



Notebook Contents:

- Adding packages and importing various libraries
- Loading **FRIENDS TV series** (a famous television sitcom comedy series) dataset and cleaning it using NLTK techniques
- Plotting various attributes of characters in FRIENDS TV series
- Modelling and applied supervised and unsupervised learning methods
- Conclusion

Importing various python libraries that are required for our notebook at various steps.

In [1]:

```

import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
import seaborn as sns
import nltk
import re
from nltk.book import *
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from nltk.stem import PorterStemmer
from nltk.stem.wordnet import WordNetLemmatizer
import unicodedata
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.ensemble import RandomForestClassifier
from textblob import TextBlob, Word
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import CountVectorizer, TfidfVectorizer
from sklearn.naive_bayes import MultinomialNB # Naive Bayes
from sklearn.linear_model import LogisticRegression
from sklearn import metrics
from nltk.probability import ConditionalFreqDist
import random

```

```

*** Introductory Examples for the NLTK Book ***
Loading text1, ..., text9 and sent1, ..., sent9
Type the name of the text or sentence to view it.
Type: 'texts()' or 'sents()' to list the materials.
text1: Moby Dick by Herman Melville 1851
text2: Sense and Sensibility by Jane Austen 1811
text3: The Book of Genesis
text4: Inaugural Address Corpus
text5: Chat Corpus
text6: Monty Python and the Holy Grail
text7: Wall Street Journal
text8: Personals Corpus
text9: The Man Who Was Thursday by G . K . Chesterton 1908

```

Data Cleaning:

Our dataset is in excel format. We load it using **pandas** read_excel function

In [2]:

```
df = pd.read_excel('transcripts_friends/friends_dataset.xlsx')
```

Our dataset looks like below. The columns are Location(where the scene happens), Scene(situation of the play), Season(there are 10 seasons and Season column has the number), Text(dialogue), Speaker(the character who is talking) and dialouge_count(length of the dialogue also the number of letters in the dialogue)

In [3]:

```
df.head()
```

Out[3]:

	Unnamed: 0	Location	Scene	Season	Speaker	Text	dialogue_count
0	0	Chandler and Joey's	Joey is repacking the furniture into boxes to...	4	Joey	What?	5.0
1	1	Monica and Rachel's	the next morning, Monica is getting the door,	1	Monica	Oh, you got the whole night, huh?	33.0
2	2	Mike's apartment	His phone rings and he picks up	9	Chandler	Phoebe is going to say "yes"? That's, that's g...	51.0
3	3	Monica and Rachel's	Ross and Monica are sitting on the couch play...	4	Ross	Yeah.	5.0
4	4	Phoebe,Âs birthday	she,Âs telling everyone what she found out a...	7	Phoebe	Oh!	4.0

The below are the characters in FRIENDS TV show. We are initialising each character with an empty list

In [4]:

```
Rachel = []
Monica = []
Chandler = []
Ross = []
Joey = []
Phoebe = []
```

Based on the Speaker, we are loading each character list with the text or the dialogues that they are delivering in the episode.

In [5]:

```
for d in df.index:
    if df['Speaker'][d] == 'Ross':
        Ross.append(df['Text'][d])
    elif df['Speaker'][d] == 'Chandler':
        Chandler.append(df['Text'][d])
    elif df['Speaker'][d] == 'Phoebe':
        Phoebe.append(df['Text'][d])
    elif df['Speaker'][d] == 'Monica':
        Monica.append(df['Text'][d])
    elif df['Speaker'][d] == 'Joey':
        Joey.append(df['Text'][d])
    elif df['Speaker'][d] == 'Rachel':
        Rachel.append(df['Text'][d])
```

For example the list 'Ross' has all the dialogues that he has delivered in the 10 seasons of the show. We still need to clean the data as the data has unexpected or special characters which will be cleaned in the next few lines of code

In [6]:

```
Ross
```

Out[6]:

```
[ 'Yeah.',
  ' Woohoo!',
  'I love this. ',
  "No, I'm sorry. Look I don't think that's what you wanna hear right
now but I can't help it. I love marriage.",
  'I broke my thumb.',
  ' Dude, what are you doing?',
  ' Umm, uh, I was just telling the guys,Ä¶',
  'Huh. That,Äs a really pretty name for-for an industrial solven
t.',
  'Hey Rach, can you pass me the TV Guide?',
  ',Ä¶and the miracle was that that little bit of oil that should,Äv
e just lasted just one day, burned for,Ä¶',
  'Mary-Angela.',
  'Oww!',
  'What?',
  'Yeah.',
  'Beef in a dessert?! I- no no no, there is no way!',
  'Well I had a great time! Umm, Chancy on the other hand,Ä¶',
  'Yeah.',
  'Uh, Pheeb, while we,Äre hovering around the subject. I just have
to say dinosaurs, they-they don,Ät go, rrroof!',
  'All right. ,ÄCandy and Cookie?,Ä',
  'Ohh! Thank you.',
  "Emily's cousin kicked me out!",
  "It's an honor to meet you. I can't tell you how long I've been an
admirer of your work, I mean, that Nobel prize, whoooo! I mean, I h
ave to tell you that, you're one of the reasons I got into the fiel
d.",
  'Oh great! We,Äre going out again Saturday. But I just found she,Ä
s also seeing some other guy.',
  "Yeah, y'know the ah, the girlfriend I told you about last night?
Well it turns out she ah, she wants to get back together with me. O
h, I found it!!",
  'Now I,Äm so happy.',
  'Yep, we got it, we got it. Thank you so much.',
  'Okay, umm,Ä¶',
  'What? What?!!',
  'Did I, did I even treat?',
  'Are you kidding? I have had some very dirty dreams about this...',
  'Well good, okay. I-I, kind of think y,Äknow if we,Ä¶if,Ä¶ You,Är
e wearing the ring.',
  'Okay, well here we are. Now we,Äre in a tough spot again, Rach. W
hat do you want to do? How do you want to handle it? Huh? Do you wan
na fight for us? Or, do you wanna bail? I just can,Ät see us throw
ing away something we know is so damn good. Rachel, I love you so mu
ch.',
  'Shoot.',
  'Oh no-no-no, we,Äre just two people who happen to run into each o
ther here at the coffee house. ',
  'Good call!',
  'Oh. ',
  "Oh that's nice.",
  'Right.',
  'But having a dove place the ring on your finger would,Äve been no
problem?',
  'Touched. Used. Sat on. Sleep on.',
  'Well, I mean it,Äs not all bad. I,Äm learning to appreciate the
uh, smaller things in life. Like the sound of a bird and the color o
```

f the sky.',
'Really? That okay, that,Äôs great.',
'No-no. No.',
"No, and I'm not going to.",
'Two! I,Äôve been engaged twice!',
'Hey, hey. I know you love me. I know you do.',
'Hey! Are you ready yet?',
"All right Emily, as much as I love you, I'm sorry, I can't move to London without Ben.",
'Well, we-we said we,Äôd just do it that one time but, but now I think she may wanna start things up again.',
'Ä¶is for me not to see you anymore.',
'Playpen?! Ben,Äôs seven!',
'Do you mind if I sit here for a sec.?',
'Forget it.',
'Chandler was how old when he first touched a girl,Äôs breast?',
'According to Chandler, what phenomenon scares the bejeezus out of him?',
'You set her up?!',
'Y,Äôknow we should probably ask the doctor if she even knows how to deliver a baby that,Äôs half human and half pure evil!',
"I honestly don't know if I'm hungry or horny.",
"Yeah? All right I'll call the airlines. ",
'All right then. How do you test the temperature of the baby,Äôs bath water?',
'Oh, it looks like mom and dad,Äôs house. Oh, it even has a tree with a broken limb out front and the uh, the window in the attic is,Ä¶ Oh my God!!',
'A little bit.',
'They have another guess.',
'Well, what do you do?',
'I love when you talk dirty to me.',
"Okay when you're playing a machine and it hasn't paid out, a lurker waits for you to give up and then,Ä¶",
'Yay!',
"You're over me?",
'Oh, I was unbelievable.',
'And the place looks so nice!',
'Then how did you get caught in the barbed wire?',
'Ah, I,Äôm sorry.',
'Uh, oh-oh, no you didn,Äôt. I did.',
"Well maybe it's cold in there. Or maybe I screwed up the first date I had in 9 years.",
"I'm just so happy you guys are finally getting a kid.",
'Hi.',
"You, give him back his underwear! I'm gonna go get a cab, and I want everyone down stairs in two minutes! Monica!",
"Ranion's theory of species variegation?",
'Hey Chandler, there,Äôs a party tomorrow, you,Äôll feel better then.',
"Uh, they don't like it when you correct their grammar.",
"She says Marcel's humping thing's not a phase. Apparently he's reached sexual maturity.",
'Who?',
'Fine, you go.',
'Okay, okay! I,Äôm going. I,Äôm going. ',
'Hi!',
'I like it, and Emily likes it, and that,Äôs what counts. So uh, how are you guys doing?',
'Hey listen I uh, talked to Chandler, sorry about the movie.',
'Ah....',

'Hey, remember when I had a monkey?',
'Hi.',
'Look, I do not re-love her.',
'And his first name.',
" I'm an eight!",
'Does it always, uh--?',
'Or that.',
'Oh, all right. Can you-can you see what it is?',
' So I,Äm gonna take off then!',
'All right look, I-I realize it upsets you.',
'Äand then, we could,Äve gone from the ceremony to the reception with you in the sidecar!',
"No, no, no, no, no, I don't want to know, absolutely not. I think, you know, I think you should know until you look down there, and say, oop, there it is! Or isn't...",
"Well, I added the 'exactly like me' part... But she said she's looking for someone, and someone is gonna be there tonight.",
' Wow! I have never had such a healthy break-up! She was such a grown-up about it! She didn,Ät seem too immature for me! Did I just make a huge mistake?',
'With you?! Yeah right!',
' My god. You...you look beautiful.',
"Marcel, c'mere, c'mere. Okay, Marcel, please, could you leave my leg alone? Could you just stop humping me for two seconds?! Marcel, would- okay, just take him away. Just take him.",
"That doesn't matter! We're talking about the foundation of our friendship.",
'Is that,Äare you saying yes? Is that yes?',
'I know and yet here you are all ready for the next date.',
'ÄNothing!!',
'What,Äs up?',
'Well let there,Äiwhat if a man comes along and puts a gun to your head and says, "You ride this bike or I,Äll sh,ÄI,Äll shoot you."',
'Sure, Monica would have to give her up.',
'Ah, well, it means that I can sell cookies, but I,Äm not invited to sleep-overs.',
"Uhh, yeah it would! Let's do it!",
'Or! Or, we could go to the bank, close our accounts and cut them off at the source.',
'Hey.',
'Phoebe, you can,Ät get out of this! Okay? You have to learn how to ride a bike!',
'What?! What does he want?! I wasn,Ät doing anything!',
'Oh! Got ,Äem right here, check!',
"Emily? Emily! Oh my God! Oh my God, it's Emily! Hi!",
'Why would I eat my own arm?',
' Okay, shoot!',
'Oh yeah, how about you and the, "I,Äm sorry!"',
"I am speechless... I mean the fact that you would put my happiness first like that. I mean, you're an incredible friend, you know that?",
'Yeah, yeah, it,Äll be great! You can, you can lay on the beach and I can cry over my failed marriage. See-see how I make jokes?',
'Really?!',
'No Rach! Come on! No-no! Yeah, I,Äm sure we won,Ät get arrested for this.',
'Huh.',
"So he hasn't called?",
'Oh! Hello uh, Mona from her restaurant. Mona, wow what a, what a beautiful name.',

'None of the sane ones wanted to come back with me! That's not the point. Ok? The point is you...you are the one',

"Yeah, i-it's for the museum. Someone found a bone, we want the bone, but they don't want us to have the bone, so I'm going over there to try to persuade them to give us the bone, it's, it's a whole big bone thing. Anyway, I'm gonna be gone for like, uh... like a week, so, uh, if you wanna reach me, y-you can't. So here's my itinerary ",

"No! Oh, no-no-no. Hey, you weren't bad, you've been very good, Ben.",

'Monica, I, I'm cutting you off.',

'Yep?',

' Rachel!!!',

'30 seconds on the clock. 5 questions wins the game. The lightning round begins, now! What is Joey's favorite food?',

'I don't know Rachel, why?',

'Oh, sorry. Well, look, maybe I can help you with it.',

'Too little, too late, Benji!',

'Hi!',

'Hey!',

"The hills were alive with the sound of music.",

'I, I'm sorry, it's just one of my last nights together before she leaves for camp, to be a counselor!',

'Hey Rach, can you pass me the TV Guide?',

'What do I know? I just sell Middle Eastern food from a cart!',

'He, he's coming here for Thanksgiving!',

'Look. Look, my mom gave me that ring because she wanted me to propose to Rachel, but all I wanted to do is if she maybe, kinda, wanted ah, start, things up again.',

'And confused. Rach, sweetie, I-I um, I didn't propose to you.',

'And I too am just a love machine. ',

'2 hours, 27 minutes.',

'I, I've never walked down the aisle knowing it can't end in divorce.',

"That guy Mark. From Bloomingdale's... She thinks he's just being nice to her. But I know he really wants to sleep with her.",

'Listen, I, I'm ah, I, I'm sorry I, I've been so crazy and jealous and, it's just that I like you a lot, so...',

"I know I am! ...And when it's summer, and it's hot, why can't you wear a tank top?",

'Oh really, really great! Yeah! A-actually she's right down the street, umm, do-do you know what? You should stop by and say hi.',

"Oh, mom. Mom. Chandler hates Thanksgiving and doesn't eat any Thanksgiving food.",

'Whoa-whoa-whoa, hey! Now remember what we talked about, you gotta be strong.',

'Rach we have a code brown situation.',

"No you didn't. You said you would, but you never did!",

'Really?',

"I can't believe Chandler is missing this!",

nan,

'It was so not an accident. She saw I was about to tag her, so she threw her big fat grandma arm elbow right into my face. And just keep running.',

"Oh, she didn't think it would be that big of deal.",

"So, I just finished this fascinating book. By the year 2030, there'll be computers that can carry out the same amount of functions as an actual human brain. So theoretically you could download your thoughts and memories into this computer and-and-and live forever as a machine.",

'I can't believe this! I shouldn't be the one making her throw up!',

'Like buddies.',
 'Hey!'
 "Nono, me neither. Although, uh, y'know, back in college, Susan Sal
 lidor did.",
 'Hey, how,Äôd the date go with Mr. Millionaire?',
 "No no no, she gets a credit, hey, I'm in there too.",
 'I got it at Pottery Barn!! Okay?!',
 ' You,Äôre so pretty. I love you.',
 'I can,Äôt believe they-they didn,Äôt even tell us!'
 "Oh, that's right! Daddy and uncle Joey are going on a trip today.
 We're going to a conference in Barbados, right?",
 "No, no, it's okay. Really. They're plenty of people who just see t
 heir sisters at Thanksgiving and just see their college roommates at
 reunions and just see Joey at Burger King. So is, is that better?",
 'Wow, you ah, you really like all this space stuff, huh?',
 'Okay, stop it! I can,Äôt deal with this right now. I have to go ha
 ve a baby.',
 'A lesson in the importance of unagi. ',
 'Hey!'
 "So, what's going on now?",
 'Y,Äôknow what? Fine! Get attacked! I don,Äôt even care!'
 'Yeah.'
 'It was hard... I remember... I was in my bedroom... playing with m
 y dinosaurs... playing and learning... and my father walks in and sa
 ys... he says... "What are you doing with those things? What\'s wron
 g with you, why aren\'t you... why aren\'t you outside playing like
 a... like a real boy?',
 ' No! No, I won,Äôt! I,Äôll be at the bottom of the dating barrel n
 ow. The only guys below me will be Four Divorce Guy uh, Murderer Gu
 y, and-and, Geologists.',
 'What?',
 'Hey!'
 'Oh no.',
 "Look, she loved her job here. And let's face it you're not gonna f
 ind anyone who did it as well as she did it. Isn't that true?",
 "Nah ah! Nah ah! No no no! No ad-libbing and dude, you can't touch
 the paintings.",
 'Okay, it,Äôs coffee.',
 'Oh my God, is that still...',
 nan,
 'Do you feel better?',
 "Yeah, that,Äôs okay, I mean if you guys all have to go away for th
 e first weekend I,Äôm alone by myself, y'know then I totally, totall
 y understand.",
 'Pride.',
 'What do you mean, they,Äôre not moving in? They-they,Äôre still mo
 ving in right?',
 " That'd be good...",
 ' I just found out that Elizabeth,Äôs dad wants to meet me.',
 "Yeah, he-he,Äôs right, he,Äôs right. This is your time y'know, yea
 h, you,Äôre young, you,Äôre-you,Äôre weird, chicks dig that.",
 "Nothing, nothing. Lee-lo, the laundry's done.",
 'Oh that is quite all right ma,Äôam. ',
 'Okay here, have one of these peppers. Oh ha,Ä¶ Oh God! So,Ä¶so ho
 t! By the way, you don,Äôt want to touch the pepper and then touch
 your eye.',
 'Hey Joey, how come our stuff isn,Äôt free?',
 'No. ',
 'What? No! No, I,Äôm not stopping. I,Äôm Red Ross!'
 "Okay, I'm scum, I'm scum.",
 'Wait a minute, does-does everyone feel this way?'

