

Assignment 1 - NLP Regular Expressions

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Task

Use Python Regular Expressions to identify top-10 most frequent causes of **failed** food inspections in Chicago. You can download the dataset here: <https://data.cityofchicago.org/Health-Human-Services/Food-Inspections/4ijn-s7e5>

Rules and Requirements

Your final output and the code should be contained within Jupyter Notebook

Code

In [3]:

```
import pandas as pd
```

In [4]:

```
#use only the columns you need: whether the inspection failed and the specific violations
df = pd.read_csv('Food_Inspections.csv', usecols=['Results', 'Violations'])
#drop any rows with NA/NaN in either column
df=df.dropna()
```

First we want to limit our analysis to failed inspections. What are all the unique results in the Results column?

In [5]:

```
df.Results.unique()
```

Out[5]:

```
array(['Pass w/ Conditions', 'Fail', 'Pass', 'No Entry', 'Not Ready',
      'Out of Business'], dtype=object)
```

There is only one value that could reasonably be interpreted as a failed inspection: 'Fail'. We will use only those rows.

In [6]:

```
df=df.loc[df['Results']=='Fail']
df.head()
```

Out[6]:

	Results	Violations
3	Fail	3. MANAGEMENT, FOOD EMPLOYEE AND CONDITIONAL E...
6	Fail	1. PERSON IN CHARGE PRESENT, DEMONSTRATES KNOW...
13	Fail	3. MANAGEMENT, FOOD EMPLOYEE AND CONDITIONAL E...
15	Fail	3. MANAGEMENT, FOOD EMPLOYEE AND CONDITIONAL E...
22	Fail	2. CITY OF CHICAGO FOOD SERVICE SANITATION CER...

There are this many inspections in the remaining data:

In [7]:

```
len(df.index)
```

Out[7]:

31076

Let us examine what the text looks like in the Violations column. Here is a typical value:

In [8]:

```
violations=df['Violations']  
violations.iloc[0]
```

Out[8]:

```
'3. MANAGEMENT, FOOD EMPLOYEE AND CONDITIONAL EMPLOYEE; KNOWLEDGE, RESPONSIBILITIES AND REPORTING  
- Comments: 2-102.14(N) OBSERVED NO EMPLOYEE HEALTH POLICY ON THE PREMISES. MANAGEMENT INSTRUCTED  
TO PROVIDE A SIGNED EMPLOYEE HEALTH POLICY FOR EACH EMPLOYEE. PRIORITY FOUNDATION 7-38-010. NO CIT  
ATION ISSUED. | 5. PROCEDURES FOR RESPONDING TO VOMITING AND DIARRHEAL EVENTS - Comments: 2-501.11  
OBSERVED NO CLEAN UP PROCEDURE ON THE PREMISES FOR VOMIT AND DIARRHEAL EVENTS. MANAGEMENT  
INSTRUCTED TO PROVIDE A CLEAN UP PROCEDURE AND SUPPLIES. PRIORITY FOUNDATION 7-38-005. NO CITATION  
ISSUED. | 47. FOOD & NON-FOOD CONTACT SURFACES CLEANABLE, PROPERLY DESIGNED, CONSTRUCTED & USED -  
Comments: 4-501.11(A) REPAIR THE LEAKING WATER FROM THE DISHWASHING MACHINE. | 49. NON-FOOD/FOOD  
CONTACT SURFACES CLEAN - Comments: 4-602.13 CLEAN AND SANITIZE THE COFFEE AND DRINK DISPENSER STAT  
IONS BEHIND THE FRONT COUNTER AND THE EXTERIOR OF THE FROSTY MACHINE. CLEAN THE GREASE FROM THE VE  
NTILATION HOOD AND FILTERS. CLEAN THE INTERIOR OF BOTH SIDES OF THE CONDIMENT COOLER AT THE SANDWI  
CH PREP STATION AND THE TOP OF THE DISHMACHINE. | 55. PHYSICAL FACILITIES INSTALLED, MAINTAINED &  
CLEAN - Comments: 6-501.12 CLEAN THE FLOOR BEHIND THE FRONT COUNTER AND BEVERAGE STATION. CLEAN TH  
E GREASE ON THE WALL BEHIND THE DEEP FRYERS. | 58. ALLERGEN TRAINING AS REQUIRED - Comments: PA 10  
0-0367 OBSERVED THE CERTIFIED FOOD MANAGER WITHOUT THE ALLERGEN TRAINING. MANAGEMENT INSTRUCTED TO  
SHOW PROOF OF TRAINING. | 59. PREVIOUS PRIORITY FOUNDATION VIOLATION CORRECTED - Comments: 8-404.1  
3 PREVIOUS PRIORITY FOUNDATION VIOLATION #38 WAS NOT CORRECTED FROM REPORT #2222608 ON 9/20/18:  
38 - OBSERVED OVER 40 LIVE SMALL FLIES THROUGHOUT THE PREP AREA AND DINING AREA AND OUTSIDE OF TH  
E WASHROOMS. MANAGEMENT INSTRUCTED TO MINIMIZE OR ELIMINATE THE PEST ACTIVITY. PRIORITY 7-42-  
090. CITATION ISSUED.'
```

