

# Assignment 2 Data Cleaning and Integration

## Brief

- **Due date:** 11:59PM 02/25/2016
  - **Data:** class.txt, superbowl.html
  - **Handin:** follow the handin instruction
  - **Required files:** p1/README, p1/clean.py, p1/cleaned.txt, p1/query.py, p2/transform.py, p2/result.csv, p2/README
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## Entity Resolution: UIC Courses

In an unfortunate series of events, the UIC registrar's course catalog has been corrupted, and must be rebuilt. You have been selected to help with rebuilding it, using various data sources that were acquired from various websites. Your job is to develop (and implement) a series of transformation rules that can be used to recreate the registrar's catalog.

In this assignment, you are given a file `class.txt` that shows the courses taught by UIC professors. However, since data is not clean, there might be cases that multiple versions of professor/course names actually refer to the same professor/course. Your task is to clean the dataset using proper transformation rules, and analyze the cleaned dataset by answering some queries below.

First of all, we suggest that you take a look at the dataset and get a sense of why this dataset is dirty. Then, try to come up with some transformation rules that you would like to use when you clean the dataset. The format of the input data is:

```
professor_name - course_1|course_2|...course_n
```

After you have determined the appropriate transformation rules, write a Python script, `clean.py`, to read the dataset, apply transformation rules, and output a cleaned dataset `cleaned.txt`. Note that the cleaned dataset should have the same format as the dirty dataset, and professors should be listed in alphabetical order based on their last name (**do not include their first name in the cleaned dataset**). For each professor, the courses that he/she teaches should also be listed in alphabetical order.

Finally, using the cleaned dataset, write a python script `query.py` with 3 functions (one for of the following queries, named q1,q2, and q3) to answer the following questions. Each of the functions should take only the cleaned, raw `cleaned.txt` file as input, and print the solution to the console.

- 1: How many distinct courses does this dataset contain?
- 2: List all the courses (in alphabetical order) taught by Professor Mitchell Theys in comma-separated form.
- 3: For professors who have taught at least 5 courses, using Jaccard distance to determine which two professors have the most aligned teaching interests based on course titles. Note that you should implement the function to calculate Jaccard distance instead of using an existing package.

Note that `class.txt` is only a subset of the full dataset, and we will run your `clean.py` on our full dataset to evaluate its quality. i.e., it has to be run with the input: `python3 clean.py [any_file].txt`, as well as your `query.py` script.

### Hint

- You can assume that the professor's last name is a unique identifier for the name of the professor.
- Normally, the professor's last name comes after their first name. But when the name is in comma-separated form, the first name comes after the last name.
- Note that since the dataset is made up, it does not have to represent the real situation in our department.
- Pay attention to abbreviations!

NOTE: The provided dirty dataset `class.txt` is only a subset of all of the data that the registrar has. Your solution (`clean.py`) will be evaluated using a much larger data set, so make sure that your solution is general.

### What to turn in

1. `clean.py` -- Python script that applies your transformation rules.
2. `cleaned.txt` -- Output from `clean.py`.
3. `query.py` -- Python script with 3 functions that answer the above queries.
4. README -- Description of transformation rules, any other relevant information.

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## Reformatting Data: Super Bowl Champions

The Super Bowl is an annual American football game that determines the **champion of the National Football League (NFL)**. In this assignment, you are given the source file `superbowl.html`

which is the HTML source code of the whole [Wikipedia](#) webpage. This data is in HTML format, and we would like to transform it into a more usable format. There are few tables in the mentioned web page; however, the objective is to use python and the [BeautifulSoup](#) library to scrape the data from the second table and save it into a CSV file `result.csv`. Each line in `result.csv` should contain 6 fields: Game number, year, winning team, score, losing team, and venue. Note that the number after every team (and venue) indicates the number of times that the team (or venue) has been in the Super Bowl.

First, extract relevant portion of `superbowl.html`. Note that an HTML table is divided into rows with the `<tr>` tag, and each row is divided into data cells with the `<td>` tag. Using the converted HTML file, write a python script `transform.py` to pull data out of the relevant HTML portion (second table) and save it into a CSV file, named `result.csv` which should match the output shown below. As shown below, the CSV file headings should match those of the table's and the rest rows in the file would be the first 50 rows of the mentioned table on [Wikipedia](#).