'Oh, who? Me?',
'Ben Franklin.',
"That's closer.",
"I've lost the will to live.",
' Yes, of course they like you! ',
'Whoa, hello, did you just meet Monica?',
'Ooh hey, Emma, daddy has some presents for you okay? Okay? I want you to wait right here. Come here sweetie.',
'Oh, what were the other two?',
'Oh, ye-ah!',
'You ah, wanted to see me?',
'Okay, okay. Ooooh, ooh maybe I rode in on a Harley.',
'This is weird for me!',
'Hey, y,Äknow if you want to pick up some extra cash? Some friends of mine made good money doing telemarketing.',
'Yeah, not since I got too strong for you.',
"Yeah, uh, except for the red sock, which is still red. I'm sorry, please don't be upset, it could happen to anyone.",
'Yeah, cheerie-o!',
'We have to stop them before something happens!',
'Woha! Wait... What are we doing? What we have is too important to mess it up over some girl. I mean, we can get laid anytime we want.',
"You sang Baby Got Back didn't you?",
'Huh? ',
"Yeah, and I'm responsible for just like half of that.",
'Because there are naked ladies there.',
'Heavy thing, not getting lighter!',
' Dude, what are you doing?',
' . Three hundred and fifty dollars?',
'Yes. Yes. Yes. ',
" I'm dead and no one cares?",
'Dude. Well done. You know what? If I die, and Rachel dies and Monica dies then you can totally take care of Emma.',
'Whoa-oh, okay! Yeah, why am I telling you that?',
"Look, if she's talking to it, I just think that I should get some belly time too. Not that I believe any of this.",
' ,Äand then, we could,Äöve gone from the ceremony to the reception with you in the sidecar!',
"No, no, no. Don't do that! I want you to look her in the eyes, and tell her the truth.",
'Not just a key, I gave her the only key! I am now a homeless person in a very serious relationship.',
'Okay! Do you wanna tell the story?!',
'Noo. Why?',
' Happy New Year, Pheeb!',
'Stay away!',
"Wow, uh, Joey that's-that's great. Thanks man.",
"Yours, I just got 43 points for 'KIDNEY'.",
'I don,Ät know! I guess I just can,Ät believe any of this is happening.',
' I gotta go make a fake Ben.',
'I mean look, that-that one night we had was fun and,Äand certainly y passionate, but don,Ät you think it,Äs better if we just stayed friends?',
'No-no, I,Äm,ÄI,Äm sure no one was looking. Just want some privacy. ',
'But the good news is, no one in a two-block radius will ever know.',
'Oh my God!',
'Be-caaaauuse... ',

"Yeah, that's true. Except I don't wanna get over her.",
' , yaw... ',
' Hey guys! ',
"I've got to say you guys, that's an incredible gesture!",
' It,Äôs not for me, it,Äôs for Rachel. ',
' I don,Äôt know, but I ah, I have the feeling that my being there w
ill do it. I,Äöll go over and I will borrow something. Juice!! I nee
d juice!! ',
' Is this about Mark? ',
' Yeah. Listen, can you keep this information to yourself? ',
"I told her I'd have to think about it. I mean, how the hell am I s
upposed to make this kind of a decision? I'm actually asking you!",
' Y,Äôknow, I don,Äôt think we,Äôre going to settle this. ',
' Right. ',
" I- I- I ca- I can't believe this. I mean, all I asked you to do w
as keep him in the apartment.",
"I was really upset about Rachel and Paolo, and I think I had too m
uch tequila, and Nora- um, Mrs. Mom- your Bing- was just being nice,
y'know, and- But nothing happened, nothing- Ask Joey, Joey, uh, came
in-",
' No! No we don,Äôt! ',
' Yep, and you know what other holiday is coming up? ',
"He's in! Oh, did you hear that, Marcel? San Diego. San Diego!",
" There's something you didn't know about your dad!",
' Hey! ',
' Yeah, if you,Äôre really hungry. It was a joke, I made a joke. ',
' Or you can sit with him on the front porch and make sure no one st
eals the trash cans. He does that every week too. ',
' Sweet! ',
' Well, start looking. ',
' How do you know? I mean we thought Carol was straight before I mar
ried her! ',
' Please! Are you kidding? I-I hurt three huge men, I gave a guy a b
loody nose,ÄîI mean I-I,Äôm not proud of it but, I really am. And it
,Äôs all because of you, wonderful, amazing you. ',
' Come on Pheebs, it,Äôs not that bad! Y,Äôknow most people would be
excited if they didn,Äôt have to work for a couple of weeks. ',
' No, Mike, no, no. You wanna pick me, I mean... watch! Huh? ',
' Ohh, okay. ',
' Oh, I thought it was just a kid yelling, "I,Äôm gay! I,Äôm gay!" C
an I bring her in? ',
' Well, if-if she thought they were on a break,Ä¶',
' So the first time you ask a guy out, he-he turns you down? ',
' Excuse me, do any of you know how to play? ',
' Um, Monica and I aren,Äôt supposed to play football. ',
' Oh, I am sorry, did you not like her, because I was hoping that we
could come to one of your kissing parties on',
' Uh, hello, the buzzer buzzed. It doesn,Äôt count. ',
' Department of Sanitation? ',
nan,
' I-I heard about Mrs. Verhoeven passing away and I,Äôm so sorry for
your loss. ',
' Oh. Listen, do you think- and try not to let my intense vulnerabil
ity become any kind of a factor here- but do you think it would be o
kay if I asked you out? Sometime? Maybe? ',
' No, I,Äôve looked everywhere! ',
' What?! It is?! ',
' Yeah, why is it staring at me? I think it knows I,Äôm talking abou
t it. Don,Äôt-don,Äôt you,ÄîWh,ÄîWha,ÄîHey!! ',
' I could ask her to live with me! ',
' Yeah. ',

"Uh, I haven't.",
 'Keep dancing.'
 'Thanks.'
 'Yeah.'
 'Um, that is because my doctor says that I have a very serious....
 nugget.... diffency.'
 'Correct. Rachel claims this is her favorite movie,Ä¶',
 'Amazing... amazing.'
 ' Hey!'
 'So why don,Äôt you quit?'
 'But...'
 'So why don,Äôt you quit?'
 'And, I love you!! ',
 "Yeah well, he's not gonna get this one. Ben is way cuter than that
 kid. I mean look at him, look at you, ",
 'You had a rough day, uh?','
 'Yes, exactly!'
 'Huh. Sounds like Mark Something wants to have some sex.'
 'Who?','
 'Yes, yes!'
 "No. No, y'know you don,Äôt, you don,Äôt wear enough of this. Wha
 t?",
 'I,Äôm sorry your husband cheated on you.'
 'Marcel! Where are you going with that disc?','
 "Oh dude, don't worry about it, I found an unattended maid's car. W
 e're way ahead of the game.",
 "Oh my god. It's all here. What made you save it all these years?
 ",
 'Yeah? Not to you, because you know this stuff. I don,Äôt know any
 of it and I,Äôm the father. I wish I,Äôd be more involved y,Äôkno
 w.'
 'Hey where-where are the pictures that creepy pretzel vendor took o
 f us together?','
 'Oh cool!','
 'She is a kook.'
 'I know.'
 "That's what it seemed like.",
 'Yeah, ooh yeah, I think there is one from batch 17 left, uh,Ä¶ ',
 'Look. Look, I wasn,Äôt going to say anything to you, but... All ri
 ght, I don,Äôt think you should be seeing Tommy anymore.'
 "Yes, we did, everything's A-OK!",
 'Yeah, but I got cous-cous!','
 'What?!','
 'Yeah?','
 'Okay. Have a great time you guys.'
 'Guess whose middle name is Muriel.'
 "Wait a minute, there's two sets of nozzles, which one is it?",
 "Yeah, I mean... I think when it's your shot, y'know, you-you know
 it's your shot. Did it... feel like your shot..?",
 "They're towing your car, they're towing your car!!",
 'Now, if you need to stay late, I want to be supportive of that.'
 "Ok. Wow, you guys sure have a lot of books about bein' a lesbia
 n.",
 'No-o-o! No way!','
 'Where in Cuba?','
 "Oh, no. At first I have to get you to agree. Then we'll see if she
 wants to come back.",
 'Get out! ',
 "Ooh, well. Ah, I kinda have got a lot on my plate right now, not t
 hat I wouldn't love a weekend in the country with a strange man. ",
 'I,Äôm so glad you,Äôre going on this trip!'

"No. No, no. She doesn't want to see you right now.",
 'Well, Rachel moving to another country? Not being able to see her every day. How can I be okay with this?',
 'You were the 200-pound 11-year-old who rode her!',
 'Y,Äôknow what,Ä¶ ',
 'No! ',
 "Okay, I think we're getting into a weird area here...",
 "Okay, I guess it's just flan for three! Hey, hey, that rhymed!",
 ' This blue suit, or this brown one?',
 nan,
 'Oh great! That means I,Äôm stuck with, "So, we were watching you i n there and you were sittin,Äô right here! Whoa!"',
 'Hey.',
 'That only took me an hour.',
 "Well, I do! Why don't we go back to my place, light a couple of candles, break open a box of Cinnamon Fruit Toasties, uh...",
 'Oh.',
 "OK, turn around. I just don't want you staring at me when I'm doing this.",
 'Yeah!',
 'It,Äôs heads. Gentlemen, pick your category.',
 "You should've seen the look on her face. I don't want Rachel to hate me! I don't know what to do.",
 'Yeah, of course, Donald.',
 'Challenge extended.',
 'No, hey, well, I-I completely understand. You were, you were stressed.',
 'How,Äôs my little boy?',
 'Yes, second in two years. Third overall.',
 'My dad wanted to know if you wanted to play racquetball with us.',
 'Must pee. ',
 "Oh, no, it's great. It's great. He is... He is an amazing guy.",
 'Would you excuse us for a second? Umm,Ä¶. what are you doing?',
 'Why does everyone keep saying that?',
 'I hate that guy.',
 "Well, if you see him could you please tell him I'm looking for him?",
 'I-I just thought you were doing so well. I,Ä¶',
 'Actually that-that,Äôs not true, in The Incredible Hulk uh, No. 72, Dr. Bruce Banner found,Ä¶ ',
 'The test is ready.',
 'All right, try pedaling.',
 ' Is everything alright?',
 'That,Äôs a good point. So uh, how long are you gonna punish him?',
 'Remember the Russian satellite, Sputnik? Spud-nik. Spudnik!',
 'No, I,Äôm good. ',
 'All right. ,ÄôCandy and Cookie?,Äô',
 ' Yeah,ÄôNo-but-but-but-but! We,Äôre just gonna go home and take a shower. Now, that,Äôs not scary right?',
 'Sorry I ah, I scared you in there.',
 'Oh, well you see how it works is, the part with Dick Clark in Times Square is actually live, but they tape some of the party stuff ahead of time. Yeah, not a lot of people know that.',
 'Well, so, you-you,Äôll get a job here! I mean, I,Äôm always hearing about uh, them foreigners coming in here and stealing American jobs; that could be you!',
 'People can hear you.',
 "You're on!",
 'Helps a little.',
 'That,Äôs not really porn.',
 'Wow! ',

'Hey! I just spoke to your dad, and you know what? He seems to think we,Äöll be able to find a new place for the wedding.',
 'Happy birthday!!!',
 'Come on Rach, you don,Äôt have what, ten minutes?',
 'You were incredible! Brand new woman, ladies and gentlemen.',
 "Well y'know ,Äöcause Rachel and I used to go out.",
 'Okay? But-but imagine a lot more lights, okay? And-and y,Äôknow fewer bricks, and-and-and flowers, and candles,Ä¶',
 'Oh, okay.',
 'Sure.',
 'Hey, it,Äôs my list.',
 'Here we go. Mona umm, I think it,Äôs time we-we had a conversation about-about where things are with us.',
 "What's going on?",
 "Yes! Yes! I mean it's-it's kinda far from work, but uh, y'know, I'll get so much done on the commute. I-I've been given the gift of time!",
 'Yes! My baby,Äôs finally free!',
 'Y,Äôknow what?! It doesn,Äôt matter! It doesn,Äôt matter what you believe! What matters is what happened!',
 'That was just the pants on the couch. Umm, hey, do you, do you mind if I use your bathroom?',
 'It really was.',
 'And then, like three days in a row he got to the newspaper before I did, and peed all over the crossword.',
 'Show me where?',
 'No, no, really. You should go. Just go! Go! Go out! Really, the world is your oyster. Kick up the heels. Paint the town red. ',
 ' Are you sure?',
 'Well sorry, that,Äôs what I do on dates.',
 'Oh no. Dad! Dad! What,Ä¶ Oh God,Ä¶everything,Äôs ruined! Dad, she ,Äôs gonna be crushed!',
 'Hey Pheeb, could you please not put your feet up on my new,Ä¶,Ä¶old sheet?',
 nan,
 "Okay look, do-do, you have anything Christmassy? I promised my son, and I really don't want to disappoint him, um, come on, I,Ä¶uh, you gotta have something.",
 'Oh really? Did she tell you he plays the recorder, recites poetry and bakes Madeleines?',
 'I was doing great with Julie before I found out about you.',
 'All right.',
 'Oh, I-I don,Äôt think there,Äôs any trail.',
 "Hey, it,Äöll grow back, right? And she-she,Äôs really fun, and she ,Äôs cool, and-and I,Äôm finally moving on. Y'know? I mean getting over Rachel was so , y'know? Y'know, and I,Äôm finally feeling sane again. And now if I go up there, and-and I kiss her, and, Gooood I wanna kiss her, and-and-and it doesn,Äôt work out, right? Do I really wanna put myself through that again?",
 "This is it. Unless we're on a break.",
 'What a pity stay?',
 'Okay, remember, we were young. Hey, Spring break, sophomore year, I got high in my bedroom and my parents walked in and smelled it and so I told them that you had gotten stoned and jumped out the window.',
 'Hey, I am not unemployed. I,Äôm on sabbatical!',
 "No, no, no, you can't take the remote control!",
 'Look, I,Äôm sorry.',
 "Then, uh, then we got dressed, and I-I... I walked her to the- -t he bus stop... I'm fine.",
 'Why, why, why would you dream that?'

'Hey! ',
 'Oh my God.',
 'It,Äôs a legitimate learning technique. Wow! ',
 ' Dreidel, dreidel, dreidel, I made you out of clay.',
 'No-no, this is my collection of fossil samples.',
 'Uh... to the bathroom.',
 ' And that is why we cannot see each other anymore.',
 nan,
 'Ow! Ow! Oh, no-no-no! ',
 'I don,Äôt think you have much choice.',
 'Well, you can help me! ',
 "well he seemed to bum hard that you'd never been in a serious relationship.",
 'What kind of problem?',
 'Yeah, what, what was I thinking?',
 '200 dollars.',
 'It didn,Äôt.',
 'Oh Donald that-that would be great. I am totally ready to come back to work. I,ÄîWhat? GET OFF MY SISTER!!!!!!!!!!!!!! ',
 "It's laundry. The thinking through is minimal.",
 'Two, I think a two.',
 "No, no, no. Technically the... sex is not... being had, but that's... see, that's not the point. See, um, the point is that... Rachel and I should be, er, together. You know, and if you get in there.... um...",
 'Eh? We,Äöll show him! ',
 'I thought I heard voices! Hi Charlie! Come, please come in. Come in.',
 'What?',
 "First of all, I'm not losing...",
 'Yeah, not as much as you used to love to play uncooked batter eater.',
 'You okay?',
 ' Just-just so you know I was a freshman and she was a senior. So it wasn,Äôt as bad as-as,Ä¶',
 'Yes. I mean, it,Äôs what we always planned. And if you have a plan, you should stick to it. That,Äôs why they call them plans. Hello? I,Äôm fine.',
 'What do you want to do now? Huh? You wanna go get a drink?',
 'No, we can go to Williamsburg.',
 'Wait a minute, the house was built on radioactive waste, and an ancient Indian burial ground? That would never happen.',
 'Joey! Hey, I need to talk to Charlie. Is she there?',
 'He was unbelievable. He was like that-that-that Bugs Bunny cartoon where Bugs is playing all the positions, right, but instead of Bugs it was first base-Alan, second base-Alan, third base-...',
 'There was no song. There was no song! ',
 'Yeah! And! And, it was the easiest 400 bucks I,Äôve ever made.',
 'And we didn,Äôt have sex.',
 "Y'know what, y'know what, I,Äôm-I,Äôm not the one that wanted that, that break, okay. You,Äôre the one that bailed on us. You,Äôre the one that, that ran when things got just a little rough!",
 'Whatever dude, you kissed a guy.',
 'Yeah, oh hey, you are right on time.',
 'Although I was married to her.',
 'Got me.',
 ' Nono, that would be me again.',
 'No, but come on, we,Äôre off to a great start aren,Äôt we? I knew I,Äôd get you here fast, but this has got to be some kind of a record! ',
 'What?! Chandler she,Äôs our cousin! ',