We can make some conclusions as to how the text of these violations is organized.

- The value is all in one string.
- It contains multiple violations, each separated by a " | "
- Each violation has several parts that are consistently structured:
 - a violation number and header (e.g. 58. ALLERGEN TRAINING AS REQUIRED)
 - a comments section which includes a number (possibly a code citation) as well as a narrative explanation of the violation

This is better visualized when an entry is broken up by violation.

In [9]:

```
string=violations.iloc[0]  
splits=string.count('|')  
string.split('|', maxsplit=splits)
```

Out[9]:

```
['3. MANAGEMENT, FOOD EMPLOYEE AND CONDITIONAL EMPLOYEE; KNOWLEDGE, RESPONSIBILITIES AND REPORTING  
- Comments: 2-102.14(N) OBSERVED NO EMPLOYEE HEALTH POLICY ON THE PREMISES. MANAGEMENT INSTRUCTED  
TO PROVIDE A SIGNED EMPLOYEE HEALTH POLICY FOR EACH EMPLOYEE. PRIORITY FOUNDATION 7-38-010. NO CIT  
ATION ISSUED. ',  
' 5. PROCEDURES FOR RESPONDING TO VOMITING AND DIARRHEAL EVENTS - Comments: 2-501.11 OBSERVED NO  
CLEAN UP PROCEDURE ON THE PREMISES FOR VOMIT AND DIARRHEAL EVENTS. MANAGEMENT INSTRUCTED TO  
PROVIDE A CLEAN UP PROCEDURE AND SUPPLIES. PRIORITY FOUNDATION 7-38-005. NO CITATION ISSUED. ',  
' 47. FOOD & NON-FOOD CONTACT SURFACES CLEANABLE, PROPERLY DESIGNED, CONSTRUCTED & USED - Comment  
s: 4-501.11(A) REPAIR THE LEAKING WATER FROM THE DISHWASHING MACHINE. ',  
' 49. NON-FOOD/FOOD CONTACT SURFACES CLEAN - Comments: 4-602.13 CLEAN AND SANITIZE THE COFFEE AND  
DRINK DISPENSER STATIONS BEHIND THE FRONT COUNTER AND THE EXTERIOR OF THE FROSTY MACHINE. CLEAN TH  
E GREASE FROM THE VENTILATION HOOD AND FILTERS. CLEAN THE INTERIOR OF BOTH SIDES OF THE CONDIMENT  
COOLER AT THE SANDWICH PREP STATION AND THE TOP OF THE DISHMACHINE. ',  
' 55. PHYSICAL FACILITIES INSTALLED, MAINTAINED & CLEAN - Comments: 6-501.12 CLEAN THE FLOOR  
BEHIND THE FRONT COUNTER AND BEVERAGE STATION. CLEAN THE GREASE ON THE WALL BEHIND THE DEEP FRYERS  
, ',  
' 58. ALLERGEN TRAINING AS REQUIRED - Comments: PA 100-0367 OBSERVED THE CERTIFIED FOOD MANAGER W  
ITHOUT THE ALLERGEN TRAINING. MANAGEMENT INSTRUCTED TO SHOW PROOF OF TRAINING. ',
```

```
' 59. PREVIOUS PRIORITY FOUNDATION VIOLATION CORRECTED - Comments: 8-404.13 PREVIOUS PRIORITY FOUNDATION VIOLATION #38 WAS NOT CORRECTED FROM REPORT #2222608 ON 9/20/18: 38 - OBSERVED OVER 40 LIVE SMALL FLIES THROUGHOUT THE PREP AREA AND DINING AREA AND OUTSIDE OF THE WASHROOMS. MANAGEMENT INSTRUCTED TO MINIMIZE OR ELIMINATE THE PEST ACTIVITY. PRIORITY 7-42-090. CITATION IS SUED.']
```

