Homework 7

1.1 Through the window the light blinded me.

Word	Number of Senses (Without Part of Speech)	Number of Senses (With Part of Speech)
Through	7	2
The	0	0
Window	8	8
The	0	0
Light	48	15
Blinded	4	3
Me	0	0
Combinations:	10,752	720

1.2 My journal hides my best kept secrets.

Word	Number of Senses (Without Part of Speech)	Number of Senses (With Part of Speech)
My	0	0
Journal	5	5
Hides	6	4
My	0	0
Best	46	26
Kept	23	22
Secrets	3	3
Combinations:	95,220	34,320

1.3 I hid in the basement.

Word	Number of Senses (Without Part of Speech)	Number of Senses (With Part of Speech)
I	0	0
Hid	4	4
In	7	1
The	0	0
Basement	2	2
Combinations:	56	8

1.4 My reflection stared back at me.

Word	Number of Senses (Without Part of Speech)	Number of Senses (With Part of Speech)
My	0	0
Reflection	8	8
Stared	2	2
Back	28	6
At	0	0
Me	0	0
Combinations:	448	96

1.5 We sat on the bench, tranquil.

Word	Number of Senses (Without Part of Speech)	Number of Senses (With Part of Speech)
We	0	0
Sat	11	10
On	5	3
The	0	0
Bench	9	7
Tranquil	2	2
Combinations:	990	420

2.

Original Sentence	Stop Words	Filtered
I like to run when the sun is out.	I, to, when, the, is	Like run sun out
It is bad to eat right before a run.	It, is, to, before, a	Bad eat right run
There is too much sun to eat out	There, is, too, to	Much sun eat out
Right now, I would like to eat.	I, would, to	Right now like eat

2a. w occurs in the same sentence as word vj

W/V	Like	Run	Sun	Out	Bad	Eat	Right	Much	Now
Run	1	0	1	1	1	1	1	0	0
Sun	1	1	0	1	1	1	1	1	0
Eat	0	1	1	1	1	0	1	1	1

2b. w occurs before or after word vj.

W/V	Like	Run	Sun	Out	Bad	Eat	Right	Much	Now
Run	1	0	1	0	0	0	1	0	0
Sun	0	1	0	1	0	1	1	1	0
Eat	1	0	1	1	1	0	1	0	0

3.

Sets/Comp.	Euclidean $d(\vec{x},\vec{y})=\sqrt{\sum_{i=1}^{n}(x_i-y_i)^2}$	Cosine $d(\vec{x},\vec{y})=\frac{\vec{v}\cdot\vec{w}}{\lvert\vec{v}\rvert\lvert\vec{w}\rvert}$	Jaccard $d(\vec{x},\vec{y})=\frac{\sum_{i=1}^{n}\min(x_i,y_i)}{\sum_{i=1}^{n}\max(x_i,y_i)}$
Run-Sun (2a)	$\sqrt{(1-1)^2+(0-1)^2+(1-0)^2+(1-1)^2+\dots}$ $\sqrt{3}=1.732050808$	$\frac{(1\times1)+(0\times1)+(1\times0)+(1\times1)+\dots}{\sqrt{1^2+0^2+1^2+1^2+\dots}\cdot\sqrt{1^2+1^2+0^2+1^2+\dots}}$ $\frac{5}{\sqrt{6}\cdot\sqrt{7}}=0.7715167497$	$\frac{\min(1,1)+\min(0,1)+\min(1,0)+\dots}{\max(1,1)+\max(0,1)+\max(1,0)+\dots}$ $\frac{5}{8}=0.625$
Run-eat (2a)	$\sqrt{(1-0)^2+(0-1)^2+(1-1)^2+(1-1)^2+\dots}$ $\sqrt{5}=2.236067977$	$\frac{(1\times0)^2+(0\times1)^2+(1\times1)^2+(1\times1)^2+\dots}{\sqrt{1^2+0^2+1^2+1^2+\dots}\cdot\sqrt{0^2+1^2+1^2+1^2+\dots}}$ $\frac{4}{\sqrt{6}\cdot\sqrt{7}}=0.6172133999$	$\frac{\min(1,0)+\min(0,1)+\min(1,1)+\dots}{\max(1,0)+\max(0,1)+\max(1,1)+\dots}$ $\frac{4}{9}=0.\overline{444}$
Run-Sun (2b)	$\sqrt{(1-0)^2+(0-1)^2+(1-0)^2+(0-1)^2+\dots}$ $\sqrt{6}=2.449489743$	$\frac{(1\times0)^2+(0\times1)^2+(1\times0)^2+(0\times1)^2+\dots}{\sqrt{1^2+0^2+1^2+0^2+\dots}\cdot\sqrt{0^2+1^2+0^2+1^2+\dots}}$ $\frac{1}{\sqrt{3}\cdot\sqrt{5}}=0.2581988898$	$\frac{\min(1,0)+\min(0,1)+\min(1,0)+\dots}{\max(1,0)+\max(0,1)+\max(1,0)+\dots}$ $\frac{1}{7}=0.1428571429$
Run-Eat (2b)	$\sqrt{(1-1)^2+(0-0)^2+(1-1)^2+(0-1)^2+\dots}$ $\sqrt{2}=1.414213562$	$\frac{(1\times1)^2+(0\times0)^2+(1\times1)^2+(0\times1)^2+\dots}{\sqrt{1^2+0^2+1^2+0^2+\dots}\cdot\sqrt{1^2+0^2+1^2+1^2}}$ $\frac{3}{\sqrt{3}\cdot\sqrt{5}}=0.7745966693$	$\frac{\min(1,1)+\min(0,0)+\min(1,1)+\dots}{\max(1,1)+\max(0,0)+\max(1,1)+\dots}$ $\frac{3}{5}=0.6$

4. The Jaccard method would be the best method, as described by the book, and also represented by the data retrieved from the calculations.