'What,Äôs that on the bottom?',
 'They're towing a car. And I am seeing...spots.',
 'All right, look, look, you,Äöve got to do this yourself, okay in p
 erson. At least you know her name. You just go to the house and you
 ask for Mary-Angela, okay, when which ever one she is comes to the d
 oor, you take her for a walk, you let her down easy.',
 'So what, we just sit?',
 'What the hell are doing?!!',
 'Ohh, I-I see lotion, I have lotion! Will that work?',
 "Yup! You could plunk me down in the middle of any woman's uterus,
 no compass, and I can find my way out of there like that! ",
 'I love you.',
 'She barely knows me. We just live in the same building.',
 "Yeah that-that, doesn't look right.",
 "I'm having a baby in here! Ok, everyone stand back. Ow.",
 "Hey, hey, hey, that's not the rule and you know it.",
 'In the death seat?!!',
 ' Excellent! Well, okay, I gotta have some more fun!',
 'No, I ran. It was really far, and when did people stop understandi
 ng the phrase, "Get the hell out of my way!"',
 'Two, I think a two.',
 'Okay sorry, whew.',
 'Okay, we,Äöll be right in. So ah, did your boss try to slap you a
 gain today?',
 'Yeah-yeah I uh, I have a uh, a guy problem.',
 ' What are you doing?',
 ' The big apple!',
 'Yeah. She,ÄiWell, she,Äôs one crazy lady?',
 "Whoa, whoa, whoa. You looked at her. You never look. You just answ
 er, it's just a reflex. Do I look fat? Nooo! Is she prettier than I
 am? Noo! Does size matter?",
 nan,
 "Yeah that's the same.",
 'Get Out!',
 'Man! ',
 'What... what am I gonna do? My speech is gone, Chandler!',
 'What? What? What?!! Well they should put that on the box!!!',
 'Joey! No!',
 nan,
 'Fine, just stop thinking about me.',
 'That was in high school! It,Äôs not like it was binding forever.',
 'Okay, umm I want you to know that I have never done anything like
 this before. I mean, I mean I,Äöve been in um, relationships in gene
 ral, uh but I have never done it with a student,ÄiI mean I not,Äinot
 it! I mean, I mean I don,Äôt,ÄiWe haven,Äôt done it. Uh, I mean, I m
 ean, we,Äöve-we,Äöve-we,Äöve done stuff. Okay, okay, a joke, a joke
 ,Äilighen the mood. Umm, two guys go into a bar. One of them is Iri
 sh.',
 'Nobody likes change.',
 'Oh-ho, okay.',
 'Nope. I mean, I know Susan does every year, but I think I wanna ta
 ke this year to teach him all about Hanukkah.',
 "I wonder how I would react under fire, y'know? And not backfire bu
 t-but heavy fire, like I was in a war or something.",
 "Yeah, yeah. Y'know, now that you kicked the sign, hey! I don't mis
 s Marcel any more!",
 "No I didn't, and you want to know why? Because your ex-boyfriend i
 s still in love with you.",
 nan,
 'Namaste. ',
 ' Joey! ',

'Hey guys, does anybody know a good date place in the neighborhood?','

'I have been down in your store for twenty minutes trying to get a tie! What do I have to do to get some service?! ',

' That,Äôs a duck.',

'Damnit! I have this date tomorrow night and I have to look cool!','

'So?','

'Hey, where,Äôs Chandler?','

'Joey, the guy,Äôs your best friend.',

"Okay, I don't think it's going to pivot anymore.",

'It,Äôs,Ä¶it,Äôs complicated okay?','

'Because you sent away the dog!','

'11, unbelievable, 11 is correct. ',

'So honey this uh, this threesome thing umm, I mean how-how are you gonna start to find,Ä¶',

'No, come on, he doesn,Äôt know this stuff. If he knew how you felt.',

" Joey, it's Ross! I need some help!",

'Oh well, I guess I,Äöll catch up with her later.',

'All right!!',

'No. ',

"Hmm, yeah. Come on Ross jr. It's time to go in.",

"In fact, I'll bet you 50 bucks that you can't go the whole year without making fun of us. Eh, y'know what, better yet? A week.",

'I would!','

'Yes!','

"No, it's for when Carol goes into labor. She can get me wherever I am. I mean, all she has to do is to dial 55-JIMBO.",

'All right, see you guys. ',

' So we,Ä¶we both wanted to.',

'Some would say she,Äôs attractive, yes.',

'Oh my God.',

' Well, can I talk to you for a sec.?',

'Ok, now, is there anything I can do to... you know, butter him up? Anything he really likes?','

"Uh, okay, yeah, we could do that, but before we head off to the murder capital of the North-East, I was, uh, kinda wanting to run something by you. Y'know how we were, uh, y'know, talking before about, uh, relationships and stuff? Well-",

"I'm the holiday armadillo! I'm a friend of Santa's and he sent me here to wish you a Merry Christmas!",

'Yeah! Se vice?','

" Ooh, ooh. Because she's my ex-wife, and will probably want to bring her, ooh, ooh, lesbian life partner.",

'Yeah... what am I going to say to Kenneth Schwartz?','

'And while that was good advice, you should know that what-what she wants,Ä¶',

'What the hell are you doing? You scared the crap outta me.',

'Oh my God.',

'My God. Rachel! What happen? Why are you here?','

"Her name is Celia. She's not a bug lady. She's curator of insects at the museum.",

'Nice luggage.',

"What, we-uh- we don't have shoes here, or...?",

'Well, do you wanna marry him?','

"Look, you guys don't need me here taking up your space.",

'What? Hey, hey, listen..',

' Hello?','

'Really?','

'Oh-oh, absolutely!','

'Really? ',

'Yeah, little change in plans. Ahh, we,Äöre gonna break-up instead.',
'Oh.',
"Nothing. Oh, actually, great news! I just got off the phone with Emily and it looks like I'm moving to a new apartment. Woo-hoo!",
'What? What?',
'Come on guys, I-I really want this guy to like me. It-it would really help me out if you guys were here to make me look good.',
'Wait-wait-wait, do you, do you think, maybe we shouldn,Äöt invite her?',
"It'll be nice to get this off finally, won't it? Yes it will. Or we can leave it on for now, that's fine.",
'And-and to years of hard work finally paying off.',
"That was the water fountain! Okay?! Anyway, people are writing reports for me, uh pushing back deadlines to meet my schedule, I'm telling you, you get tough with people you can get anything you want. Hey Tribbiani, give me that coffee! Now!",
'Okay, but just the jacket. Double-oh and seven are not gettin,Äö in there.',
'Listen, Joey, I know what he did was wrong but don,Äöt you think you could at least hear the guy out?',
" I'm sorry, I was an idiot.",
'No. That guy is.',
'Monica, uh Dad called this morning and ah, Aunt Silvia passed away.',
' Hey,ÄîOoh! What,Äös-what,Äös that, dinner stuff? You making dinner?',
'Take from me, as the groom all you have to do is show up and try to say the right name.',
'IÖøΩm so sorry ÖøΩ',
'I know, I know it was stupid.',
' You were backpacking across Western Europe?',
'Okay, hold my crawler.',
" Sorry I'm late, I was stuck at work. There was this big dinosaur.. thing.. anyway.",
'Err, right.',
'You can,Äöt do that!',
'What? Oh my God! She-she thinks we,Äöre engaged! Why? Why? Why would she think we,Äöre engaged?!',
" Well, you were right. How can they do this to us, huh? It's Thanksgiving.",
"And it can't be Joey.",
'Yes, very nice Rachel.',
"Well, everyone's gotta kiss someone. You can't kiss Ross you got the history.",
"Hey Pheebs, you know I'm i'm really glad you came to talk to me the other day and I hope I was a little helpful.",
"Right, but, it is just me and the baby, so I'm thinkin' they can take us. And so I uh, hah-hah, I just heave it down field.",
'She said what?',
"You'd better hope not because I just read what you put on your page today.",
'That was the only way I could get him to stop typing!',
"I'm the holiday armadillo! I'm a friend of Santa's and he sent me here to wish you a Merry Christmas!",
'Hey you guys I got some bad news. ',
'All the time?',
'So, what do you want to do tonight? There,Äös a Ukrainian film at the Angelica that,Äös supposed to be very powerful. Interested?',
"Y'know, hey! You,Äöre the one who ended it, remember?",
"I know, I know. I shouldn't have waited 'till now to say it, but

I'm.. That was stupid, okay? I'm sorry, but I'm telling you now. I love you. Do not get on this plane.",

'Ah! Oh.',

"Look, Rachel, this is poker. I play to win, alright? In order for me to win, other people have to lose. So if you're gonna play poker with me, don't expect me to be a 'nice guy,' OK? Cause once those cards are dealt... ",

"Here we come, walkin' down the,Äthis doesn't smell like Mom's.",

'I don,Ät know, something girly.',

'I can,Ät believe no one believes me! ',

'They,Äre not listening too me?',

'We are never gonna find him! He,Äs one guy in a huge city! ',

' This is Vicrum.',

'Uh, huh. Yeah, right after I thank everyone for giving money to the museum, I sing a song about the wonder that is Joey.',

'Wow! ',

'So... ',

"Let me see, I gotta see, I gotta see. Oh, a head. Oh, it's, it's huge. Carol, how are you doing this?",

nan,

'But having a dove place the ring on your finger would,Äve been no problem? ',

'You know that girl I told you about who lives up in Poughkeepsie? ',

'I was their first born! They thought she was barren! It,Äs not my fault.',

'Hey, if that,Äs what you want to do I,Äm not gonna say no.',

'I know. I am, I am so sorry.',

'Okay. Now-now-now should I climb down your front so we,Äre face to face or-or should I climb down your back so we,Äre-we,Äre butt to face.',

"Right. So is it gonna be like 'I'm abandoning you while your upset.'",

'Ok, ok, here we go. Ok, where am I talking to, here? I mean, uh, well, there is one way that seems to offer a certain acoustical advantage, but... ',

'Thank you.',

'Well, not really. I mean technically it,Äs-it,Äs not against the rules or anything, but it is frowned upon. Especially by that professor we ran into last night, Judgey von Holierthanthou.',

'Yeah! ',

"That's ok. Uh, anyway, well he and I both really liked you a lot, uhm, but we didn't want anything to jeopardize our friendship, so we kinda made a pact, that neither of us could ask you out!",

'No, but, your-your mad.',

'Oh I a lot of stuff! ',

'Well, why don,Ät you correct him? ',

' Oh, hey you guys! This is Charlie! Charlie, this is Phoebe and my sister, Monica.',

'Breathe.',

'No, no, it was just our parents and 1 or 2 friends. It was a small wedding.',

'Pretty amazing huh? ',

'Yeah.',

'Really? That would be great. I mean, I have to do something, she kinda teased me about how I dress.',

'Hi. How is she? ',

'Of course he is! What, do you think I,Äd just use my son as-as an excuse? What kind of father do you think I am? ',

"I'll take sports.",

" Okay, it's not a contest.",

'Huh. That,Äôs a really pretty name for-for an industrial solven
t.',
'Hmm.',
'How rude.',
'Well do you want some help?',
'Ah! Ah! I forgot my jacket!',
'Peach pit.',
"It came in the mail today, it's uh, 72 long-stemmed red roses, one
for each day that I've known and loved Emily, cut up into mulch!",
' Okay!!',
'But, you, you don,Äôt want to seem too pushy.',
'Hey! So, how was Atlantic City?',
'Oh I,Äöll prove it! I,Äöll prove it like a theorem!!',
'Give me the bag.',
'Wow! I didn,Äôt know that there was a Pottery Barn up here.',
' Funny story!',
'Hey guys!',
'What?',
'Well, Ben would be there.',
' What? NO! I am not going to give them Ben!',
' Who just lost the respect of her unborn child.',
'Sweetie, don,Äôt worry you,Äöll get picked. Chandler.',
'All right! All right! It was the best nap ever!',
"What a beautiful story. Hey, I'm fine by the way.",
'Fine.',
'I was talking to myself! You,Äôre going down!',
'Well, if you think it would help.',
"OK, ahem, hey, does anybody know a good place if you're not dating
a puma?",
'That,Äôs okay Rach, we,Äôre not liking Ross right now.',
"Let-let me make sure I'm hearing this right, you're ending this wi
th me because I'm too whiney? So you're saying, I've become so whin
ey that I annoy you, Janice.",
' No.',
'Well, yeah. I can,Äôt-I can,Äôt stay here all night, and if I go i
n there she,Äôs-she,Äôs gonna wanna... do stuff.',
'Oh oh oh! I RESPECTFULLY DISAGREE!!',
'Okay.',
'You were at the coffeehouse!',
'We ran into him on the street today and he said he might have a jo
b for her. But I know he just wants to get into her pants.',
'C,Äômon! Joey! What is it?',
'How was I supposed to know we,Äôd end up being friends after colle
ge, let alone you-you would be living with my sister?',
"Well I, I don't know. Why?",
'Joey!',
'Oh, I\'m sorry, did I say "invest it"? I meant "be cool and piss i
t all away" ',
'Anyway. That,Äôs when our Mom said we were not to play football ev
er again.',
'Veto.',
"Hey! Hey, look! Ugly Naked Guy's back!",
nan,
'Thanks. Yeah, Carol borrowed it for a class, and I have to get it
back to the museum.',
'Look, I,Ä¶ Look, I,Äôm having a great time with you and I just do
n,Äôt want us to move to fast or put too much pressure on us. So, I,Ä
ôm sorry I just don,Äôt think we should go away together yet. It,Äôs
-it,Äôs too soon.',
'Ben, I want you to know that there may be some times when I may no
t be around, like this. ',

nan,
 'Hey-hey have you ever locked yourself in a TV cabinet VD boy?!',
 'Yes, yes of course, what-what would this be regarding?',
 'Hi! Hi, I,Äm uh Ross. I,Äm here to ruin this magical day for yo
 u.',
 'Oh, yeah, that would be me, um, I have, I have a problem I-I tip w
 ay too much, way, way, too much, it,Äs a sickness really.',
 'Okay.',
 'Just a sandwich. Turkey, a little mustard,Ä¶',
 ' Oh I\'m sorry, I don\'t mean to pry... it\'s just that this must
 be what regular people experience when they watch "Access Hollywoo
 d".',
 'Hi! I,Äm so glad you,Äre here, but it,Äs gonna be a while. I-I
 wished you,Äd called first.',
 'No really, I mean, I mean, God, I could use a friend.',
 'I know if you were getting married I,Äd feel, kinda,Ä¶.. y,Äkno
 w.',
 'Joey, you look nothing like Ben.',
 'Yeah,Äino, just that last song.',
 'So, this must be kinda neat for ya, huh? I mean, your Dad tells me
 that you get a couple of days off school, and you, you ah, don,Ät h
 ave to sell those cookies anymore.',
 'That's easy for you to say, you found one already.',
 'Uh-huh. But it was a first for the rest of my building.',
 ' Hey.',
 'That,Äs too bad.',
 'Hey, honey.',
 'Hey, Joey.',
 'And then Rachel wasnÖt sure she could leave the baby.',
 'No. No, I gotta go home sometime.',
 nan,
 'What am I looking at?',
 " I can't believe they gave you a ticket. You're such a good drive
 r.",
 "What? You - you're making money off my misery?",
 'Come on! That,Äs great.',
 ' Hey Rach!',
 'Yes. Yes, yes I did. But-but it was, it was just a one night thin
 g. It meant nothing.',
 'A ,Ä95 LeSabre?!',
 'Put it back exactly where you found it?',
 'Okay I-I just have to stop by my place first.',
 "I'm going to China.",
 nan,
 'Yeah.',
 'Hey, I might!',
 'Hey, if that,Äs what you want to do I,Äm not gonna say no.',
 'Yeah, kinda. It,Äs this woman from work. I hope that won,Ät be t
 oo weird. Will it, Rach?',
 'Hey Pheeb, maybe this whole heart attack thing is a sign, that-th
 at you should start think about getting a different job.',
 "We make a great foursome. We should do more stuff together. Ooh! L
 et's take a trip. Okay, where do you think we - we can go?",
 nan,
 ' Why? What, what are you jealous?',
 'That,Äs a little clearer.',
 'Yeah, Sarah, anything.',
 'Sid you lucky deaf bastard.',
 'It took two people to break up this relationship!!',
 'What?! What?! Talking about what?!',
 'Oh-oh, you,Äre-you,Äre fellow scholars. What exactly were you lo

oking for, hmm? Perhaps, perhaps Dr. Chester Stock,Âs musings on t
he Smiledon Californicus?',
'All right, there you go! ',
'Hey. ',
'Yes-yes-yes! But, I-I do not love her. ',
'I,Âm sorry, it,Âs just one of my last nights together before she
leaves for camp,Âto be a counselor! ',
"Ok, um, uh, more clothes in the dryer? I'm fine, I'm fine.",
"Alright. There's a theory, put forth by Richard Leakey-",
'No, 19. ',
'I always knew I was havin,Â a baby, I just never realised the bab
y was having me. ',
nan,
' Ok, no, no, you hang up. You, you, y,Âi ',
'Science...? Academia...? Being a good father...?',
'Well I, close your eyes, I just think you,Âre gonna like this a l
ittle better, ,Âcouse, close-close... ',
'Let go! Let go! ',
"I'm really gonna miss this apartment. Y'know, Ben-Ben took his fir
st steps right over there. ",
' Where there is no fear of commitment. ',
'Oh-oh, hitting me where it hurts, my ski skills. ',
'Yeah, well, m-maybe you,Âre right. ',
'Here you go. ',
'No problem, ok, mmmwa ',
'Now you guys just got married, why is she so depressed?',
'My doctoral dissertation is in the library at school, I went to se
e it, and there were students makin,Â babies right in the middle of
the Paleontology section! ',
'Yeah I-I don,Ât-I don,Ât think I,Âm quite there yet, but I coul
d say I looove spending time with you. ',
'It,Âs a girl! Anyway, it wou,Âit wouldn,Ât matter. Okay? Becaus
e I,Âm a teacher and she,Âs a student. ',
'Cool! ',
' I don,Ât know, but-but look how shiny! ',
'Ok. ',
'It,Âs okay, I,Âm ready. ',
'Yeah! Oh, I-I love this babies! ',
"I know, and I can't stop sweating. ",
'So you said yes to him, and you just had our baby?',
'Oh, well... ',
' I,Âll try to control myself. ',
'Hi! Hey mom. ',
'Yeah, but I got cous-cous! ',
'What? ',
'Oh, okay. ',
'Hi roomie! ',
'Rach? ',
'Hi! ',
'I gotta go find her. ',
'When did I say you were boring?! ',
"Come on you guys, we're sorry, alri...? Our subway broke down.",
'Wow, that,Âs-that,Âs-that,Âs incredible. ',
"Rachel says sharing's great and supposedly, you know, we outta be
doing it. Do you wanna?",
'Only way to fly. ',
"I just wanted to tell you something before you heard it from someo
ne else and I hope this isn't too weird, but uh, I had uh, a thing w
ith Janice. What you're-you're not mad?",
nan,
'Huh? ',