We will have to make a few assumptions if we are to focus further on the relevant information.

- The restaurant can fail an inspection whether or not a citation is issued (contrast #'s 3 and 58 above). Not all failed inspections have the 'CITATION ISSUED' language.
- The restaurant can fail an inspection whether or not any violation is deemed 'PRIORITY' (see #'s 5 and 58 above).
- The Comments for each violation will vary from restaurant to restaurant and are therefore beyond the scope of the analysis. If each one is unique they cannot be meaningfully aggregated. Also the comments contain a legal citation, which are specific but lack meaningful context.

Therefore we will consider the "cause of the failed food inspection" to be the parts of the string including the number, the general description but not the comments.

An example of these causes are as follows:

In [10]:

```
import re
#any number of digits followed by a . followed by any non-numeric character but stop when you look ahead and find a ' - Comments'
#which works when ' -' does not for whatever reason

value=re.findall('[0-9]+\.\D+(?=\s-\sComments)', string)
value
```

Out[10]:

```
['3. MANAGEMENT, FOOD EMPLOYEE AND CONDITIONAL EMPLOYEE; KNOWLEDGE, RESPONSIBILITIES AND REPORTING',
'5. PROCEDURES FOR RESPONDING TO VOMITING AND DIARRHEAL EVENTS',
'47. FOOD & NON-FOOD CONTACT SURFACES CLEANABLE, PROPERLY DESIGNED, CONSTRUCTED & USED',
'49. NON-FOOD/FOOD CONTACT SURFACES CLEAN',
'55. PHYSICAL FACILITIES INSTALLED, MAINTAINED & CLEAN',
'58. ALLERGEN TRAINING AS REQUIRED',
'59. PREVIOUS PRIORITY FOUNDATION VIOLATION CORRECTED']
```

We will count the number of occurrences of each violation by cycling through the dataframe, using regex to extract the relevant violations in each cell and then count them by incrementing in a dictionary.

In [12]:

```
all_violations={}

for i in range(len(violations.index)):
    string=violations.iloc[i]
    restaurant_violations=re.findall('[0-9]+\.\D+(?=\s-\sComments)', string)
    for v in restaurant_violations:
        if not v in all_violations:
            all_violations[v] = 1
        else:
            all_violations[v] += 1
    #all_violations.append(restaurant_violations)
all_violations
```

Out[12]:

```
{'1. PERSON IN CHARGE PRESENT, DEMONSTRATES KNOWLEDGE, AND PERFORMS DUTIES': 19,
'1. SOURCE SOUND CONDITION, NO SPOILAGE, FOODS PROPERLY LABELED, SHELLFISH TAGS IN PLACE': 363,
'10. ADEQUATE HANDWASHING SINKS PROPERLY SUPPLIED AND ACCESSIBLE': 270,
'10. SEWAGE AND WASTE WATER DISPOSAL, NO BACK SIPHONAGE, CROSS CONNECTION AND/OR BACK FLOW': 691,
'11. ADEQUATE NUMBER, CONVENIENT, ACCESSIBLE, DESIGNED, AND MAINTAINED': 2848,
'11. FOOD OBTAINED FROM APPROVED SOURCE': 4,
'12. HAND WASHING FACILITIES: WITH SOAP AND SANITARY HAND DRYING DEVICES, CONVENIENT AND ACCESSIBLE TO FOOD PREP AREA': 1901,
'13. FOOD IN GOOD CONDITION, SAFE, & UNADULTERATED': 9,
'13. NO EVIDENCE OF RODENT OR INSECT INFESTATION, NO BIRDS, TURTLES OR OTHER ANIMALS': 601}
```