Game number	year	winning team	score	losing team	venue
I	1967	Green Bay Packers	01,35-10	Kansas City Chiefs	01,Los Angeles Memorial Coliseum
II	1968	Green Bay Packers	02,33-14	Oakland Raiders	01,Orange Bowl
III	1969	New York Jets	01,16-7	Indianapolis Colts	01,Orange Bowl
IV	1970	Kansas City Chiefs	02,23-7	Minnesota Vikings	01,Tulane Stadium
V	1971	Indianapolis Colts	02,16-13	Dallas Cowboys	01,Orange Bowl
VI	1972	Dallas Cowboys	02,24-3	Miami Dolphins	01,Tulane Stadium
VII	1973	Miami Dolphins	02,14-7	Washington Redskins	01,Los Angeles Memorial Coliseum
VIII	1974	Miami Dolphins	03,24-7	Minnesota Vikings	02,Rice Stadium
IX	1975	Pittsburgh Steelers	01,16-6	Minnesota Vikings	03,Tulane Stadium
X	1976	Pittsburgh Steelers	02,21-17	Dallas Cowboys	03,Orange Bowl
XI	1977	Oakland Raiders	02,32-14	Minnesota Vikings	04,Rose Bowl
XII	1978	Dallas Cowboys	04,27-10	Denver Broncos	01,Louisiana Superdome
XIII	1979	Pittsburgh Steelers	03,35-31	Dallas Cowboys	05,Orange Bowl
XIV	1980	Pittsburgh Steelers	04,31-19	St. Louis Rams	01,Rose Bowl
XV	1981	Oakland Raiders	03,27-10	Philadelphia Eagles	01,Louisiana Superdome
XVI	1982	San Francisco 49ers	01,26-21	Cincinnati Bengals	01,Pontiac Silverdome
XVII	1983	Washington Redskins	02,27-17	Miami Dolphins	04,Rose Bowl
XVIII	1984	Oakland Raiders	04,38-9	Washington Redskins	03,Tampa Stadium
XIX	1985	San Francisco 49ers	02,38-16	Miami Dolphins	05,Stanford Stadium
XX	1986	Chicago Bears	01,46-10	New England Patriots	01,Louisiana Superdome
XXI	1987	New York Giants	01,39-20	Denver Broncos	02,Rose Bowl
XXII	1988	Washington Redskins	04,42-10	Denver Broncos	03,Jack Murphy Stadium
XXIII	1989	San Francisco 49ers	03,20-16	Cincinnati Bengals	02,Joe Robbie Stadium
XXIV	1990	San Francisco 49ers	04,55-10	Denver Broncos	04,Louisiana Superdome
XXV	1991	New York Giants	02,20-19	Buffalo Bills	01,Tampa Stadium
XXVI	1992	Washington Redskins	05,37-24	Buffalo Bills	02,Metrodome
XXVII	1993	Dallas Cowboys	06,52-17	Buffalo Bills	03,Rose Bowl
XXVIII	1994	Dallas Cowboys	07,30-13	Buffalo Bills	04,Georgia Dome
XXIX	1995	San Francisco 49ers	05,49-26	San Diego Chargers	01,Joe Robbie Stadium
XXX	1996	Dallas Cowboys	08,27-17	Pittsburgh Steelers	05,Sun Devil Stadium
XXXI	1997	Green Bay Packers	03,35-21	New England Patriots	02,Louisiana Superdome

XXXII,1998,Denver Broncos 05,31-24,Green Bay Packers 04,Jack Murphy Stadium 02  
XXXIII,1999,Denver Broncos 06,34-19,Atlanta Falcons 01,Joe Robbie Stadium 03  
XXXIV,2000,St. Louis Rams 02,23-16,Tennessee Titans 01,Georgia Dome 02  
XXXV,2001,Baltimore Ravens 01,34-7,New York Giants 03,Raymond James Stadium 01  
XXXVI,2002,New England Patriots 03,20-17,St. Louis Rams 03,Louisiana Superdome 06  
XXXVII,2003,Tampa Bay Buccaneers 01,48-21,Oakland Raiders 05,Jack Murphy Stadium 03  
XXXVIII,2004,New England Patriots 04,32-29,Carolina Panthers 01,NRG Stadium 01  
XXXIX,2005,New England Patriots 05,24-21,Philadelphia Eagles 02,ALLTEL Stadium 01  
XL,2006,Pittsburgh Steelers 06,21-10,Seattle Seahawks 01,Ford Field 01  
XLI,2007,Indianapolis Colts 03,29-17,Chicago Bears 02,Joe Robbie Stadium 04  
XLII,2008,New York Giants 04,17-14,New England Patriots 06,University of Phoenix Stadium 01  
XLIII,2009,Pittsburgh Steelers 07,27-23,Arizona Cardinals 01,Raymond James Stadium 02  
XLIV,2010,New Orleans Saints 01,31-17,Indianapolis Colts 04,Joe Robbie Stadium 05  
XLV,2011,Green Bay Packers 05,31-25,Pittsburgh Steelers 08,Cowboys Stadium 01  
XLVI,2012,New York Giants 05,21-17,New England Patriots 07,Lucas Oil Stadium 01  
XLVII,2013,Baltimore Ravens 02,34-31,San Francisco 49ers 06,Louisiana Superdome 07  
XLVIII,2014,Seattle Seahawks 02,43-8,Denver Broncos 07,MetLife Stadium 01  
XLIX,2015,New England Patriots 08,28-24,Seattle Seahawks 03,University of Phoenix Stadium 02  
50,2016,Denver Broncos 08,24-10,Carolina Panthers 02,Levi's Stadium 01

### What to turn in

1. `transform.py`
2. `result.csv`
3. README (please explain your solution and note any issues/bugs with your solution)

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## Handing in

Please put the required files for the first part (Entity Resolution) in a folder called p1, and the required files for the second part (Reformatting Data) in a folder called p2. For submitting to blackboard, create a folder with your NetID, put p1 and p2 in the folder and zip it into **[your NetID].zip**, not other file extension.

Late submission is not acceptable. The submission link in Blackboard will disappear immediately at the deadline. You could submit multiple times, only the latest version will be graded.

### Cheating/Plagiarism Policy:

Please follow the academic integrity part given as part of the course [syllabus](#).