nan,
'Wow. I,Äô sorry, when I was a kid I lost a bike to that. ',
'Oh-oh, wait, my mother is gonna be here any minute. And she has the keys.',
"Hmm -you know, actually this'll work out well. Cause when you have to move back in with Joey, Joey's hot new roommate can come and live with me.",
'Okay.',
"It's in Barbados.",
'What, are we keeping Thanksgiving a secret this year?',
"Nono, she's gone.",
' Not on the ones we sent out.',
nan,
'Yeah, losers talk!',
"Oh, umm, I'm just getting rid of a couple of things.",
'Oh. Hel-lo!',
' You didn,Äôt do it?',
" no I can't.",
' That would be nice.',
'I,Äô telling you, just a little bit at a time.',
'Oh, it was, nah, well....',
'Hey Pheebs, you gonna have the rest of that Pop-Tart?... Pheebs?',
'Hi!',
' Hi!',
"O-ok. Just relax, Phoene, just stay calm. . Oh my god, I can't find my wallet. ",
'What? Is it the comet? ',
'Yeah, uh... and then I figured after you win, we could all go out to the balcony and see a night rainbow with gremlins dancing on top of it!',
'Did you get like a fresh batch of pregnancy hormones today?!',
'I,Äöll try that.',
'We met at Phoebe,Äôs birthday party, I,Äô, I,Äô Ross Geller.',
"Uh, nothing, I'm sure they'll be impressed with your excellent computer skills.",
'Emma left her stuffed t-rex at my house. You know she can,Äôt sleep without it.',
"It's old, it's definitely old. Didn't you hear the, the double beep?",
'What?',
'Ohh,Ä¶',
' Oh yeah!',
'You know how close women can get.',
'Department of Sanitation?',
' Ooh, hey Ben, what if the Holiday Armadillo told you all about the festival of lights?',
'Oh, taking my parents back to the hotel.',
'All right. ',
'Oh no.',
nan,
'I prefer not to answer that right now, I,Äô still carrying a little holiday weight.',
' And what is second prize?',
" And listen, man, if you wanna be gay, be gay. Doesn't matter to me.",
'Hi.',
'Hey, I thought I cheered you up.',
'Uh yes! Thank you.',
' Did you um,ÄïI,Äô sorry, did you just say it,Äôs Rachel?',
'Wow!',
"Hello! I'm in the front seat, okay? I'm Gary's partner!",

'A lot of other gas smells,Ä¶',
' I am sorry, Chandler.',
'Oh, just planning my bachelor party with my best man.',
"C'mon, seriously, Joey, what's the part?",
'Uh-huh, Carol, so were we. All right, just-just imagine for a moment, Susan meets someone and-and they really hit it off. Y,Äòknow? Say-say they,Äòre coming back from the theatre, and they-they stop at a pub for a couple of drinks, they,Äòre laughing, y,Äòknow, someone innocently touches someone else,Ä¶ There,Äòs electricity, it,Äòs new. It,Äòs exciting. Are you telling me there isn,Äòt even the slightest possibility of something happening?',
'Oh, be-because of the leather pants.',
"I don't think that's what this is.",
'Oh great! ',
'The big deal is I don,Äòt want naked, greasy strangers in my apartment when I want to kick back with a puzzle,Ä¶beer! Cold beer.',
" Ohh... I'd love to but I really have to grade these papers.",
"Oh, but it's a kind game! So we're a little late, you know, the girls will be there, let's stay just for one more goal.",
"It isn't ridiculous, look around! No one's here!",
'And so now you guys are gonna be married?',
'Well we,Ä¶we don,Äòt have a garage.',
'I saw you!',
' Hey, hey, Yertle the Turtle. A classic.',
'I don,Äòt care! I am not quitting! I insist on finishing this game!',
'Yeah.',
"Dr. Gettleman? Yeah I know, I don't think that's a good idea. In fact, I think he's dead.",
'Thank you. So did you ah, did you tell Mark Something about me?',
"My nana used to do it. That's how she paid for all my dance,Ä¶karate lessons.",
"Eh, I mean, I mean she's not unattractive but hot? I",
'Oh my God! What happened to the door?!',
"I can't believe this. I was just being a good guy. I treated you with respect and understanding.",
'Bye, Nana.',
'And you,Äòre afraid you won,Äòt be able to,Ä¶fill his shoes.',
"You know what? I'm gonna finish this later, ok? Let me just grab my coat.",
'Ugh, easy for you to say, you already know what your kids names are going to be.',
"No you didn't. You said you would, but you never did!",
'My God!',
' Hi.',
' Did you say something?',
nan,
'What? Ohh. Oh that,Äòs right that,Äòs right. That,Äòs Richard,Äòs favorite place too.',
'Yeah, well what about you? You weren't you know, so hot in college either. After everything he said, he'd go "ba dum bum chessh",
'Oh, no! The MET! The Metropolitan Museum of Art.',
'Professor Neuman, the head of the department, so,Ä¶.',
"That's not a thing!",
'Sure.',
"Well if you can't remember, can't we just forget about this?",
'It is! It is!',
'wow, are you still going to move in with him?',
" Yeah, it's not coming off.",
'Ah, actually, I,Äòm sorry we-we probably should get going.',
"I'm fine! I saw a psychiatrist at work today."

'All right. All right, I,Äöll do it.',
'Hmm. ',
'Are you into crafts at all?',
'What?',
'You took my watch?',
'Well uh, y,Äöknow what? Even if she doesn,Äöt know anything, I do! I have a son. And his mother and I didn,Äöt live together, and whenever he was with me I took care of him all the time, by myself.',
' Okay, that-that,Äös enough! Y,Äöknow, let,Äös, let,Äös let someone else play.',
'Yes.',
'Ehh, I was just, I was just thinking about your father.',
'Correct! What is Chandler Bing,Äös job?',
'Wow. I,Äöm sorry, when I was a kid I lost a bike to that. ',
'What? No-no, a lurker.',
'He said he liked that!! Oh you,Äöre right, you,Äöre right. I,Äöm sorry.',
'Uh yes! Thank you.',
'So I asked Emily if she would come to New York, and she said yes.',
" I'm calling Mom.",
"In fact, I'll bet you 50 bucks that you can't go the whole year without making fun of us. Eh, y'know what, better yet? A week.",
'That,Äös a good question, dad. That,Äös a good question,Ä¶',
'Yeah, it,Äöll be like a funny Thanksgiving story!',
'Oh, please. I am not singing to your stomach, ok?',
'And this girl is making eyes at Chandler, okay? So after awhile he -he goes over to her and uh, after a minute or two, I see them kissing. Now, I know what you,Äöre thinking, Chandler,Äös not the type of guy who just goes to bars and makes out with girls, and you,Äöre right, Chandler,Äös not the type of guy who just goes to bars and makes out with,Ä¶girls.',
'All right! All right! Chandler entered a Vanilla Ice look-a-like contest and won!',
' Hey.',
"Hello! I'm in the front seat, okay? I'm Gary's partner!",
'Of course, what happened? ',
' Someone knocked over a lamp.',
' What-what are you doing?! Are you,Äiookay that,Äös not funny! Just stop horsing around!',
'Wow!',
"Yeah, but you're making me look bad!",
'Well you sure used a large font.',
"C'mon, cut. Cut, cut, cut,...",
'And!! Isabella Rossellini.',
' Hey!',
"Ok, but you know what? I gotta say, I'm really impressed that you were able to memorize all this so quickly!",
'Okay, it,Äös not, it,Äös not.',
'Yeah, but it didn,Äöt fit. Well, luckily there,Äös a store here that has one left in her size, but I,Äöm the groom, I,Äöm not supposed to see the dress,Ä¶',
'I don,Äöt know what you,Äöre talking about.',
'Awwwahuh, no, no, no!!!',
"You don't have to do that, I'll pay for myself. But just the fact that you want me to have fun with you guys - that's so sweet! Come here ",
' Okay dad.',
'I would, but I bruise like a peach. Besides, yôøyou know, everything is gonna be fine. The babyôø's sleeping.',
"Really? Wh-what's wrong?",

' Hello! ',
' Well Mr. Big Shot is better than ,Äðwethead,Äð. ',
' Okay. ',
' Actually I,Äðm a palian,Äð Dinosaurus is fine,Äð the drawing is no
t. ',
' Well, I suppose we just try to not look directly at it. ',
' I just asked that girl out. ',
' Not like this! ',
' Rachel, come on. Give us a chance. ',
' Phoebe, why is your bag moving? ',
' Well hey, who did these resumes for ya? ',
' To be fair, he doesn,Äðt seem to be impersonating Fonzie,Äð ',
' It does. It really and truly does. ',
' I want to take my tongue... and... ',
' Yeah. ',
' What? ',
' Doorknob! Doorknob! ',
' You mean that? ',
' It was soo not an accident. She saw I was about to tag her, so she
threw her big fat grandma arm elbow right into my face. And just kee
p running. ',
' Yeah but Pottery Barn! Y,Äðknow what I think? It,Äðs just she-she
,Äðs weird. Y,Äðknow it,Äðs because she,Äðs a twin. Twins are weir
d. ',
' "no, no, no there's nothing wrong with you I mean you don't strike
me as the type of person that wants to get married anyway.",
' Phoebe!! ',
' That was good. ',
' Monica! Would it? ',
' And! Break!! ',
' You okay? ',
' Yeah. ',
' Let me ask you something, at your school was there a like uh a pla
ce on campus where students went to uh, fool around. ',
' "All right, we'll work it out.",
' Rach, he,Äðs not an ex-con. ',
' Well, I thought so too, but then she said she,Äðd marry you. ',
' Yeah, make that three. ',
' Oh, I wish I knew, but the evaluations are all anonymous. ',
' Even if we want it really bad. ',
' I grew up with Monica! If you didn,Äðt eat fast you didn,Äðt ea
t!! ',
' Oh, really! ',
' "So we're a little late.",
' Okay. ',
' Not even once. ',
' Wait! Whoa-whoa, you,Äðyou gave her the ring? ',
' That,Äðs okay, I,Äðll just pick ,Äðem off. ',
' Wh-what did he say?! ',
' What? So what are you going to do? I mean how, how are you going
to tell Chandler? ',
' Apparently she fell in the shower and hit her head. ',
' "Uh, don't you think that would be a little weird? I mean, two guys
in a romantic inn...",
' "Ah y'know, this building is on my paper route so I... ",
' You ate my sandwich? ',
' "Wooooooo, hehehe. Hey, ahh, you don't feel like you're gonna throw
up, do ya?",
' "It's I just know they're gonna be a couple of windbags wearing twe
ed jackets with suede elbow patches.",
' "Yup! You could plunk me down in the middle of any woman's uterus,

```

no compass, and I can find my way out of there like that! ",
"Ah, no Mon, Dad had to buy everyone of your boxes because you ate
them all. But ah, y'know I,Äô sure that,Äôs not gonna happen this t
ime, why don,Äôt I put you down for three of the mint treasures and
just a couple of the Rudolph,Äôs.",
"Well, I'm so excited about this.",
'What?',
'Yep, and you know what other holiday is coming up?',
"Rachel and I are bringing Emma to Ralph Lauren today to introduce
her to everyone. Doesn't she look cute?",
' I gave him an extremely professional massage!',
'Phoebe, you can,Äôt massage people in my apartment!',
'Dr. Green. How are you? ',
' Hey!',
"Come on. These people'll scooch down. You guys'll scooch, won't yo
u? Let's try scooching! Come on. Come on. Uh, Kristen Riggs, this is
Carol Willick. Carol, Kristin. Uh, Carol teaches sixth grade. And, K
ristin, Kristin.....does something that, funnily enough, wasn't eve
n her major!",
' Is everything okay?',
'What?',
'Oh God, this is so nerve wracking! How-how do you do this?',
'Yeah.',
"What, we-uh- we don't have shoes here, or...?",
'Fine! Y,Äôknow what? It doesn,Äôt matter, because, if I remember c
orrectly, there is a comb on the floor of the bathroom.',
'Hey, I was looking out for you.',
'Yes let,Äôs. Y,Äôknow what? Uh, it,Äôs-it,Äôs not important. What
is important is that, is that we,Äôre having a baby. And it,Äôs not
,ÄôDoesn,Äôt matter who came on to who.',
'Oh for cryin,Äô out loud! ',
'I didn,Äôt get the annulment.',
'Hmm. ',
'Hey where-where are the pictures that creepy pretzel vendor took o
f us together?',
'Hey!',
'October 18th.',
'I gave them to Joey.',
'We uh, we just cooked it up.',
'How would he like to come with me to the Museum of Natural History
after everyone else has left, just the two of us, and he can touch a
nything he wants. . I just heard it as you must have heard it and th
at,Äôs not good. Let me start again. I,Äôm a paleontologist, you,Äôl
l be there with us and the touching refers only to bones,Äô fossil
s!',
"My Thanksgiving leftover sandwich. I can't believe someone ate i
t!",
'I,Äôm sorry. Dr. Green, Mona. Mona, Dr. Green.',
"Check it out! Almost 3 hours without droppin' it!",
...]
```

We are printing the number of dialogues delivered by each characters in all the episodes of 10 seasons

In [7]:

```
print(len(Chandler), len(Monica), len(Joey), len(Ross), len(Phoebe), len(Rachel
))
```

```
15389 15353 15235 16672 13628 17058
```

Since there are many empty rows and integers at some part of the columns we are going to remove the integers and float datatypes of cells and nan and just have only the sentences

In [8]:

```
Ross = [w for w in Ross if str(w) != 'nan']
Ross = [w for w in Ross if type(w) != float]
Ross = [w for w in Ross if type(w) != int]

Rachel = [w for w in Rachel if str(w) != 'nan']
Rachel = [w for w in Rachel if type(w) != float]
Rachel = [w for w in Rachel if type(w) != int]

Chandler = [w for w in Chandler if str(w) != 'nan']
Chandler = [w for w in Chandler if type(w) != float]
Chandler = [w for w in Chandler if type(w) != int]

Joey = [w for w in Joey if str(w) != 'nan']
Joey = [w for w in Joey if type(w) != float]
Joey = [w for w in Joey if type(w) != int]

Monica = [w for w in Monica if str(w) != 'nan']
Monica = [w for w in Monica if type(w) != float]
Monica = [w for w in Monica if type(w) != int]

Phoebe = [w for w in Phoebe if str(w) != 'nan']
Phoebe = [w for w in Phoebe if type(w) != float]
Phoebe = [w for w in Phoebe if type(w) != int]
```

We are defining a function wherein it cleans the special characters, punctuations and just extract the words in the text of Ross.

- Firstly, we remove the special characters by replacing them with blank spaces using re.sub from regular expressions package.
- Secondly, we tokenise each sentence in the Ross list using word_tokenize from nltk package
- Thirdly, we Stem the words using PorterStemmer(). Stemming is the process of reducing inflection in words to their root forms such as mapping a group of words to the same stem even if the stem itself is not a valid word in the Language.
- Finally, we Lemmatise the words list using WordNetLemmatizer(). Lemmatization, unlike Stemming, reduces the inflected words properly ensuring that the root word belongs to the language. In Lemmatization root word is called Lemma. A lemma (plural lemmas or lemmata) is the canonical form, dictionary form, or citation form of a set of words.

