

Database Theory and Applications for Biomedical Research and Practice

BMIN 502 / EPID 635
Week 8: More database implementation

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Agenda

- Review MySQL installation
- More relational theory
 - Joins
- The data dictionary
- Assignment 6, continued
- Preparing for the PennOmics class

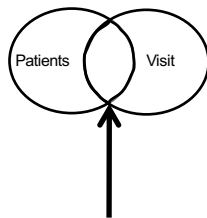
Relationships between tables

- **Join**
 - Association between a field in one table and its counterpart in another table
- **View (or Dynaset)**
 - Sets (virtual tables) created dynamically as the result of joining two or more tables

Types of joins

- **Equijoin**
 - Records are combined and added to dynaset only when values are equal for the join fields
- **Left outer join**
 - Records from “left-hand” table are added to dynaset even if none in “right-hand” table match
- **Right outer join**
 - Records from “right-hand” table are added to dynaset even if none in “left-hand” table match

INNER JOIN (or JOIN)

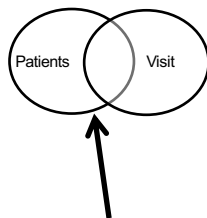


```
SELECT Patients.ID, Visit.VISITDATE
FROM Patients
JOIN Visit on Patients.ID = Visit.ID
```

Patients		Visit	
ID	NAME	ID	VISITDATE
1	Smith	1	1/1/95
2	Jones	1	1/2/95
3	Williams	1	1/7/95
4	Peterson	2	12/14/94
		2	12/22/94
		2	1/8/95
		2	1/9/95
		4	3/14/95
		5	4/1/95

Dynaset		
ID	NAME	VISITDATE
1	Smith	1/1/95
1	Smith	1/2/95
1	Smith	1/7/95
2	Jones	12/14/94
2	Jones	12/22/94
2	Jones	1/8/95
2	Jones	1/9/95
4	Peterson	3/14/95

LEFT JOIN

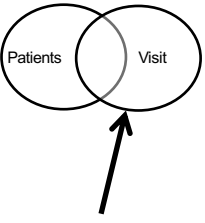


```
SELECT Patients.ID, Visit.VISITDATE
FROM Patients
LEFT JOIN Visit on Patients.ID = Visit.ID
```

Patients		Visit	
ID	NAME	ID	VISITDATE
1	Smith	1	1/1/95
2	Jones	1	1/2/95
3	Williams	1	1/7/95
4	Peterson	2	12/14/94
		2	12/22/94
		2	1/8/95
		2	1/9/95
		4	3/14/95
		5	4/1/95

Dynaset		
ID	NAME	VISITDATE
1	Smith	1/1/95
1	Smith	1/2/95
1	Smith	1/7/95
2	Jones	12/14/94
2	Jones	12/22/94
2	Jones	1/8/95
2	Jones	1/9/95
3	Williams	
4	Peterson	3/14/95

RIGHT JOIN



Patients		Visit	
ID	NAME	ID	VISITDATE
1	Smith	1	1/1/95
2	Jones	1	1/2/95
3	Williams	1	1/7/95
4	Peterson	2	12/14/94
		2	12/22/94
		2	1/8/95
		2	1/9/95
		4	3/14/95
		5	4/1/95

Dynaset		
ID	NAME	VISITDATE
1	Smith	1/1/95
1	Smith	1/2/95
1	Smith	1/7/95
2	Jones	12/14/94
2	Jones	12/22/94
2	Jones	1/8/95
2	Jones	1/9/95
4	Williams	3/14/95
5		4/1/95

Result of RIGHT JOIN

```
SELECT Patients.ID, Visit.VISITDATE
FROM Patients
RIGHT JOIN Visit on Patients.ID = Visit.ID
```

You can create a view with a join...

```
CREATE OR REPLACE VIEW 'patient_list' AS
SELECT demographics.subject_id AS demo_subject_id, demographics.dob,
       admission.subject_id AS adm_subject_id, admission.adm_date
FROM demographics
JOIN admission ON demographics.subject_id = admission.subject_id
```

- Note that we need to rename the PKs here, using the AS statement. This is because the view is a virtual table that represents the join, and you would have two subject_id fields in that view.
- Renaming them to represent the table the PKs belong to is the way to get around this constraint
- Duplicate PKs are not allowed in any tables!!

