAA2 |
| 1010 | AAA2 |
| 1001 | AAA3 |
| 1002 | AAA3 |
| 1004 | AAA3 |
| 1005 | AAA3 |
| 1006 | AAA3 |
| 1008 | AAA3 |
| 1010 | AAA3 |
| 1003 | AAA4 |
| 1007 | AAA4 |
| 1008 | AAA4 |
| 1000 | AAA5 |
| 1006 | AAA5 |
| 1007 | AAA5 |
| 1009 | AAA5 |
| 1010 | AAA5 |
| 1000 | AAA6 |
| 1009 | AAA6 |