In [9]:

```
def get_words(text):
    """This function returns clean data. This function will take data from open
    file pointers and drop new line and tab characters.
    Convert all the characters to lowercase to minimize the vocabulary """
    words_list = []
    for s in text:
        s = re.sub('[^A-Za-z0-9]+', ' ', s)
        words_list = words_list + word_tokenize(s)
    for a in words_list:
        a = PorterStemmer().stem(a)
        a = WordNetLemmatizer().lemmatize(a, "v")
    return words_list
```

get_words(Ross) as defined from above will give us the word list of Ross dialogues which is later filtered for any stop words in english using nltk.corpus.stopwords.words(). If there are any stop words like aa,ummm,aaah,hm etc they will be removed from the list So finally Ross vocabulary count is 4860

In [10]:

```
""" removes all the english stop words """
Ross_words = get_words(Ross)
stopwords = nltk.corpus.stopwords.words()
Ross_words = [w.lower() for w in Ross_words if w.isalnum() and w.lower() not in
stopwords]
vocabulary = set(Ross_words)
len(vocabulary)
```

Out[10]:

4860

Parts of Speeching(POS) tagging:

The POS tagger in the NLTK library outputs specific tags for certain words. The .pos_tag() function needs to be passed a tokenized text for tagging. For example,

- CC coordinating conjunction
- CD cardinal digit
- DT determiner
- EX existential there (like: “there is” ... think of it like “there exists”)
- FW foreign word
- IN preposition/subordinating conjunction
- JJ adjective ‘big’
- JJR adjective, comparative ‘bigger’ etc.,

In [11]:

```
"""Tagging the list of noun,pronoun,verbs,etc"""  
nltk.pos_tag(Ross_words)
```

Out[11]:

```
[ ('yeah', 'NN'),
  ('woohoo', 'WRB'),
  ('love', 'NN'),
  ('sorry', 'NN'),
  ('look', 'NN'),
  ('think', 'VBP'),
  ('wan', 'IN'),
  ('hear', 'NN'),
  ('right', 'RB'),
  ('help', 'VB'),
  ('love', 'VB'),
  ('marriage', 'NN'),
  ('broke', 'VBD'),
  ('thumb', 'JJ'),
  ('dude', 'NN'),
  ('umm', 'JJ'),
  ('uh', 'UH'),
  ('telling', 'VBG'),
  ('guys', 'NNS'),
  ('huh', 'VBP'),
  ('really', 'RB'),
  ('pretty', 'JJ'),
  ('industrial', 'JJ'),
  ('solvent', 'NN'),
  ('hey', 'NN'),
  ('rach', 'VBP'),
  ('pass', 'NN'),
  ('tv', 'NN'),
  ('guide', 'NN'),
  ('miracle', 'NN'),
  ('little', 'JJ'),
  ('bit', 'NN'),
  ('oil', 'NN'),
  ('lasted', 'VBN'),
  ('day', 'NN'),
  ('burned', 'VBD'),
  ('mary', 'JJ'),
  ('angela', 'NN'),
  ('oww', 'NN'),
  ('yeah', 'NN'),
  ('beef', 'NN'),
  ('dessert', 'JJ'),
  ('way', 'NN'),
  ('well', 'RB'),
  ('great', 'JJ'),
  ('time', 'NN'),
  ('umm', 'JJ'),
  ('chancy', 'NN'),
  ('hand', 'NN'),
  ('yeah', 'UH'),
  ('uh', 'JJ'),
  ('pheebs', 'JJ'),
  ('hovering', 'VBG'),
  ('around', 'IN'),
  ('subject', 'JJ'),
  ('say', 'VBP'),
  ('dinosaurs', 'NNS'),
  ('go', 'VBP'),
  ('rrroof', 'RB'),
```



```
('right', 'RB'),
('candy', 'NN'),
('cookie', 'NN'),
('ohh', 'IN'),
('thank', 'JJ'),
('emily', 'RB'),
('cousin', 'NN'),
('kicked', 'VBD'),
('honor', 'JJ'),
('meet', 'NN'),
('tell', 'NN'),
('long', 'RB'),
('admirer', 'JJ'),
('work', 'NN'),
('mean', 'NN'),
('nobel', 'JJ'),
('prize', 'NN'),
('whoooo', 'JJ'),
('mean', 'NN'),
('tell', 'NN'),
('reasons', 'NNS'),
('got', 'VBD'),
('field', 'NN'),
('oh', 'RB'),
('great', 'JJ'),
('going', 'VBG'),
('saturday', 'JJ'),
('found', 'VBD'),
('seeing', 'VBG'),
('guy', 'NN'),
('yeah', 'NNS'),
('know', 'VBP'),
('ah', 'RB'),
('girlfriend', 'VBP'),
('told', 'VBN'),
('last', 'JJ'),
('night', 'NN'),
('well', 'RB'),
('turns', 'VBZ'),
('ah', 'NN'),
('wants', 'VBZ'),
('get', 'VB'),
('back', 'RB'),
('together', 'RB'),
('oh', 'NN'),
('found', 'VBD'),
('happy', 'JJ'),
('yep', 'NN'),
('got', 'VBD'),
('got', 'VBD'),
('thank', 'RB'),
('much', 'JJ'),
('okay', 'IN'),
('umm', 'JJ'),
('even', 'RB'),
('treat', 'VBP'),
('kidding', 'VBG'),
('dirty', 'NN'),
('dreams', 'NNS'),
('well', 'RB'),
('good', 'JJ'),
```

```
('okay', 'NN'),  
('kind', 'NN'),  
('think', 'VBP'),  
('know', 'VBP'),  
('wearing', 'VBG'),  
('ring', 'VBG'),  
('okay', 'RB'),  
('well', 'RB'),  
('tough', 'JJ'),  
('spot', 'NN'),  
('rach', 'NN'),  
('handle', 'NN'),  
('huh', 'NN'),  
('wan', 'NN'),  
('fight', 'VBD'),  
('us', 'PRP'),  
('wan', 'VBP'),  
('bail', 'JJ'),  
('see', 'VBP'),  
('us', 'PRP'),  
('throwing', 'VBG'),  
('away', 'RB'),  
('something', 'NN'),  
('know', 'JJ'),  
('damn', 'RB'),  
('good', 'JJ'),  
('rachel', 'NN'),  
('love', 'VB'),  
('much', 'JJ'),  
('shoot', 'NN'),  
('oh', 'JJ'),  
('two', 'CD'),  
('people', 'NNS'),  
('happen', 'VBP'),  
('run', 'VB'),  
('coffee', 'NN'),  
('house', 'NN'),  
('good', 'JJ'),  
('call', 'NN'),  
('oh', 'NN'),  
('oh', 'JJ'),  
('nice', 'RB'),  
('right', 'JJ'),  
('place', 'NN'),  
('ring', 'NN'),  
('finger', 'NN'),  
('would', 'MD'),  
('problem', 'NN'),  
('touched', 'VB'),  
('used', 'VBN'),  
('sat', 'JJ'),  
('sleep', 'RB'),  
('well', 'RB'),  
('mean', 'VB'),  
('bad', 'JJ'),  
('learning', 'VBG'),  
('appreciate', 'NN'),  
('uh', 'JJ'),  
('smaller', 'JJR'),  
('things', 'NNS'),  
('life', 'NN'),
```

```
('like', 'IN'),
('sound', 'JJ'),
('bird', 'NN'),
('color', 'NN'),
('sky', 'NN'),
('really', 'RB'),
('okay', 'JJ'),
('great', 'JJ'),
('going', 'VBG'),
('two', 'CD'),
('engaged', 'JJ'),
('twice', 'RB'),
('hey', 'VBP'),
('hey', 'NNS'),
('know', 'VBP'),
('love', 'RB'),
('know', 'VBP'),
('hey', 'VBP'),
('ready', 'JJ'),
('yet', 'RB'),
('right', 'JJ'),
('emily', 'RB'),
('much', 'RB'),
('love', 'VB'),
('sorry', 'JJ'),
('move', 'NN'),
('london', 'NN'),
('without', 'IN'),
('well', 'RB'),
('said', 'VBD'),
('time', 'NN'),
('think', 'NN'),
('may', 'MD'),
('wan', 'VB'),
('start', 'VB'),
('things', 'NNS'),
('see', 'VBP'),
('anymore', 'RB'),
('playpen', 'JJ'),
('seven', 'CD'),
('mind', 'NN'),
('sec', 'JJ'),
('forget', 'VB'),
('chandler', 'NN'),
('old', 'JJ'),
('first', 'RB'),
('touched', 'VBN'),
('girl', 'NN'),
('breast', 'NN'),
('according', 'VBG'),
('chandler', 'NN'),
('phenomenon', 'NN'),
('scares', 'NNS'),
('bejeezus', 'VBP'),
('set', 'VBN'),
('know', 'VBP'),
('probably', 'RB'),
('ask', 'JJ'),
('doctor', 'NN'),
('even', 'RB'),
('knows', 'VBZ'),
```

```
('deliver', 'RP'),
('baby', 'JJ'),
('half', 'NN'),
('human', 'JJ'),
('half', 'NN'),
('pure', 'NN'),
('evil', 'VBZ'),
('honestly', 'RB'),
('know', 'JJ'),
('hungry', 'JJ'),
('horny', 'NN'),
('yeah', 'RB'),
('right', 'JJ'),
('call', 'NN'),
('airlines', 'NNS'),
('right', 'RB'),
('test', 'VBP'),
('temperature', 'NN'),
('baby', 'NN'),
('bath', 'NN'),
('water', 'NN'),
('oh', 'VBP'),
('looks', 'VBZ'),
('like', 'IN'),
('mom', 'NN'),
('dad', 'NN'),
('house', 'NN'),
('oh', 'VBD'),
('even', 'RB'),
('tree', 'JJ'),
('broken', 'VBN'),
('limb', 'NN'),
('front', 'NN'),
('uh', 'NN'),
('window', 'JJ'),
('attic', 'JJ'),
('oh', 'IN'),
('god', 'JJ'),
('little', 'JJ'),
('bit', 'NN'),
('another', 'DT'),
('guess', 'NN'),
('well', 'RB'),
('love', 'VB'),
('talk', 'NN'),
('dirty', 'IN'),
('okay', 'JJ'),
('playing', 'VBG'),
('machine', 'NN'),
('paid', 'VBN'),
('lurker', 'NN'),
('waits', 'NNS'),
('give', 'VBP'),
('yay', 'NN'),
('oh', 'NN'),
('unbelievable', 'JJ'),
('place', 'NN'),
('looks', 'VBZ'),
('nice', 'JJ'),
('get', 'VB'),
('caught', 'VBN'),
```

('barbed', 'JJ'),
('wire', 'NN'),
('ah', 'NN'),
('sorry', 'NN'),
('uh', 'JJ'),
('oh', 'UH'),
('oh', 'RB'),
('well', 'RB'),
('maybe', 'RB'),
('cold', 'JJ'),
('maybe', 'RB'),
('screwed', 'VBN'),
('first', 'JJ'),
('date', 'NN'),
('9', 'CD'),
('years', 'NNS'),
('happy', 'JJ'),
('guys', 'NNS'),
('finally', 'RB'),
('getting', 'VBG'),
('kid', 'NN'),
('hi', 'NN'),
('give', 'VBP'),
('back', 'RB'),
('underwear', 'JJ'),
('gon', 'NN'),
('go', 'VBP'),
('get', 'VB'),
('cab', 'JJ'),
('everyone', 'NN'),
('stairs', 'VBD'),
('two', 'CD'),
('minutes', 'NNS'),
('monica', 'VBP'),
('ranion', 'NN'),
('theory', 'NN'),
('species', 'NNS'),
('variegation', 'VBP'),
('hey', 'JJ'),
('chandler', 'NN'),
('party', 'NN'),
('tomorrow', 'NN'),
('feel', 'VB'),
('better', 'RB'),
('uh', 'UH'),
('like', 'IN'),
('correct', 'JJ'),
('grammar', 'NN'),
('says', 'VBZ'),
('marcel', 'RBS'),
('humping', 'VBG'),
('thing', 'NN'),
('phase', 'NN'),
('apparently', 'RB'),
('reached', 'VBD'),
('sexual', 'JJ'),
('maturity', 'NN'),
('fine', 'NN'),
('go', 'VBP'),
('okay', 'JJ'),
('okay', 'NN'),

```
('going', 'VBG'),
('going', 'VBG'),
('hi', 'NN'),
('like', 'IN'),
('emily', 'RB'),
('likes', 'VBZ'),
('counts', 'NNS'),
('uh', 'JJ'),
('guys', 'NNS'),
('hey', 'VBP'),
('listen', 'VBP'),
('uh', 'JJ'),
('talked', 'VBD'),
('chandler', 'NN'),
('sorry', 'NN'),
('movie', 'NN'),
('ah', 'IN'),
('hey', 'JJ'),
('remember', 'VBP'),
('monkey', 'JJ'),
('hi', 'JJ'),
('look', 'NN'),
('love', 'IN'),
('first', 'JJ'),
('eight', 'CD'),
('always', 'RB'),
('uh', 'VBP'),
('oh', 'JJ'),
('right', 'JJ'),
('see', 'NN'),
('gon', 'RB'),
('right', 'JJ'),
('look', 'NN'),
('realize', 'VBP'),
('upsets', 'NNS'),
('could', 'MD'),
('gone', 'VBN'),
('ceremony', 'JJ'),
('reception', 'NN'),
('sidcar', 'NN'),
('know', 'VBP'),
('absolutely', 'RB'),
('think', 'VBP'),
('know', 'JJ'),
('think', 'VBP'),
('know', 'JJ'),
('look', 'VBP'),
('say', 'VBP'),
('oop', 'RB'),
('well', 'RB'),
('added', 'VBN'),
('exactly', 'RB'),
('like', 'IN'),
('part', 'NN'),
('said', 'VBD'),
('looking', 'VBG'),
('someone', 'NN'),
('someone', 'NN'),
('gon', 'NN'),
('tonight', 'NN'),
('wow', 'NN'),
```

```
('never', 'RB'),
('healthy', 'JJ'),
('break', 'NN'),
('grown', 'JJ'),
('seem', 'VBP'),
('immature', 'JJ'),
('make', 'VBP'),
('huge', 'JJ'),
('mistake', 'NN'),
('yeah', 'NN'),
('right', 'JJ'),
('god', 'NN'),
('look', 'NN'),
('beautiful', 'JJ'),
('marcel', 'NN'),
('mere', 'EX'),
('mere', 'JJ'),
('okay', 'JJ'),
('marcel', 'NN'),
('please', 'NN'),
('could', 'MD'),
('leave', 'VB'),
('leg', 'CC'),
('alone', 'RB'),
('could', 'MD'),
('stop', 'VB'),
('humping', 'VBG'),
('two', 'CD'),
('seconds', 'NNS'),
('marcel', 'NNS'),
('would', 'MD'),
('okay', 'VB'),
('away', 'RP'),
('matter', 'NN'),
('talking', 'VBG'),
('foundation', 'NN'),
('friendship', 'NN'),
('saying', 'VBG'),
('yes', 'UH'),
('yes', 'NNS'),
('know', 'VBP'),
('yet', 'RB'),
('ready', 'JJ'),
('next', 'JJ'),
('date', 'NN'),
('nothing', 'NN'),
('well', 'RB'),
('let', 'VB'),
('comes', 'VBZ'),
('along', 'RB'),
('puts', 'JJ'),
('gun', 'NN'),
('head', 'NN'),
('says', 'VBZ'),
('ride', 'VBP'),
('bike', 'IN'),
('sh', 'NN'),
('shoot', 'NN'),
('sure', 'JJ'),
('monica', 'NN'),
('would', 'MD'),
```

```
('give', 'VB'),
('ah', 'NN'),
('well', 'RB'),
('means', 'VBZ'),
('sell', 'JJ'),
('cookies', 'NNS'),
('invited', 'VBD'),
('sleep', 'JJ'),
('overs', 'NNS'),
('uhh', 'JJ'),
('yeah', 'RB'),
('would', 'MD'),
('let', 'VB'),
('could', 'MD'),
('go', 'VB'),
('bank', 'NN'),
('close', 'JJ'),
('accounts', 'NNS'),
('cut', 'VBD'),
('source', 'NN'),
('hey', 'NN'),
('phoebe', 'VBP'),
('get', 'VB'),
('okay', 'JJ'),
('learn', 'NN'),
('ride', 'NN'),
('bike', 'IN'),
('anything', 'NN'),
('oh', 'JJ'),
('got', 'VBD'),
('right', 'JJ'),
('check', 'NN'),
('emily', 'RB'),
('emily', 'RB'),
('oh', 'JJ'),
('god', 'NN'),
('oh', 'VBZ'),
('god', 'JJ'),
('emily', 'RB'),
('hi', 'NNS'),
('would', 'MD'),
('eat', 'VB'),
('arm', 'JJ'),
('okay', 'NN'),
('shoot', 'NN'),
('oh', 'UH'),
('yeah', 'NN'),
('sorry', 'JJ'),
('speechless', 'JJ'),
('mean', 'JJ'),
('fact', 'NN'),
('would', 'MD'),
('put', 'VB'),
('happiness', 'RB'),
('first', 'RB'),
('like', 'IN'),
('mean', 'NN'),
('incredible', 'JJ'),
('friend', 'NN'),
('know', 'VBP'),
('yeah', 'RB'),
```



```
('yeah', 'RB'),
('great', 'JJ'),
('lay', 'JJ'),
('beach', 'NN'),
('cry', 'NN'),
('failed', 'VBD'),
('marriage', 'NN'),
('see', 'NN'),
('see', 'VBP'),
('make', 'VB'),
('jokes', 'NNS'),
('really', 'RB'),
('rach', 'VBP'),
('yeah', 'UH'),
('sure', 'JJ'),
('get', 'NN'),
('arrested', 'VBN'),
('huh', 'NN'),
('called', 'VBN'),
('oh', 'RB'),
('hello', 'JJ'),
('uh', 'JJ'),
('mona', 'NN'),
('restaurant', 'NN'),
('mona', 'NN'),
('wow', 'NN'),
('beautiful', 'JJ'),
('none', 'NN'),
('sane', 'NN'),
('ones', 'NNS'),
('wanted', 'VBD'),
('back', 'RP'),
('point', 'NN'),
('ok', 'NN'),
('point', 'NN'),
('yeah', 'NN'),
('museum', 'NN'),
('someone', 'NN'),
('found', 'VBD'),
('bone', 'RB'),
('bone', 'JJ'),
('us', 'PRP'),
('bone', 'VBP'),
('going', 'VBG'),
('try', 'NN'),
('persuade', 'VBD'),
('give', 'JJ'),
('us', 'PRP'),
('whole', 'JJ'),
('big', 'JJ'),
('bone', 'NN'),
('thing', 'NN'),
('anyway', 'RB'),
('gon', 'VBZ'),
('gone', 'VBN'),
('like', 'IN'),
('uh', 'NNS'),
('like', 'IN'),
('week', 'NN'),
('uh', 'VBP'),
('wan', 'JJ'),
```

```
('reach', 'NN'),
('itinerary', 'JJ'),
('oh', 'NN'),
('hey', 'NN'),
('bad', 'JJ'),
('good', 'JJ'),
('monica', 'NN'),
('cutting', 'VBG'),
('yep', 'PRP'),
('rachel', 'JJ'),
('30', 'CD'),
('seconds', 'NNS'),
('clock', 'VBP'),
('5', 'CD'),
('questions', 'NNS'),
('wins', 'NNS'),
('game', 'NN'),
('lightning', 'VBG'),
('round', 'NN'),
('begins', 'VBZ'),
('joey', 'JJ'),
('favorite', 'JJ'),
('food', 'NN'),
('know', 'VBP'),
('rachel', 'NN'),
('oh', 'NN'),
('sorry', 'VBP'),
('well', 'RB'),
('look', 'VB'),
('maybe', 'RB'),
('help', 'VB'),
('little', 'JJ'),
('late', 'JJ'),
('benji', 'NN'),
('hi', 'NN'),
('hey', 'NN'),
('hills', 'NNS'),
('alive', 'JJ'),
('sound', 'JJ'),
('music', 'NN'),
('sorry', 'NN'),
('last', 'JJ'),
('nights', 'NNS'),
('together', 'RB'),
('leaves', 'VBZ'),
('camp', 'JJ'),
('counselor', 'NN'),
('hey', 'NN'),
('rach', 'VBP'),
('pass', 'NN'),
('tv', 'NN'),
('guide', 'NN'),
('know', 'VBP'),
('sell', 'VBP'),
('middle', 'JJ'),
('eastern', 'JJ'),
('food', 'NN'),
('cart', 'NN'),
('coming', 'VBG'),
('thanksgiving', 'VBG'),
('look', 'NN'),
```

```
('look', 'VBP'),
('mom', 'NN'),
('gave', 'VBD'),
('ring', 'NN'),
('wanted', 'VBD'),
('propose', 'JJ'),
('rachel', 'NN'),
('wanted', 'VBD'),
('maybe', 'RB'),
('kinda', 'VBN'),
('wanted', 'VBD'),
('ah', 'JJ'),
('start', 'JJ'),
('things', 'NNS'),
('confused', 'VBD'),
('rach', 'NN'),
('sweetie', 'NN'),
('propose', 'JJ'),
('love', 'NN'),
('machine', 'NN'),
('2', 'CD'),
('hours', 'NNS'),
('27', 'CD'),
('minutes', 'NNS'),
('never', 'RB'),
('walked', 'VBD'),
('aisle', 'JJ'),
('knowing', 'VBG'),
('divorce', 'NN'),
('guy', 'NN'),
('mark', 'NN'),
('bloomingdale', 'JJ'),
('thinks', 'VBZ'),
('nice', 'RB'),
('know', 'VBP'),
('really', 'RB'),
('wants', 'VBZ'),
('sleep', 'JJ'),
('listen', 'JJ'),
('ah', 'NN'),
('sorry', 'NN'),
('crazy', 'VBP'),
('jealous', 'JJ'),
('like', 'IN'),
('lot', 'NN'),
('know', 'VBP'),
('summer', 'NN'),
('hot', 'JJ'),
('wear', 'JJ'),
('tank', 'NN'),
('top', 'JJ'),
('oh', 'NN'),
('really', 'RB'),
('really', 'RB'),
('great', 'JJ'),
('yeah', 'NNS'),
('actually', 'RB'),
('right', 'JJ'),
('street', 'NN'),
('umm', 'NNS'),
('know', 'VBP'),
```

```
('stop', 'JJ'),
('bye', 'NNS'),
('say', 'VBP'),
('hi', 'JJ'),
('oh', 'JJ'),
('mom', 'NN'),
('mom', 'NN'),
('chandler', 'NN'),
('hates', 'VBZ'),
('thanksgiving', 'VBG'),
('eat', 'NN'),
('thanksgiving', 'VBG'),
('food', 'NN'),
('whoa', 'NN'),
('whoa', 'NN'),
('whoa', 'NN'),
('hey', 'NN'),
('remember', 'VBP'),
('talked', 'VBN'),
('got', 'VBD'),
('strong', 'JJ'),
('rach', 'NN'),
('code', 'NN'),
('brown', 'IN'),
('situation', 'NN'),
('said', 'VBD'),
('would', 'MD'),
('never', 'RB'),
('really', 'RB'),
('believe', 'VB'),
('chandler', 'NN'),
('missing', 'VBG'),
('soo', 'JJ'),
('accident', 'NN'),
('saw', 'VBD'),
('tag', 'NN'),
('threw', 'NN'),
('big', 'JJ'),
('fat', 'NN'),
('grandma', 'NN'),
('arm', 'NN'),
('elbow', 'NN'),
('right', 'JJ'),
('keep', 'NN'),
('running', 'VBG'),
('oh', 'JJ'),
('think', 'NN'),
('would', 'MD'),
('big', 'JJ'),
('deal', 'NN'),
('finished', 'VBD'),
('fascinating', 'VBG'),
('book', 'NN'),
('year', 'NN'),
('2030', 'CD'),
('computers', 'NNS'),
('carry', 'VBP'),
('amount', 'JJ'),
('functions', 'NNS'),
('actual', 'JJ'),
('human', 'JJ'),
```