The Data Dictionary

Data Dictionaries

- “Metadata”
- Repository of attributes characterizing all elements in a database
- Primary external documentation for a database system

Common data dictionary contents

- Table
- Field name
- Type
- Description
- Length (optional)
- Coding information

Implementing the data dictionary

- Word processing document
 - Low budget, low tech
 - Difficult to manipulate (sort, reporting, etc.)
 - Difficult to upgrade
- Database
 - Low budget, high tech
 - Versatile for sorting and reporting
 - Easy to upgrade

Example DD

http://www.commonwealthfund.org/usr_doc/App7_SupplementalVariablesDataDictionary.pdf

Table 1. Data file elements related child-specific general and enrollment information

Variable	Description of Variable	Response Code
Gender	Gender of the child	1=Male 2=Female
DOB_YEAR	Child's age in months, at the time the survey was conducted	0-12 months 13-24 months 25-36 months 37-48 months 49-60 months 61-72 months 73-84 months 85-96 months 97-108 months 109-120 months 121-132 months 133-144 months 145-156 months 157-168 months 169-180 months 181-192 months 193-204 months 205-216 months 217-228 months 229-240 months 241-252 months 253-264 months 265-276 months 277-288 months 289-300 months 301-312 months 313-324 months 325-336 months 337-348 months 349-360 months 361-372 months 373-384 months 385-396 months 397-408 months 409-420 months 421-432 months 433-444 months 445-456 months 457-468 months 469-480 months 481-492 months 493-504 months 505-516 months 517-528 months 529-540 months 541-552 months 553-564 months 565-576 months 577-588 months 589-600 months 601-612 months 613-624 months 625-636 months 637-648 months 649-660 months 661-672 months 673-684 months 685-696 months 697-708 months 709-720 months 721-732 months 733-744 months 745-756 months 757-768 months 769-780 months 781-792 months 793-804 months 805-816 months 817-828 months 829-840 months 841-852 months 853-864 months 865-876 months 877-888 months 889-900 months 901-912 months 913-924 months 925-936 months 937-948 months 949-960 months 961-972 months 973-984 months 985-996 months 997-1008 months 1009-1020 months 1021-1032 months 1033-1044 months 1045-1056 months 1057-1068 months 1069-1080 months 1081-1092 months 1093-1104 months 1105-1116 months 1117-1128 months 1129-1140 months 1141-1152 months 1153-1164 months 1165-1176 months 1177-1188 months 1189-1200 months 1201-1212 months 1213-1224 months 1225-1236 months 1237-1248 months 1249-1260 months 1261-1272 months 1273-1284 months 1285-1296 months 1297-1308 months 1309-1320 months 1321-1332 months 1333-1344 months 1345-1356 months 1357-1368 months 1369-1380 months 1381-1392 months 1393-1404 months 1405-1416 months 1417-1428 months 1429-1440 months 1441-1452 months 1453-1464 months 1465-1476 months 1477-1488 months 1489-1500 months 1501-1512 months 1513-1524 months 1525-1536 months 1537-1548 months 1549-1560 months 1561-1572 months 1573-1584 months 1585-1596 months 1597-1608 months 1609-1620 months 1621-1632 months 1633-1644 months 1645-1656 months 1657-1668 months 1669-1680 months 1681-1692 months 1693-1704 months 1705-1716 months 1717-1728 months 1729-1740 months 1741-1752 months 1753-1764 months 1765-1776 months 1777-1788 months 1789-1800 months 1801-1812 months 1813-1824 months 1825-1836 months 1837-1848 months 1849-1860 months 1861-1872 months 1873-1884 months 1885-1896 months 1897-1908 months 1909-1920 months 1921-1932 months 1933-1944 months 1945-1956 months 1957-1968 months 1969-1980 months 1981-1992 months 1993-2004 months 2005-2016 months 2017-2028 months 2029-2040 months 2041-2052 months 2053-2064 months 2065-2076 months 2077-2088 months 2089-2100 months 2101-2112 months 2113-2124 months 2125-2136 months 2137-2148 months 2149-2160 months 2161-2172 months 2173-2184 months 2185-2196 months 2197-2208 months 2209-2220 months 2221-2232 months 2233-2244 months 2245-2256 months 2257-2268 months 2269-2280 months 2281-2292 months 2293-2304 months 2305-2316 months 2317-2328 months 2329-2340 months 2341-2352 months 2353-2364 months 2365-2376 months 2377-2388 months 2389-2400 months 2401-2412 months 2413-2424 months 2425-2436 months 2437-2448 months 2449-2460 months 2461-2472 months 2473-2484 months 2485-2496 months 2497-2508 months 2509-2520 months 2521-2532 months 2533-2544 months 2545-2556 months 2557-2568 months 2569-2580 months 2581-2592 months 2593-2604 months 2605-2616 months 2617-2628 months 2629-2640 months 2641-2652 months 2653-2664 months 2665-2676 months 2677-2688 months 2689-2700 months 2701-2712 months 2713-2724 months 2725-2736 months 2737-2748 months 2749-2760 months 2761-2772 months 2773-2784 months 2785-2796 months 2797-2808 months 2809-2820 months 2821-2832 months 2833-2844 months 2845-2856 months 2857-2868 months 2869-2880 months 2881-2892 months 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4297-4308 months 4309-4320 months 4321-4332 months 4333-4344 months 4345-4356 months 4357-4368 months 4369-4380 