'13. NO EVIDENCE OF RODENT OR INSECT INFESTATION, NO BIRDS, TORILES OR OTHER ANIMALS': 601,
 '14. REQUIRED RECORDS AVAILABLE: SHELLSTOCK TAGS, PARASITE DESTRUCTION': 4,
 '15. FOOD SEPARATED AND PROTECTED': 6,
 '15. UNWRAPPED AND POTENTIALLY HAZARDOUS FOOD NOT RE-SERVED': 1,
 '16. FOOD PROTECTED DURING STORAGE, PREPARATION, DISPLAY, SERVICE AND TRANSPORTATION': 3733,
 '16. FOOD-CONTACT SURFACES: CLEANED & SANITIZED': 76,
 '17. POTENTIALLY HAZARDOUS FOOD PROPERLY THAWED': 64,
 '17. PROPER DISPOSITION OF RETURNED, PREVIOUSLY SERVED, RECONDITIONED & UNSAFE FOOD': 1,
 '18. NO EVIDENCE OF RODENT OR INSECT OUTER OPENINGS PROTECTED/RODENT PROOFED, A WRITTEN LOG SHALL BE MAINTAINED AVAILABLE TO THE INSPECTORS': 16420,
 '19. OUTSIDE GARBAGE WASTE GREASE AND STORAGE AREA; CLEAN, RODENT PROOF, ALL CONTAINERS COVERED': 3884,
 '19. PROPER REHEATING PROCEDURES FOR HOT HOLDING': 1,
 '2. CITY OF CHICAGO FOOD SERVICE SANITATION CERTIFICATE': 67,
 '2. FACILITIES TO MAINTAIN PROPER TEMPERATURE': 3546,
 '20. INSIDE CONTAINERS OR RECEPTACLES: ADEQUATE NUMBER, PROPERLY COVERED AND INSECT/RODENT PROOF': 97,
 '20. PROPER COOLING TIME AND TEMPERATURE': 3,
 '21. * CERTIFIED FOOD MANAGER ON SITE WHEN POTENTIALLY HAZARDOUS FOODS ARE PREPARED AND SERVED': 4057,
 '21. PROPER HOT HOLDING TEMPERATURES': 11,
 '22. DISH MACHINES: PROVIDED WITH ACCURATE THERMOMETERS, CHEMICAL TEST KITS AND SUITABLE GAUGE COCK': 1039,
 '22. PROPER COLD HOLDING TEMPERATURES': 67,
 '23. DISHES AND UTENSILS FLUSHED, SCRAPED, SOAKED': 5,
 '23. PROPER DATE MARKING AND DISPOSITION': 102,
 '24. DISH WASHING FACILITIES: PROPERLY DESIGNED, CONSTRUCTED, MAINTAINED, INSTALLED, LOCATED AND OPERATED': 2992,
 '25. CONSUMER ADVISORY PROVIDED FOR RAW/UNDERCOOKED FOOD': 69,
 '25. TOXIC ITEMS PROPERLY STORED, LABELED AND USED': 117,
 '26. ADEQUATE NUMBER, CONVENIENT, ACCESSIBLE, PROPERLY DESIGNED AND INSTALLED': 1329,
 '27. TOILET ROOMS ENCLOSED CLEAN, PROVIDED WITH HAND CLEANSER, SANITARY HAND DRYING DEVICES AND PROPER WASTE RECEPTACLES': 288,
 '28. * INSPECTION REPORT SUMMARY DISPLAYED AND VISIBLE TO ALL CUSTOMERS': 619,
 '28. TOXIC SUBSTANCES PROPERLY IDENTIFIED, STORED, & USED': 4,
 '29. COMPLIANCE WITH VARIANCE/SPECIALIZED PROCESS/HACCP': 5,