('brain', 'NN'),
('theoretically', 'RB'),
('could', 'MD'),
('download', 'VB'),
('thoughts', 'NNS'),
('memories', 'NNS'),
('computer', 'NN'),
('live', 'VBP'),
('forever', 'RB'),
('machine', 'NN'),
('believe', 'VBP'),
('making', 'VBG'),
('throw', 'NN'),
('like', 'IN'),
('buddies', 'NNS'),
('hey', 'VBP'),
('nono', 'RB'),
('neither', 'CC'),
('although', 'IN'),
('uh', 'NN'),
('know', 'VBP'),
('back', 'RB'),
('college', 'NN'),
('susan', 'NN'),
('sallidor', 'NN'),
('hey', 'NN'),
('date', 'NN'),
('go', 'VBP'),
('mr', 'JJ'),
('millionaire', 'NN'),
('gets', 'VBZ'),
('credit', 'NN'),
('hey', 'NN'),
('got', 'VBD'),
('pottery', 'RB'),
('barn', 'JJ'),
('okay', 'NN'),
('pretty', 'RB'),
('love', 'IN'),
('believe', 'VB'),
('even', 'RB'),
('tell', 'VB'),
('us', 'PRP'),
('oh', 'RB'),
('right', 'VBD'),
('daddy', 'JJ'),
('uncle', 'NN'),
('joey', 'NN'),
('going', 'VBG'),
('trip', 'NN'),
('today', 'NN'),
('going', 'VBG'),
('conference', 'NN'),
('barbados', 'NN'),
('right', 'JJ'),
('okay', 'NN'),
('really', 'RB'),
('plenty', 'JJ'),
('people', 'NNS'),
('see', 'VBP'),
('sisters', 'NNS'),

```
('thanksgiving', 'VBG'),  
( 'see', 'VBP'),  
( 'college', 'NN'),  
( 'roommates', 'NNS'),  
( 'reunions', 'NNS'),  
( 'see', 'VBP'),  
( 'joey', 'JJ'),  
( 'burger', 'NN'),  
( 'king', 'VBG'),  
( 'better', 'JJR'),  
( 'wow', 'NN'),  
( 'ah', 'VBP'),  
( 'really', 'RB'),  
( 'like', 'JJ'),  
( 'space', 'NN'),  
( 'stuff', 'NN'),  
( 'huh', 'NN'),  
( 'okay', 'JJ'),  
( 'stop', 'NN'),  
( 'deal', 'NN'),  
( 'right', 'RB'),  
( 'go', 'VB'),  
( 'baby', 'RB'),  
( 'lesson', 'JJ'),  
( 'importance', 'NN'),  
( 'unagi', 'NN'),  
( 'hey', 'NN'),  
( 'going', 'VBG'),  
( 'know', 'VBP'),  
( 'fine', 'JJ'),  
( 'get', 'NN'),  
( 'attacked', 'VBD'),  
( 'even', 'RB'),  
( 'yeah', 'JJR'),  
( 'hard', 'JJ'),  
( 'remember', 'NN'),  
( 'bedroom', 'NN'),  
( 'playing', 'NN'),  
( 'dinosaurs', 'NNS'),  
( 'playing', 'VBG'),  
( 'learning', 'VBG'),  
( 'father', 'NN'),  
( 'walks', 'NNS'),  
( 'says', 'VBZ'),  
( 'says', 'VBZ'),  
( 'things', 'NNS'),  
( 'wrong', 'JJ'),  
( 'outside', 'JJ'),  
( 'playing', 'VBG'),  
( 'like', 'IN'),  
( 'like', 'IN'),  
( 'real', 'JJ'),  
( 'boy', 'NN'),  
( 'bottom', 'NN'),  
( 'dating', 'VBG'),  
( 'barrel', 'NN'),  
( 'guys', 'NNS'),  
( 'four', 'CD'),  
( 'divorce', 'NN'),  
( 'guy', 'NN'),  
( 'uh', 'JJ'),
```

```
('murderer', 'NN'),  
( 'guy', 'NN'),  
( 'geologists', 'NNS'),  
( 'hey', 'VBP'),  
( 'oh', 'JJ'),  
( 'look', 'NN'),  
( 'loved', 'VBD'),  
( 'job', 'NN'),  
( 'let', 'NN'),  
( 'gon', 'VB'),  
( 'find', 'VB'),  
( 'anyone', 'NN'),  
( 'well', 'RB'),  
( 'true', 'JJ'),  
( 'ah', 'NN'),  
( 'ah', 'NN'),  
( 'libbing', 'VBG'),  
( 'dude', 'NN'),  
( 'touch', 'JJ'),  
( 'paintings', 'NNS'),  
( 'okay', 'IN'),  
( 'coffee', 'NN'),  
( 'oh', 'NN'),  
( 'god', 'NN'),  
( 'still', 'RB'),  
( 'feel', 'VB'),  
( 'better', 'RB'),  
( 'yeah', 'PRP'),  
( 'okay', 'JJ'),  
( 'mean', 'JJ'),  
( 'guys', 'NNS'),  
( 'go', 'VB'),  
( 'away', 'RB'),  
( 'first', 'JJ'),  
( 'weekend', 'NN'),  
( 'alone', 'RB'),  
( 'know', 'VBP'),  
( 'totally', 'RB'),  
( 'totally', 'RB'),  
( 'understand', 'JJ'),  
( 'pride', 'NN'),  
( 'mean', 'NN'),  
( 'moving', 'VBG'),  
( 'still', 'RB'),  
( 'moving', 'VBG'),  
( 'right', 'RB'),  
( 'good', 'JJ'),  
( 'found', 'VBN'),  
( 'elizabeth', 'RB'),  
( 'dad', 'JJ'),  
( 'wants', 'VBZ'),  
( 'meet', 'JJ'),  
( 'yeah', 'RB'),  
( 'right', 'RB'),  
( 'right', 'JJ'),  
( 'time', 'NN'),  
( 'know', 'VB'),  
( 'yeah', 'RB'),  
( 'young', 'JJ'),  
( 'weird', 'NN'),  
( 'chicks', 'NNS'),
```

```
('nothing', 'NN'),  
('nothing', 'NN'),  
('lee', 'NN'),  
('laundry', 'VBZ'),  
('done', 'VBN'),  
('oh', 'JJ'),  
('quite', 'RB'),  
('right', 'JJ'),  
('okay', 'NN'),  
('peppers', 'NNS'),  
('oh', 'VBP'),  
('oh', 'JJ'),  
('god', 'NNS'),  
('hot', 'JJ'),  
('way', 'NN'),  
('touch', 'JJ'),  
('pepper', 'IN'),  
('touch', 'JJ'),  
('eye', 'NN'),  
('hey', 'NN'),  
('joey', 'VBP'),  
('stuff', 'JJ'),  
('free', 'JJ'),  
('stopping', 'NN'),  
('red', 'JJ'),  
('ross', 'NN'),  
...]
```

The below code runs the **Frequency Distribution** of the words in the Ross' vocabulary

In [12]:

```
fdist = FreqDist(Ross_words)
fdist.most_common(30)
```

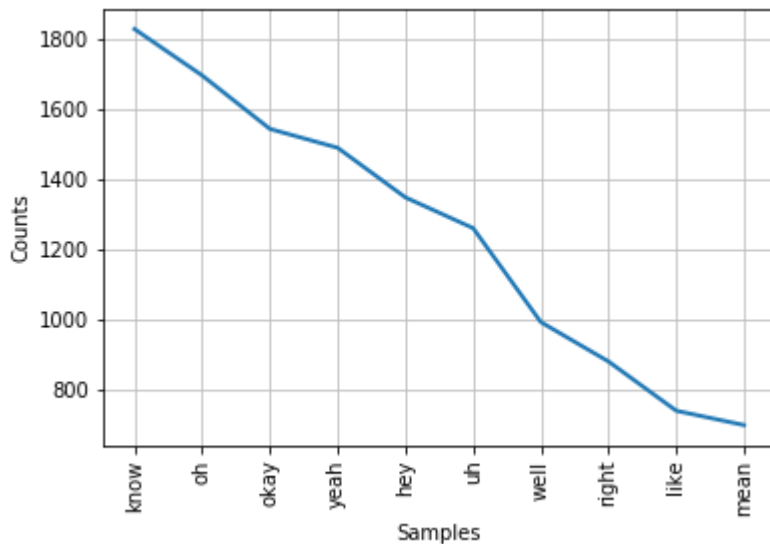
Out[12]:

```
[('know', 1830),
 ('oh', 1697),
 ('okay', 1544),
 ('yeah', 1490),
 ('hey', 1348),
 ('uh', 1260),
 ('well', 991),
 ('right', 878),
 ('like', 737),
 ('mean', 696),
 ('gon', 686),
 ('go', 680),
 ('get', 664),
 ('think', 644),
 ('really', 638),
 ('look', 601),
 ('got', 564),
 ('see', 489),
 ('going', 462),
 ('guys', 459),
 ('rachel', 427),
 ('good', 424),
 ('would', 398),
 ('sorry', 372),
 ('great', 366),
 ('yes', 338),
 ('joey', 332),
 ('huh', 324),
 ('time', 317),
 ('hi', 314)]
```

Frequenct Distribution plot is as follows:

In [13]:

```
FreqDist(Ross_words).plot(10, cumulative = False)
```



Out[13]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x1a31660908>
```

To find the **conditional probability** or the probability of a word coming in a list is done by ConditionalFreqDist() function. For example, conditional probability of Ross using Hi! word is 18% or approximately 0.18

In [14]:

```
"""Conditional Probability"""
cfdist = ConditionalFreqDist((len(word), word) for word in Ross)
cfdist[3].freq('Hi!')
```

Out[14]:

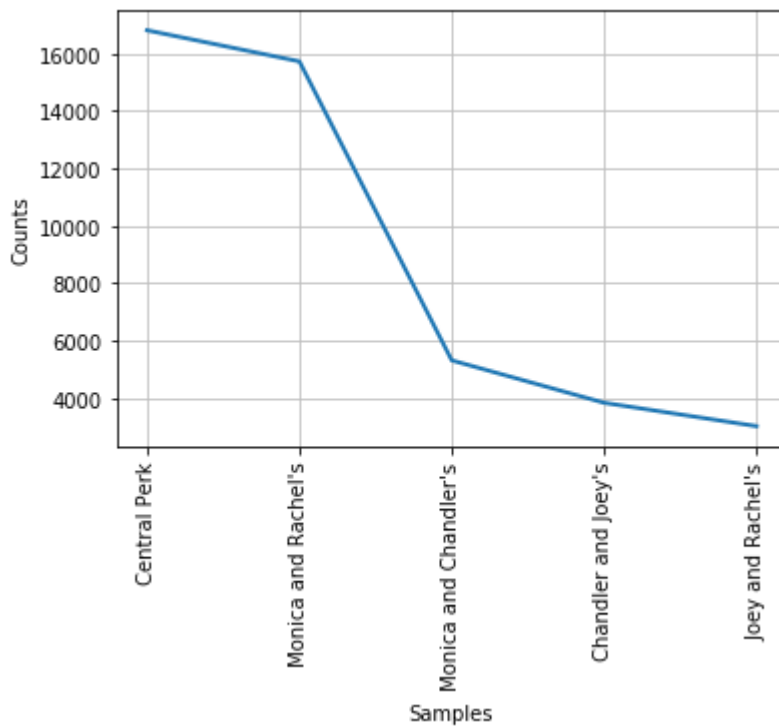
```
0.1821705426356589
```

Finding the place where the characters in the show hangout, we plot the frequency distribution of various locations in the dataset and **Central Perk** is obviously their first choice

In [15]:

```
locations = []  
for row in df.Location:  
    locations.append(row)  
freqdist = FreqDist(locations)  
print(freqdist)  
freqdist.plot(5)
```

<FreqDist with 744 samples and 93335 outcomes>



Out[15]:

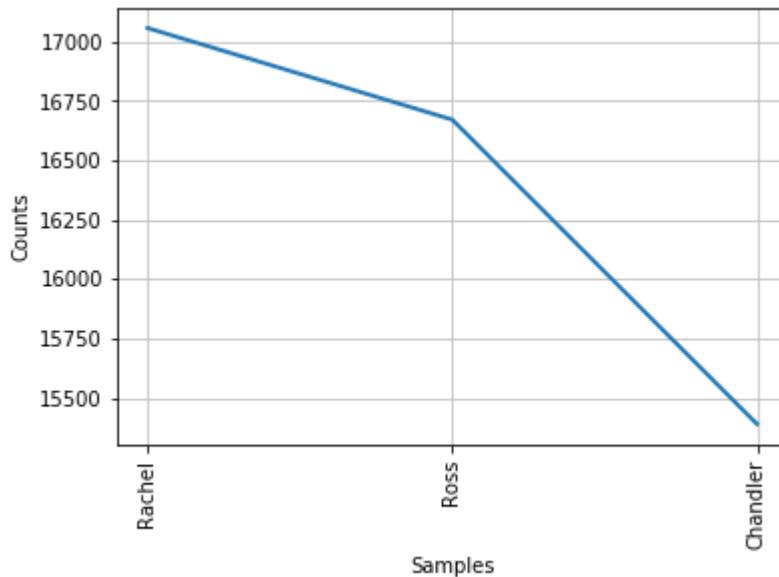
<matplotlib.axes._subplots.AxesSubplot at 0x1a317196a0>

To find who delivered most dialogues in the show we use Frequency distribution Plot of Speaker column and it's the most talkative **Rachel**

In [16]:

```
dialogues = []
type(dialogues)
for d in df['Speaker']:
    dialogues.append(d)
freqdist_d = FreqDist(dialogues)
print(freqdist_d)
freqdist_d.plot(3)
```

<FreqDist with 6 samples and 93335 outcomes>



Out[16]:

<matplotlib.axes._subplots.AxesSubplot at 0x1a316ee518>

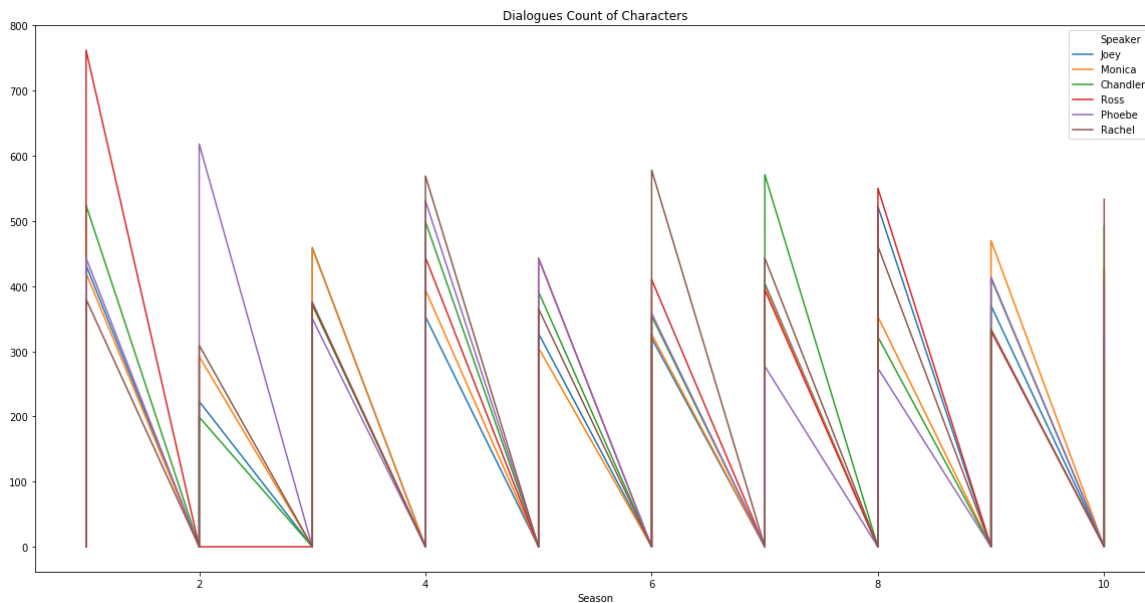
We will go ahead and find who delivered most Dialogues in each season we use the seaborn line plot with categories.

In [17]:

```
plt.figure(figsize=(20,10))
dc = sns.lineplot(x="Season", y="dialogue_count", hue="Speaker", estimator=None,
                  data=df, palette=None)
dc.set_title("Dialogues Count of Characters")
dc.set_ylabel('')
```

Out[17]:

Text(0, 0.5, '')



Finding the **lexical diversity** of words which means in a simple way, on an average, how many times a word is repeated in the Ross dialogue list.

In [18]:

```
def lexical_diversity(doc):
    return len(doc)/len(set(doc))
```

```
lexical_diversity(Ross_words)
```

Out[18]:

15.283950617283951

Lexical Dispersion Plot of random 5 words used by Ross

In [19]:

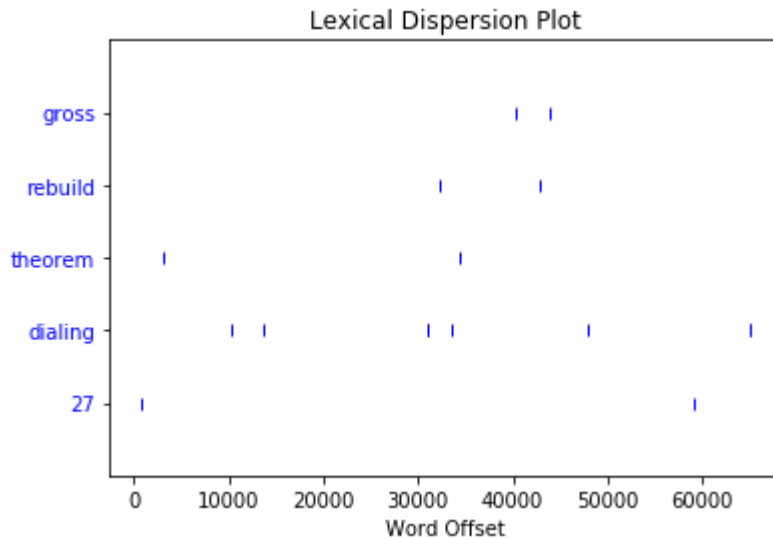
```
words_ross = list(FreqDist(Ross_words).keys())
random_words = random.choices(words_ross, k=5)
random_words
```

Out[19]:

['gross', 'rebuild', 'theorem', 'dialing', '27']

In [20]:

```
nlTK.Text(Ross_words).dispersion_plot(random_words)
```



Sentiment analysis of dialogues by characters

Defining a function which finds the polarity of a sentence (greater than zero means positive else it's negative). It ranges from -1 to 1.

In [21]:

```
def detect_sentiment(text):
    return TextBlob(text).sentiment.polarity
```

In [22]:

```
df.Text = df.Text.apply(str)
```

Initialising a new column in our dataframe which is sentiment, the value of polarity

In [23]:

```
df['sentiment'] = df.Text.apply(detect_sentiment)
```

In [24]:

```
df['sentiment']
```

Out[24]:

```
0      0.000000
1      0.200000
2      1.000000
3      0.000000
4      0.000000
5      0.000000
6      0.000000
7      0.000000
8     -1.000000
9      0.000000
10     0.000000
11     0.000000
12     0.000000
13     0.200000
14     0.500000
15     0.345238
16     0.000000
17     0.000000
18     0.156250
19     0.000000
20     0.250000
21     0.285714
22     0.000000
23    -0.500000
24     0.000000
25     0.625000
26     0.000000
27     1.000000
28     0.000000
29     0.000000
...
93305  0.000000
93306  0.500000
93307  0.000000
93308 -0.051852
93309  0.625000
93310  0.050000
93311  0.000000
93312  0.000000
93313  0.625000
93314  0.000000
93315  0.000000
93316  0.000000
93317  0.080357
93318  0.000000
93319  0.463128
93320  0.412500
93321  0.000000
93322  0.000000
93323  0.312500
93324 -0.071429
93325  0.000000
93326  0.000000
93327  0.000000
93328 -0.400000
93329  0.000000
93330  0.000000
93331 -0.117188
93332  0.000000
```



```
93333    0.000000
93334    0.000000
Name: sentiment, Length: 93335, dtype: float64
```

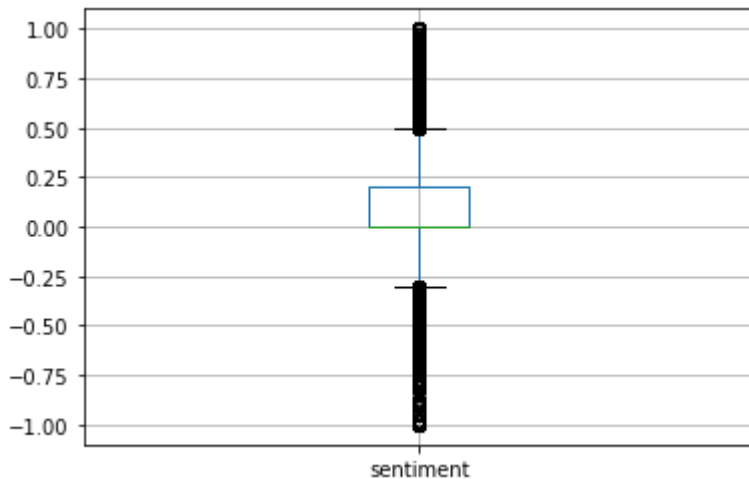
The concentration of values in sentiment column is shown by a box plot.

In [25]:

```
df.boxplot(column = 'sentiment')
```

Out[25]:

<matplotlib.axes._subplots.AxesSubplot at 0x1a32d384e0>



More positive sentimental dialogue is:

In [26]:

```
df[df.sentiment > 0.75].Text.head(10)
```

Out[26]:

```
2      Phoebe is going to say "yes"? That's, that's g...
27      This stuff is great!
101     Me too. Yeah, this place is great. I'm so happ...
116      Now I,Äô so happy.
207     Well, I have a girlfriend, I,Äô-I,Äô happy. ...
208      Good call!
242     Okay! Okay! Okay! You win! You win!! I can't h...
278      I am extremely talented!
280      Ross, you're like my best friend.
480      That's great.
Name: Text, dtype: object
```

More negative sentimental dialogue is:

In [27]:

```
df[df.sentiment < -0.25].Text.head(10)
```

Out[27]:

```
8                                What? That's terrible!
23      It's so weird seeing Ross and Rachel with a ba...
34      She doesn't want her parents to know she's...
110     It's an honor to meet you. I can't tell you ho...
118     Nothing! You have apologized to her like a mil...
123     Listen umm, I've been thinking, it's not f...
155     Are you kidding? I have had some very dirty dr...
175     Oh! I knew it! I knew it! I felt really thick ...
233     Hey! It's my fashion girls! What's wrong?
243     Oh, you want something serious. Y'know what yo...
Name: Text, dtype: object
```

Defining a new function which displays 'positive' and 'negative' based on left or right side of zero

In [28]:

```
def emotion_result(val):
    if val > 0:
        return 'positive'
    elif val <= 0:
        return 'negative'
```

A new column in our dataframe which displays the emotion result(positive or negative)

In [29]:

```
df['emotion'] = df.sentiment.apply(emotion_result)
```

Modelling techniques on our dataset:

Adding features to a document matrix:

In [30]:

```
feature_cols = ['Text']
```

defining X and y for our modelling

In [31]:

```
X = df[feature_cols]
y = df.emotion
# split into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, random_state=1)
```

Using **CountVectorizer** with text column in dataset

In [32]:

```
vect = CountVectorizer()  
X_train_dtm = vect.fit_transform(X_train.Text)  
X_test_dtm = vect.transform(X_test.Text)  
print((X_train_dtm.shape))  
print((X_test_dtm.shape))
```

```
(70001, 12238)
```

```
(23334, 12238)
```

In [33]:

```
# Shape of feature column  
X_train.drop('Text', axis=1).shape
```

Out[33]:

```
(70001, 0)
```

In [34]:

```
# Casting feature columns to float and converting to a sparse matrix  
import scipy as sp  
extra = sp.sparse.csr_matrix(X_train.drop('Text', axis=1).astype(float))  
extra.shape
```

Out[34]:

```
(70001, 0)
```

In [35]:

```
# Combine sparse matrices  
X_train_dtm_extra = sp.sparse.hstack((X_train_dtm, extra))  
X_train_dtm_extra.shape
```

Out[35]:

```
(70001, 12238)
```

In [36]:

```
# repeating for testing dataset  
extra = sp.sparse.csr_matrix(X_test.drop('Text', axis=1).astype(float))  
X_test_dtm_extra = sp.sparse.hstack((X_test_dtm, extra))  
X_test_dtm_extra.shape
```

Out[36]:

```
(23334, 12238)
```

In [37]:

```
logreg = LogisticRegression(C=1e9)
logreg.fit(X_train_dtm, y_train)
y_pred_class = logreg.predict(X_test_dtm)
print((metrics.accuracy_score(y_test, y_pred_class)))
```

/Users/rani/anaconda3/lib/python3.7/site-packages/sklearn/linear_model/logistic.py:432: FutureWarning: Default solver will be changed to 'lbfgs' in 0.22. Specify a solver to silence this warning.
FutureWarning)

0.9766863803891317

In [38]:

```
# Use logistic regression with Text column
logreg = LogisticRegression(C=1e9)
logreg.fit(X_train_dtm_extra, y_train)
y_pred_class = logreg.predict(X_test_dtm_extra)
print((metrics.accuracy_score(y_test, y_pred_class)))
```

0.9766863803891317

Supervised learning

Importing TFIDF vectorizer

In [39]:

```
from sklearn.feature_extraction.text import CountVectorizer
vectorizer = CountVectorizer(stop_words='english')
vectorizer
```

Out[39]:

```
CountVectorizer(analyzer='word', binary=False, decode_error='strict',
                dtype=<class 'numpy.int64'>, encoding='utf-8', input
='content',
                lowercase=True, max_df=1.0, max_features=None, min_d
f=1,
                ngram_range=(1, 1), preprocessor=None, stop_words='e
nglish',
                strip_accents=None, token_pattern='(?u)\\b\\w\\w+
\\b',
                tokenizer=None, vocabulary=None)
```

In [40]:

```
from sklearn.feature_extraction.text import TfidfTransformer
tfidf = TfidfTransformer()
tfidf
```

Out[40]:

```
TfidfTransformer(norm='l2', smooth_idf=True, sublinear_tf=False, use
_idf=True)
```

In [41]:

```
X = vectorizer.fit_transform(df.Text[0:int(len(df.Text)/3)])  
X
```

Out[41]:

```
<31111x9314 sparse matrix of type '<class 'numpy.int64'>'  
  with 134199 stored elements in Compressed Sparse Row format>
```

Building weighted term documented matrix using the TFIDF vectorizer

In [42]:

```
X_weighted = tfidf.fit_transform(X)  
X_weighted.toarray()
```

Out[42]:

```
array([[0., 0., 0., ..., 0., 0., 0.],  
       [0., 0., 0., ..., 0., 0., 0.],  
       [0., 0., 0., ..., 0., 0., 0.],  
       ...,  
       [0., 0., 0., ..., 0., 0., 0.],  
       [0., 0., 0., ..., 0., 0., 0.],  
       [0., 0., 0., ..., 0., 0., 0.]])
```

In [43]:

```
# building the term-document matrix for the test set using the existing transfor  
ms  
  
X_test = vectorizer.transform(df.Text[int(len(df.Text)/3)+1:])  
X_test_weighted = tfidf.fit_transform(X_test)
```

In [44]:

```
# get the emotion for each text in both the train and test sets  
train_labels = df.emotion[0:int(93335/3)]  
test_labels = df.emotion[int(93335/3)+1:]
```

In [45]:

```
train_labels
```

Out[45]:

```
0      negative
1      positive
2      positive
3      negative
4      negative
5      negative
6      negative
7      negative
8      negative
9      negative
10     negative
11     negative
12     negative
13     positive
14     positive
15     positive
16     negative
17     negative
18     positive
19     negative
20     positive
21     positive
22     negative
23     negative
24     negative
25     positive
26     negative
27     positive
28     negative
29     negative
...
31081   positive
31082   positive
31083   negative
31084   positive
31085   negative
31086   positive
31087   positive
31088   positive
31089   negative
31090   negative
31091   positive
31092   negative
31093   negative
31094   negative
31095   negative
31096   negative
31097   negative
31098   negative
31099   negative
31100   negative
31101   negative
31102   negative
31103   negative
31104   positive
31105   negative
31106   negative
31107   negative
31108   negative
```

```
31109    negative
31110    negative
Name: emotion, Length: 31111, dtype: object
```

Initialising y with postive if there is positive sentiment and negative if there is negative sentiment

In [46]:

```
y = np.asarray([1 if 'positive' in label else 0 for label in train_labels])
y_test = np.asarray([1 if 'positive' in label else 0 for label in test_labels])
```

In [47]:

```
X_weighted.shape, y.shape, X_test_weighted.shape, y_test.shape
```

Out[47]:

```
((31111, 9314), (31111,), (62223, 9314), (62223,))
```

We're know to train a classifier with (multinomial) Naive Bayes.

In [48]:

```
from sklearn.naive_bayes import MultinomialNB
from sklearn.metrics import classification_report

