Question 6:
At the 24th iteration (iteration 23), the training data is completely separated because the accuracy is 1.0. While the 13th iteration (iteration 12) produces the highest accuracy when testing on the dev set, the 8th iteration would be better in terms

Question 7:
I did two separate iteration checks. The first was to determine where the training data completely separated, and the optimal iteration was generally when the dev accuracy first peaked. In some cases, where the accuracy increases dramatically after the first peak

Features	Number of iterations to separation	optimal iteration	Test Accuracies using best iteration
Lemmatization, uppercase, 2-grams	14	6	0.7090301003344481
Lemmatization, uppercased	Does not separate within 30 iterations	9	0.6291390728476821
Lemmatization	27	5	0.6490066225165563
uppercased	22	7	0.652317880794702
2-grams	13	6	0.6870860927152318

Using the combination of Lemmatization, uppercase, and 2-gram, I found that the test accuracy was 0.706953642384106.

Question 8:

Part A:

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         ['ARA', 'DEU', 'FRA', 'HIN', 'ITA', 'JPN', 'KOR', 'SPA', 'TEL', 'TUR', 'ZHO']
'ARA' [42    1     0     0     0     1     1     4     5     5     1]
'DEU' [ 1   34     4     0     0     1     0     0     0     0     1]
'FRA' [ 2    2    41     1     1     0     0     2     1     1     0]
'HIN' [ 2    1     1    17     0     0     0     0     5     3     1]
'ITA' [ 3    2     4     1    36     2     0     4     0     2     0]
'JPN' [ 4    1     2     0     0    42     9     1     1     2     0]
'KOR' [ 2    1     1     2     0     8    41     0     0     1     5]
'SPA' [ 6    2     2     1     4     1     1    35     1     6     2]
'TEL' [ 2    0     0     7     0     1     0     1    52     1     0]
'TUR' [ 0    3     1     1     0     2     5     0     0    42     1]
'ZHO' [ 3    0     2     1     0     5     4     1     1     3    45]
```

Part B: please see (test weight.tsv for full table)

max weights for ARA	'ALOT OF	EVERY THING	AND A	, AND	REASON .	MANY REASON	TO HELP
min weights for ARA	'. IF	. BUT	THAT PEOPLE	TO ENJOY	PEOPLE DO	ARE THE	HA BEEN
max weights for DEU	', THAT	. BUT	THE STATEMENT	AND THEREFORE	, BECAUSE	I WOULD	ONE HAND
min weights for DEU	', AND	WE CAN	THAT IS	TIME TO	, I	TO MAKE	IF WE
max weights for FRA	'. INDEED	IS A	IN FACT	INDEED ,	TO CONCLUDE	EVEN IF	TO TAKE
min weights for FRA	'THE IDEA	THE PEOPLE	IN MY	AGREE THAT	WHICH MAKE	THERE ARE	TO GET
max weights for HIN	'A COMPARED	IN TODAY	OLD AGE	RISK AND	SAY THAT	BUT HE	NUMBER OF
min weights for HIN	'. FINALLY	BASED ON	OUR LIFE	. IF	HARD TO	. BECAUSE	AND THE
max weights for ITA	'I THINK	THINK THAT	POSSIBILITY TO	TO IMPROVE	THAT IN	PEOPLE THAT	THE PAST
min weights for ITA	'. BECAUSE	. BUT	BECAUSE OF	. THERE	OVER THE	ONE HAND	. YOU
max weights for JPN	'IN JAPAN	JAPAN ,	, AND	. THEREFORE	I DISAGREE	. IF	. FROM
min weights for JPN	'ALL THE	OF TIME	ARE A	TO GIVE	LIFE ,	FOR A	IS A
max weights for KOR	'IN KOREA	KOREA ,	THESE DAY	. HOWEVER	EVEN THOUGH	HOWEVER ,	ALSO ,
min weights for KOR	'FOR ME	OF THE	THINK THAT	OF VIEW	IMPORTANT FOR	AT THE	THEY MAY
max weights for SPA	', IS	PEOPLE IS	OTHER HAND	THAT ARE	A BETTER	, ETC	IN THEIR
min weights for SPA	'FROM THE	. IT	ACCORDING TO	AND SO	I WANT	PEOPLE .	BETTER THAN
max weights for TEL	'I STRONGLY	THE ABOVE	ALL THE	. FINALLY	MAY BE	WHEN COMPARED	IN THE
min weights for TEL	'HOWEVER ,	, YOU	DO NOT	I THINK	. HOWEVER	A WELL	, AND
max weights for TUR	'. BECAUSE	CAN NOT	START TO	OF THIS	MAKE U	IN TURKEY	MUCH MORE
min weights for TUR	', AND	, THE	TO KNOW	ENJOY THEIR	, BUT	AGREE WITH	LEARN FACT
max weights for ZHO	'. TAKE	OPINION ,	ENJOY THE	WO N'T	, THE	TO TRY	TIME ON
min weights for ZHO	'EVEN IF	***bias_term ***	THAT ARE	RISK AND	ABLE TO	TRYING TO	THE TIME

Part C:

Language	Precision	Recall	F1	Weight of bias
ARA	. 626865671642	.7	. 661417322835	12
DEU	. 723404255319	. 829268292683	. 772727272727	-10
FRA	. 706896551724	. 803921568627	. 752293577982	-5
HIN	. 548387096774	. 566666666667	. 55737704918	6
ITA	. 878048780488	. 666666666667	. 757894736842	4
JPN	. 666666666667	. 677419354839	. 672	-2
KOR	. 672131147541	. 672131147541	. 672131147541	1
SPA	. 729166666667	. 573770491803	. 642201834862	-5
TEL	. 787878787879	. 8125	.8	12
TUR	. 636363636364	. 763636363636	. 694214876033	4
ZHO	.803571428571	. 692307692308	. 743801652893	-17