 '3. MANAGEMENT, FOOD EMPLOYEE AND CONDITIONAL EMPLOYEE; KNOWLEDGE, RESPONSIBILITIES AND REPORTING': 443,
 '3. POTENTIALLY HAZARDOUS FOOD MEETS TEMPERATURE REQUIREMENT DURING STORAGE, PREPARATION DISPLAY AND SERVICE': 3651,
 '30. FOOD IN ORIGINAL CONTAINER, PROPERLY LABELED: CUSTOMER ADVISORY POSTED AS NEEDED': 4211,
 '31. CLEAN MULTI-USE UTENSILS AND SINGLE SERVICE ARTICLES PROPERLY STORED: NO REUSE OF SINGLE SERVICE ARTICLES': 2718,
 '31. WATER & ICE FROM APPROVED SOURCE': 2,
 '32. FOOD AND NON-FOOD CONTACT SURFACES PROPERLY DESIGNED, CONSTRUCTED AND MAINTAINED': 14993,
 '32. VARIANCE OBTAINED FOR SPECIALIZED PROCESSING METHODS': 1,
 '33. FOOD AND NON-FOOD CONTACT EQUIPMENT UTENSILS CLEAN, FREE OF ABRASIVE DETERGENTS': 16426,
 '33. PROPER COOLING METHODS USED; ADEQUATE EQUIPMENT FOR TEMPERATURE CONTROL': 74,
 '34. FLOORS: CONSTRUCTED PER CODE, CLEANED, GOOD REPAIR, COVING INSTALLED, DUST-LESS CLEANING METHODS USED': 19342,
 '35. WALLS, CEILINGS, ATTACHED EQUIPMENT CONSTRUCTED PER CODE: GOOD REPAIR, SURFACES CLEAN AND DUST-LESS CLEANING METHODS': 18224,
 '36. LIGHTING: REQUIRED MINIMUM FOOT-CANDLES OF LIGHT PROVIDED, FIXTURES SHIELDED': 7723,
 '36. THERMOMETERS PROVIDED & ACCURATE': 127,
 '37. FOOD PROPERLY LABELED; ORIGINAL CONTAINER': 97,
 '37. TOILET ROOM DOORS SELF CLOSING: DRESSING ROOMS WITH LOCKERS PROVIDED: COMPLETE SEPARATION FROM LIVING/SLEEPING QUARTERS': 2514,
 '38. INSECTS, RODENTS, & ANIMALS NOT PRESENT': 316,
 '38. VENTILATION: ROOMS AND EQUIPMENT VENTED AS REQUIRED: PLUMBING: INSTALLED AND MAINTAINED': 15507,
 '39. CONTAMINATION PREVENTED DURING FOOD PREPARATION, STORAGE & DISPLAY': 84,
 '39. LINEN: CLEAN AND SOILED PROPERLY STORED': 229,
 '4. PROPER USE OF RESTRICTION AND EXCLUSION': 1,
 '4. SOURCE OF CROSS CONTAMINATION CONTROLLED I.E. CUTTING BOARDS, FOOD HANDLERS, UTENSILS, ETC': 249,
 '40. PERSONAL CLEANLINESS': 20,
 '40. REFRIGERATION AND METAL STEM THERMOMETERS PROVIDED AND CONSPICUOUS': 4617,
 '41. PREMISES MAINTAINED FREE OF LITTER, UNNECESSARY ARTICLES, CLEANING EQUIPMENT PROPERLY STORED': 10651,
 '41. WIPING CLOTHS: PROPERLY USED & STORED': 49,
 '42. APPROPRIATE METHOD OF HANDLING OF FOOD (ICE) HAIR RESTRAINTS AND CLEAN APPAREL WORN': 1676,