months 4381-4392 months 4393-4404 months 4405-4416 months 4417-4428 months 4429-4440 months 4441-4452 months 4453-4464 months 4465-4476 months 4477-4488 months 4489-4500 months 4501-4512 months 4513-4524 months 4525-4536 months 4537-4548 months 4549-4560 months 4561-4572 months 4573-4584 months 4585-4596 months 4597-4608 months 4609-4620 months 4621-4632 months 4633-4644 months 4645-4656 months 4657-4668 months 4669-4680 months 4681-4692 months 4693-4704 months 4705-4716 months 4717-4728 months 4729-4740 months 4741-4752 months 4753-4764 months 4765-4776 months 4777-4788 months 4789-4800 months 4801-4812 months 4813-4824 months 4825-4836 months 4837-4848 months 4849-4860 months 4861-4872 months 4873-4884 months 4885-4896 months 4897-4908 months 4909-4920 months 4921-4932 months 4933-4944 months 4945-4956 months 4957-4968 months 4969-4980 months 4981-4992 months 4993-5004 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months 9217-9228 months 9229-9240 months 9241-9252 months 9253-9264 months 9265-9276 months 9277-9288 months 9289-9300 months 9301-9312 months 9313-9324 months 9325-9336 months 9337-9348 months 9349-9360 months 9361-9372 months 9373-9384 months 9385-9396 months 9397-9408 months 9409-9420 months 9421-9432 months 9433-9444 months 9445-9456 months 9457-9468 months 9469-9480 months 9481-9492 months 9493-9504 months 9505-9516 months 9517-9528 months 9529-9540 months 9541-9552 months 9553-9564 months 9565-9576 months 9577-9588 months 9589-9600 months 9601-9612 months 9613-9624 months 9625-9636 months 9637-9648 months 9649-9660 months 9661-9672 months 9673-9684 months 9685-9696 months 9697-9708 months 9709-9720 months 9721-9732 months 9733-9744 months 9745-9756 months 9757-9768 months 9769-9780 months 9781-9792 months 9793-9804 months 9805-9816 months 9817-9828 months 9829-9840 months 9841-9852 months 9853-9864 months 9865-9876 months 9877-9888 months 9889-9900 months 9901-9912 months 9913-9924 months 9925-9936 months 9937-9948 months 9949-9960 months 9961-9972 months 9973-9984 months 9985-9996 months 9997-10008 months 10009-10020 months 10021-10032 months 10033-10044 months 10045-10056 months 10057-10068 months 10069-10080 months 10081-10092 months 10093-10104 months 10105-10116 months 10117-10128 months 10129-10140 months 10141-10152 months 10153-10164 months 10165-10176 months 10177-10188 months 10189-10200 months 10201-10212 months 10213-10224 months 10225-10236 months 10237-10248 months 10249-10260 months 10261-10272 months 10273-10284 months 10285-10296 months 10297-10308 months 10309-10320 months 10321-10332 months 10333-10344 months 10345-10356 months 10357-10368 months 10369-10380 months 10381-10392 months 10393-10404 months 10405-10416 months 10417-10428 months 10429-10440 months 10441-10452 months 10453-10464 months 10465-10476 months 10477-10488 months 10489-10500 months 10501-10512 months 10513-10524 months 10525-10536 months 10537-10548 months 10549-10560 months 10561-10572 months 10573-10584 months 10585-10596 months 10597-10608 months 10609-10620 months 10621-10632 months 10633-10644 months 10645-10656 months 10657-10668 months 10669-10680 months 10681-10692 months 10693-10704 months 10705-10716 months 10717-10728 months 10729-10740 months 10741-10752 months 10753-10764 months 10765-10776 months 10777-10788 months 10789-10800 months 10801-10812 months 10813-10824 months 10825-10836 months 10837-10848 months 10849-10860 months 10861-10872 months 10873-10884 months 10885-10896 months 10897-10908 months 10909-10920 months 10921-10932 months 10933-10944 months 10945-10956 months 10957-10968 months 10969-10980 months 10981-10992 months 10993-11004 months 11005-11016 months 11017-11028 months 11029-11040 months 11041-11052 months 11053-11064 months 11065-11076 months 11077-11088 months 11089-11100 months 11101-11112 months 11113-11124 months 11125-11136 months 11137-11148 months 11149-11160 months 11161-11172 months 11173-11184 months 11185-11196 months 11197-11208 months 11209-11220 months 11221-11232 months 11233-11244 months 11245-11256 months 11257-11268 months 11269-11280 months 11281-11292 months 11293-11304 months 11305-11316 months 11317-11328 months 11329-11340 months 11341-11352 months 11353-11364 months 11365-11376 months 11377-11388 months 11389-11400 months 11401-11412 months 11413-11424 months 11425-11436 months 11437-11448 months 11449-11460 months 11461-11472 months 11473-11484 months 11485-11496 months 11497-11508 months 11509-11520 months 11521-11532 months 11533-11544 months 11545-11556 months 11557-11568 months 11569-11580 months 11581-11592 months 11593-11604 months 11605-11616 months 11617-11628 months 11629-11640 months 11641-11652 months 11653-11664 months 11665-11676 months 11677-11688 months 11689-11700 months 11701-11712 months 11713-11724 months 11725-11736 months 11737-11748 months 11749-11760 months 11761-11772 months 11773-11784 months 11785-11796 months 11797-11808 months 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