# train the classifier
classifier = MultinomialNB()
classifier.fit(X_weighted, y)

# predict labels for the test set
predictions = classifier.predict(X_test_weighted)

# output the classification report
label_names = ['negative', 'positive']
print("""Supervised Learning""")
print(classification_report(y_test, predictions, target_names=label_names))
```

Supervised Learning				
	precision	recall	f1-score	support
negative	0.85	0.98	0.91	41862
positive	0.94	0.65	0.77	20361
accuracy			0.87	62223
macro avg	0.89	0.81	0.84	62223
weighted avg	0.88	0.87	0.86	62223

Trying out the unsupervised learning but there are no satisfactory results because its usefulness is limited and we can't get good results out of non-negative matrix factorization (NMF) in Natural Language Processing.

In [49]:

```
print("""Unsupervised Learning""")
from sklearn.decomposition import NMF
nmf = NMF(n_components=10).fit(X_weighted)

feature_names = vectorizer.get_feature_names()

for topic_idx, topic in enumerate(nmf.components_):
    print('Topic #%d:' % topic_idx)
    print(' '.join([feature_names[i] for i in topic.argsort()[::-20 - 1:-1]]))
    print('')
```

Unsupervised Learning

Topic #0:

yeah sure uh good like baby got maybe think mean äöre ll äöll great
guess kinda gonna look totally love

Topic #1:

hey guys pheebs rach joey ross did chandler going uh doing look list
en mon come phoebe monica audition remember äöd

Topic #2:

oh god thank good sorry great did ross uh come wait love look just g
uys thanks ok wow got want

Topic #3:

okay gonna just äöm äöll bye ready look phoebe good umm let wait sur
e tell äöre ross fine talk second

Topic #4:

nan did yes say tell uh just said ross thank hear happen wait didn t
hing ask rachel ok wow man

Topic #5:

know did don just mean like guys gonna maybe thing ok good does ross
ve ll time didn feel think

Topic #6:

äös really äöm just gonna going like great uh äöre let ross think jo
ey mean äöknow good come look time

Topic #7:

hi äöm guys chandler monica honey pheebs sweetie phoebe come just ro
ss emily joey excuse rach umm geller uh rachel

Topic #8:

right äöre just gonna let ll äöm äöll sorry tell look got fine come
guys ok did thing ready thank

Topic #9:

äöt don think didn just want tell look äöm äöknow come mean like bel
ieve say doesn gonna äöre ross uh

Modelling using Gensim

In [50]:

```
pip install gensim
```

```
Requirement already satisfied: gensim in /Users/rani/anaconda3/lib/python3.7/site-packages (3.8.1)
Requirement already satisfied: numpy>=1.11.3 in /Users/rani/anaconda3/lib/python3.7/site-packages (from gensim) (1.16.4)
Requirement already satisfied: scipy>=0.18.1 in /Users/rani/anaconda3/lib/python3.7/site-packages (from gensim) (1.3.0)
Requirement already satisfied: smart-open>=1.8.1 in /Users/rani/anaconda3/lib/python3.7/site-packages (from gensim) (1.9.0)
Requirement already satisfied: six>=1.5.0 in /Users/rani/anaconda3/lib/python3.7/site-packages (from gensim) (1.12.0)
Requirement already satisfied: boto3 in /Users/rani/anaconda3/lib/python3.7/site-packages (from smart-open>=1.8.1->gensim) (1.10.35)
Requirement already satisfied: boto>=2.32 in /Users/rani/anaconda3/lib/python3.7/site-packages (from smart-open>=1.8.1->gensim) (2.49.0)
Requirement already satisfied: requests in /Users/rani/anaconda3/lib/python3.7/site-packages (from smart-open>=1.8.1->gensim) (2.22.0)
Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in /Users/rani/anaconda3/lib/python3.7/site-packages (from boto3->smart-open>=1.8.1->gensim) (0.9.4)
Requirement already satisfied: s3transfer<0.3.0,>=0.2.0 in /Users/rani/anaconda3/lib/python3.7/site-packages (from boto3->smart-open>=1.8.1->gensim) (0.2.1)
Requirement already satisfied: botocore<1.14.0,>=1.13.35 in /Users/rani/anaconda3/lib/python3.7/site-packages (from boto3->smart-open>=1.8.1->gensim) (1.13.35)
Requirement already satisfied: chardet<3.1.0,>=3.0.2 in /Users/rani/anaconda3/lib/python3.7/site-packages (from requests->smart-open>=1.8.1->gensim) (3.0.4)
Requirement already satisfied: idna<2.9,>=2.5 in /Users/rani/anaconda3/lib/python3.7/site-packages (from requests->smart-open>=1.8.1->gensim) (2.8)
Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in /Users/rani/anaconda3/lib/python3.7/site-packages (from requests->smart-open>=1.8.1->gensim) (1.24.2)
Requirement already satisfied: certifi>=2017.4.17 in /Users/rani/anaconda3/lib/python3.7/site-packages (from requests->smart-open>=1.8.1->gensim) (2019.6.16)
Requirement already satisfied: docutils<0.16,>=0.10 in /Users/rani/anaconda3/lib/python3.7/site-packages (from botocore<1.14.0,>=1.13.35->boto3->smart-open>=1.8.1->gensim) (0.14)
Requirement already satisfied: python-dateutil<2.8.1,>=2.1; python_version >= "2.7" in /Users/rani/anaconda3/lib/python3.7/site-packages (from botocore<1.14.0,>=1.13.35->boto3->smart-open>=1.8.1->gensim) (2.8.0)
```

Note: you may need to restart the kernel to use updated packages.

In [51]:

```
from gensim import corpora, models, similarities, matutils

# creating the corpus using a conversion utility
gensim_corpus = matutils.Sparse2Corpus(X_weighted)

# building the Latent Dirichlet Allocation (LDA) model
lda = models.LdaModel(gensim_corpus, num_topics=100)
lda
```

Out[51]:

```
<gensim.models.ldamodel.LdaModel at 0x1a32f71c50>
```

Word2vec is an nsupervised neural network model that runs on a corpus of text and learns vector representations for the individual words in the text. The word vectors are modeled in a way such that words that are semantically close to each other are also close in the vector space, so neighbors in the vector space equates to similar semantics.

Let's explore some of the implications on our dataset. Since word2vec expects a list of sentences as input, we'll need to go back to the pre-transformed word list which we defined (Ross_words)

In [52]:

```
Ross_words
```

Out[52]:

```
['yeah',  
 'woohoo',  
 'love',  
 'sorry',  
 'look',  
 'think',  
 'wan',  
 'hear',  
 'right',  
 'help',  
 'love',  
 'marriage',  
 'broke',  
 'thumb',  
 'dude',  
 'umm',  
 'uh',  
 'telling',  
 'guys',  
 'huh',  
 'really',  
 'pretty',  
 'industrial',  
 'solvent',  
 'hey',  
 'rach',  
 'pass',  
 'tv',  
 'guide',  
 'miracle',  
 'little',  
 'bit',  
 'oil',  
 'lasted',  
 'day',  
 'burned',  
 'mary',  
 'angela',  
 'oww',  
 'yeah',  
 'beef',  
 'dessert',  
 'way',  
 'well',  
 'great',  
 'time',  
 'umm',  
 'chancy',  
 'hand',  
 'yeah',  
 'uh',  
 'pheebs',  
 'hovering',  
 'around',  
 'subject',  
 'say',  
 'dinosaurs',  
 'go',  
 'rrroof',
```

'right',
'candy',
'cookie',
'ohh',
'thank',
'emily',
'cousin',
'kicked',
'honor',
'meet',
'tell',
'long',
'admirer',
'work',
'mean',
'nobel',
'prize',
'whoooo',
'mean',
'tell',
'reasons',
'got',
'field',
'oh',
'great',
'going',
'saturday',
'found',
'seeing',
'guy',
'yeah',
'know',
'ah',
'girlfriend',
'told',
'last',
'night',
'well',
'turns',
'ah',
'wants',
'get',
'back',
'together',
'oh',
'found',
'happy',
'yep',
'got',
'got',
'thank',
'much',
'okay',
'umm',
'even',
'treat',
'kidding',
'dirty',
'dreams',
'well',
'good',

'okay',
'kind',
'think',
'know',
'wearing',
'ring',
'okay',
'well',
'tough',
'spot',
'rach',
'handle',
'huh',
'wan',
'fight',
'us',
'wan',
'bail',
'see',
'us',
'throwing',
'away',
'something',
'know',
'damn',
'good',
'rachel',
'love',
'much',
'shoot',
'oh',
'two',
'people',
'happen',
'run',
'coffee',
'house',
'good',
'call',
'oh',
'oh',
'nice',
'right',
'place',
'ring',
'finger',
'would',
'problem',
'touched',
'used',
'sat',
'sleep',
'well',
'mean',
'bad',
'learning',
'appreciate',
'uh',
'smaller',
'things',
'life',

'like',
'sound',
'bird',
'color',
'sky',
'really',
'okay',
'great',
'going',
'two',
'engaged',
'twice',
'hey',
'hey',
'know',
'love',
'know',
'hey',
'ready',
'yet',
'right',
'emily',
'much',
'love',
'sorry',
'move',
'london',
'without',
'well',
'said',
'time',
'think',
'may',
'wan',
'start',
'things',
'see',
'anymore',
'playpen',
'seven',
'mind',
'sec',
'forget',
'chandler',
'old',
'first',
'touched',
'girl',
'breast',
'according',
'chandler',
'phenomenon',
'scares',
'bejeezus',
'set',
'know',
'probably',
'ask',
'doctor',
'even',
'knows',

'deliver',
'baby',
'half',
'human',
'half',
'pure',
'evil',
'honestly',
'know',
'hungry',
'horny',
'yeah',
'right',
'call',
'airlines',
'right',
'test',
'temperature',
'baby',
'bath',
'water',
'oh',
'looks',
'like',
'mom',
'dad',
'house',
'oh',
'even',
'tree',
'broken',
'limb',
'front',
'uh',
'window',
'attic',
'oh',
'god',
'little',
'bit',
'another',
'guess',
'well',
'love',
'talk',
'dirty',
'okay',
'playing',
'machine',
'paid',
'lurker',
'waits',
'give',
'yay',
'oh',
'unbelievable',
'place',
'looks',
'nice',
'get',
'caught',

'barbed',
'wire',
'ah',
'sorry',
'uh',
'oh',
'oh',
'well',
'maybe',
'cold',
'maybe',
'screwed',
'first',
'date',
'9',
'years',
'happy',
'guys',
'finally',
'getting',
'kid',
'hi',
'give',
'back',
'underwear',
'gon',
'go',
'get',
'cab',
'everyone',
'stairs',
'two',
'minutes',
'monica',
'ranion',
'theory',
'species',
'variegation',
'hey',
'chandler',
'party',
'tomorrow',
'feel',
'better',
'uh',
'like',
'correct',
'grammar',
'says',
'marcel',
'humping',
'thing',
'phase',
'apparently',
'reached',
'sexual',
'maturity',
'fine',
'go',
'okay',
'okay',

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'let',
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'wants',
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'wear',
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'top',
'oh',
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'really',
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'buddies',
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'neither',
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'sallidor',
'hey',
'date',
'go',
'mr',
'millionaire',
'gets',
'credit',
'hey',
'got',
'pottery',
'barn',
'okay',
'pretty',
'love',
'believe',
'even',
'tell',
'us',
'oh',
'right',
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'uncle',
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'today',
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'king',
'better',
'wow',
'ah',
'really',
'like',
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'stop',
'deal',
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'go',
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'get',
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'guy',
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'oh',
'look',
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'let',
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'ah',
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'touch',
'paintings',
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'coffee',
'oh',
'god',
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'feel',
'better',
'yeah',
'okay',
'mean',
'guys',
'go',
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'first',
'weekend',
'alone',
'know',
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'totally',
'understand',
'pride',
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'moving',
'still',
'moving',
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'good',
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'elizabeth',
'dad',
'wants',
'meet',
'yeah',
'right',
'right',
'time',
'know',
'yeah',
'young',
'weird',
'chicks',

```
'nothing',
'nothing',
'lee',
'laundry',
'done',
'oh',
'quite',
'right',
'okay',
'peppers',
'oh',
'oh',
'god',
'hot',
'way',
'touch',
'pepper',
'touch',
'eye',
'hey',
'joey',
'stuff',
'free',
'stopping',
'red',
'ross',
...]
```

In [53]:

```
model = models.Word2Vec([Ross_words], size=100, window=5, min_count=5, workers=4
)
```

Since we're dealing with vectors, it's possible to compare words using vector math such as cosine similarity.

In [54]:

```
model.similarity('love', 'marriage')
```

```
/Users/rani/anaconda3/lib/python3.7/site-packages/ipykernel_launcher
r.py:1: DeprecationWarning: Call to deprecated `similarity` (Method
will be removed in 4.0.0, use self.wv.similarity() instead).
```

```
"""Entry point for launching an IPython kernel.
```

Out[54]:

```
0.99762356
```

Our model can also create the words that similar to given words

In [55]:

```
model.most_similar(positive=['love', 'marriage'], negative=['oil'])
```

```
/Users/rani/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:1: DeprecationWarning: Call to deprecated `most_similar` (Method will be removed in 4.0.0, use self.wv.most_similar() instead).  
    """Entry point for launching an IPython kernel.
```

Out[55]:

```
[('dr', 0.979898989200592),  
 ('dude', 0.9797899127006531),  
 ('wait', 0.9796623587608337),  
 ('happened', 0.9794272184371948),  
 ('live', 0.9794021844863892),  
 ('told', 0.9793737530708313),  
 ('thought', 0.9793291687965393),  
 ('called', 0.979302167892456),  
 ('friend', 0.9792579412460327),  
 ('hope', 0.9792065024375916)]
```

using Principal Component Analysis (PCA) to plot and their semantic relation from our model

In [56]:

```

from sklearn.decomposition import PCA

words = ['tv', 'love', 'guess', 'emily', 'unbelievable', 'probably', 'give']
word_vectors = [model[word] for word in words]

# creating and applying PCA transform
pca = PCA(n_components=2)
principal_components = pca.fit_transform(word_vectors)

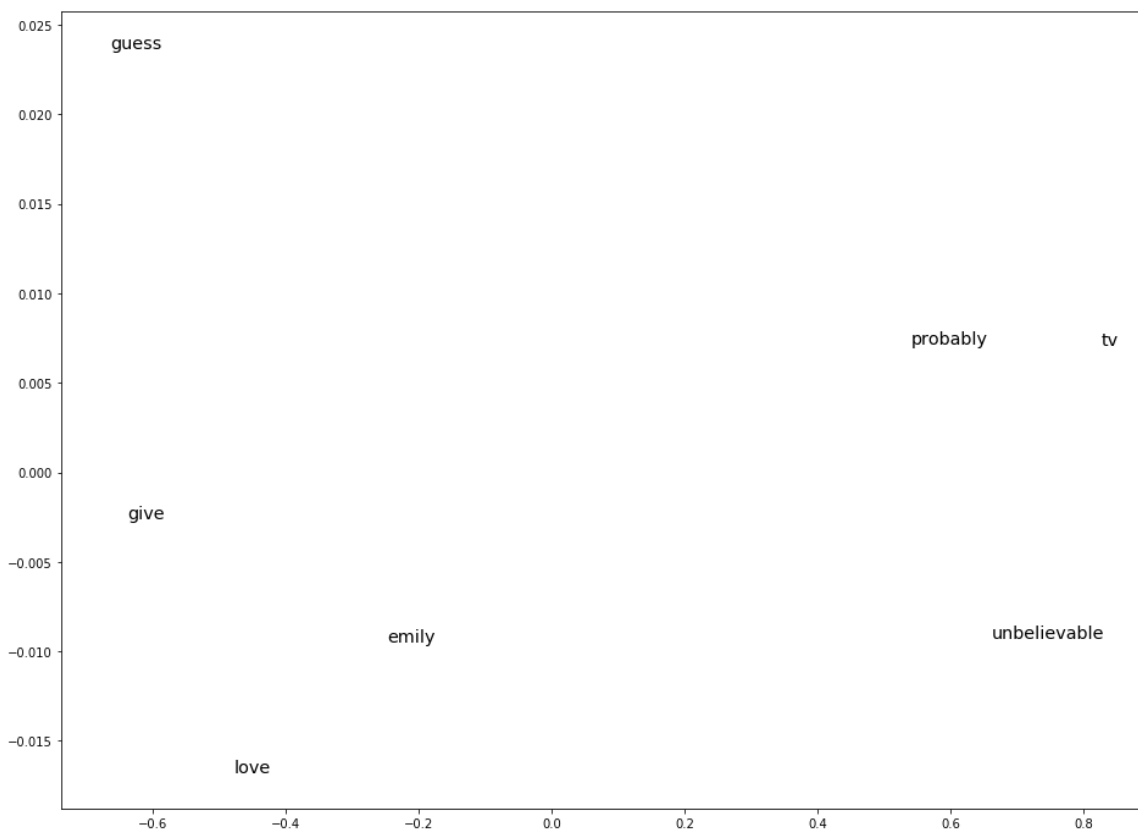
# slicing the 2D array
x = principal_components[:, 0]
y = principal_components[:, 1]

# plotting with text annotation
fig, ax = plt.subplots(figsize=(16,12))
ax.scatter(x, y, s=0)

for i, label in enumerate(words):
    ax.annotate(label, (x[i], y[i]), size='x-large')

```

/Users/rani/anaconda3/lib/python3.7/site-packages/ipykernel_launcher
r.py:4: DeprecationWarning: Call to deprecated `__getitem__` (Method
will be removed in 4.0.0, use self.wv.__getitem__() instead).
after removing the cwd from sys.path.



Conclusion:

The FRIENDS gave a lot of insights about doing sentiment analysis, plotting the attributes, and modelling the dataset for emotion and semantics of words.