 '43. FOOD (ICE) DISPENSING UTENSILS, WASH CLOTHS PROPERLY STORED': 2237,
 '43. IN-USE UTENSILS: PROPERLY STORED': 16,
 '44. ONLY AUTHORIZED PERSONNEL IN THE FOOD-PREP AREA': 131,
 '44. UTENSILS, EQUIPMENT & LINENS: PROPERLY STORED, DRIED, & HANDLED': 39,
 '45. FOOD HANDLER REQUIREMENTS MET': 1920,
 '45. SINGLE-USE/SINGLE-SERVICE ARTICLES: PROPERLY STORED & USED': 19,
 '46. CLOSING USED PROPERLY': 2

```
'46. GLOVES USED PROPERLY': 2,
'47. FOOD & NON-FOOD CONTACT SURFACES CLEANABLE, PROPERLY DESIGNED, CONSTRUCTED & USED': 264,
'48. WAREWASHING FACILITIES: INSTALLED, MAINTAINED & USED; TEST STRIPS': 136,
'49. NON-FOOD/FOOD CONTACT SURFACES CLEAN': 194,
'5. PERSONNEL WITH INFECTIONS RESTRICTED: NO OPEN SORES, WOUNDS, ETC': 9,
'5. PROCEDURES FOR RESPONDING TO VOMITING AND DIARRHEAL EVENTS': 433,
'50. HOT & COLD WATER AVAILABLE; ADEQUATE PRESSURE': 40,
'51. PLUMBING INSTALLED; PROPER BACKFLOW DEVICES': 189,
'52. SEWAGE & WASTE WATER PROPERLY DISPOSED': 29,
'53. TOILET FACILITIES: PROPERLY CONSTRUCTED, SUPPLIED, & CLEANED': 30,
'54. GARBAGE & REFUSE PROPERLY DISPOSED; FACILITIES MAINTAINED': 66,
'55. PHYSICAL FACILITIES INSTALLED, MAINTAINED & CLEAN': 589,
'56. ADEQUATE VENTILATION & LIGHTING; DESIGNATED AREAS USED': 186,
'57. ALL FOOD EMPLOYEES HAVE FOOD HANDLER TRAINING': 119,
'58. ALLERGEN TRAINING AS REQUIRED': 246,
'59. PREVIOUS PRIORITY FOUNDATION VIOLATION CORRECTED': 27,
'6. HANDS WASHED AND CLEANED, GOOD HYGIENIC PRACTICES; NO BARE HAND CONTACT WITH READY-TO-EAT FOODS.': 833,
'6. PROPER EATING, TASTING, DRINKING, OR TOBACCO USE': 1,
'61. SUMMARY REPORT DISPLAYED AND VISIBLE TO THE PUBLIC': 5,
'62. COMPLIANCE WITH CLEAN INDOOR AIR ORDINANCE': 4,
'7. NO DISCHARGE FROM EYES, NOSE, AND MOUTH': 1,
'7. WASH AND RINSE WATER: CLEAN AND PROPER TEMPERATURE': 88,
'70. NO SMOKING REGULATIONS': 401,
'8. HANDS CLEAN & PROPERLY WASHED': 8,
'8. SANITIZING RINSE FOR EQUIPMENT AND UTENSILS: CLEAN, PROPER TEMPERATURE, CONCENTRATION, EXPOSURE TIME': 1344,
'9. NO BARE HAND CONTACT WITH RTE FOOD OR A PRE-APPROVED ALTERNATIVE PROCEDURE PROPERLY ALLOWED': 11,
'9. WATER SOURCE: SAFE, HOT & COLD UNDER CITY PRESSURE': 1338}
```

Those are all of the violations. We see some overlap in the violation number (see the last two items in the dictionary), but this does not matter for our purposes.

We also see that the violations are not ordered by count. The code below extracts the top 10 violations by count.

In [13]:

```
from collections import OrderedDict
#sort the dictionary by value in descending order
all_violations_sorted = OrderedDict(sorted(all_violations.items(), key=lambda x: x[1], reverse=True))
#and take the top 10
top10=list(all_violations_sorted.items())[0:10]
top10
```

Out[13]:

```
[('34. FLOORS: CONSTRUCTED PER CODE, CLEANED, GOOD REPAIR, COVING INSTALLED, DUST-LESS CLEANING METHODS USED',
 19342),
 ('35. WALLS, CEILINGS, ATTACHED EQUIPMENT CONSTRUCTED PER CODE: GOOD REPAIR, SURFACES CLEAN AND DUST-LESS CLEANING METHODS',
 18224),
 ('33. FOOD AND NON-FOOD CONTACT EQUIPMENT UTENSILS CLEAN, FREE OF ABRASIVE DETERGENTS',
 16426),
 ('18. NO EVIDENCE OF RODENT OR INSECT OUTER OPENINGS PROTECTED/RODENT PROOFED, A WRITTEN LOG SHALL BE MAINTAINED AVAILABLE TO THE INSPECTORS',
 16420),
 ('38. VENTILATION: ROOMS AND EQUIPMENT VENTED AS REQUIRED: PLUMBING: INSTALLED AND MAINTAINED',
 15507),
 ('32. FOOD AND NON-FOOD CONTACT SURFACES PROPERLY DESIGNED, CONSTRUCTED AND MAINTAINED',
 14993),
 ('41. PREMISES MAINTAINED FREE OF LITTER, UNNECESSARY ARTICLES, CLEANING EQUIPMENT PROPERLY STORED',
 10651),
 ('36. LIGHTING: REQUIRED MINIMUM FOOT-CANDLES OF LIGHT PROVIDED, FIXTURES SHIELDED',
 7723),
 ('40. REFRIGERATION AND METAL STEM THERMOMETERS PROVIDED AND CONSPICUOUS',
 4617),
 ('30. FOOD IN ORIGINAL CONTAINER, PROPERLY LABELED: CUSTOMER ADVISORY POSTED AS NEEDED',
 4211)]
```

It is easier to comprehend when we put this in a dataframe.

In [15]:

```
df=pd.DataFrame(top10, columns=["Violation", "Number of Citations"])
pd.set_option('max_colwidth',160)
#pd.set_option('colheader_justify', 'right')
rank=list(range(1,11))
df.insert(0, "Rank", rank)
df
```

Out[15]:

	Rank	Violation	Number of Citations
0	1	34. FLOORS: CONSTRUCTED PER CODE, CLEANED, GOOD REPAIR, COVING INSTALLED, DUST-LESS CLEANING METHODS USED	19342
1	2	35. WALLS, CEILINGS, ATTACHED EQUIPMENT CONSTRUCTED PER CODE: GOOD REPAIR, SURFACES CLEAN AND DUST-LESS CLEANING METHODS	18224
2	3	33. FOOD AND NON-FOOD CONTACT EQUIPMENT UTENSILS CLEAN, FREE OF ABRASIVE DETERGENTS	16426
3	4	18. NO EVIDENCE OF RODENT OR INSECT OUTER OPENINGS PROTECTED/RODENT PROOFED, A WRITTEN LOG SHALL BE MAINTAINED AVAILABLE TO THE INSPECTORS	16420
4	5	38. VENTILATION: ROOMS AND EQUIPMENT VENTED AS REQUIRED: PLUMBING: INSTALLED AND MAINTAINED	15507
5	6	32. FOOD AND NON-FOOD CONTACT SURFACES PROPERLY DESIGNED, CONSTRUCTED AND MAINTAINED	14993
6	7	41. PREMISES MAINTAINED FREE OF LITTER, UNNECESSARY ARTICLES, CLEANING EQUIPMENT PROPERLY STORED	10651
7	8	36. LIGHTING: REQUIRED MINIMUM FOOT-CANDLES OF LIGHT PROVIDED, FIXTURES SHIELDED	7723
8	9	40. REFRIGERATION AND METAL STEM THERMOMETERS PROVIDED AND CONSPICUOUS	4617
9	10	30. FOOD IN ORIGINAL CONTAINER, PROPERLY LABELED: CUSTOMER ADVISORY POSTED AS NEEDED	4211

These are the top-10 most frequent causes of failed food inspections in Chicago.