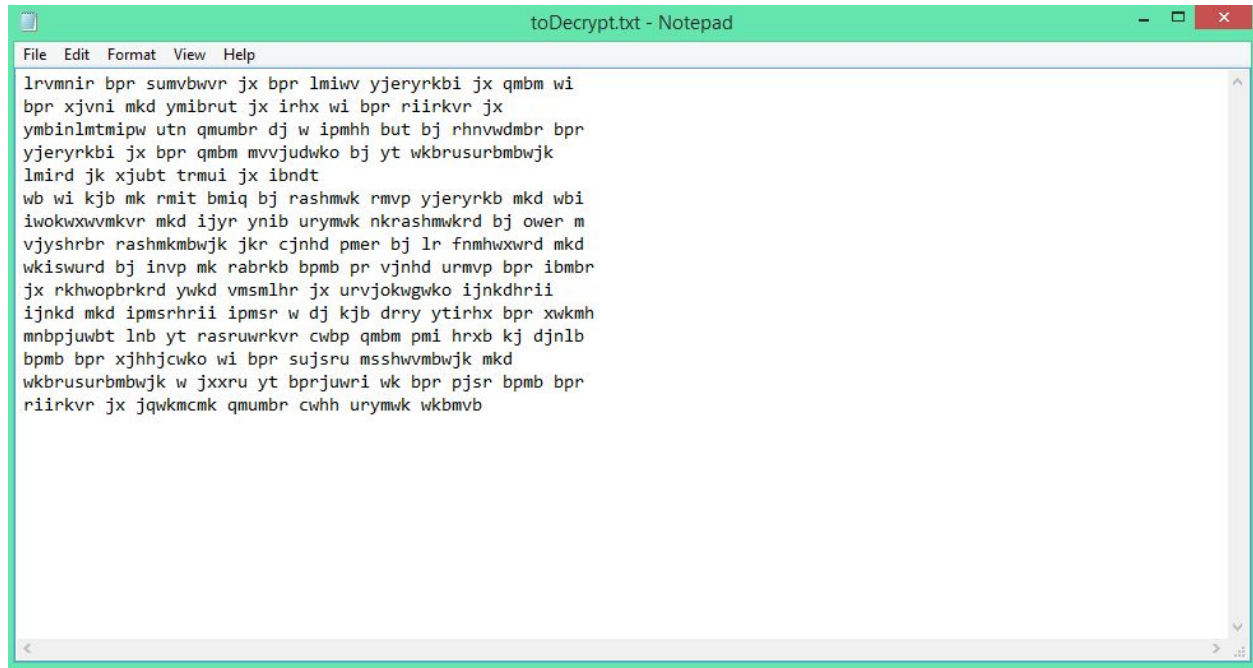Shiming Huang
CSCI360
Project 1 report

The first thing I did was create a .txt file and copy and paste the encrypted text into it named "toDecrypt.txt":


```
toDecrypt.txt - Notepad
File   Edit   Format   View   Help
lrvmnir bpr sumvbwvr jx bpr lmiwv yjeryrkbi jx qmbm wi
bpr xjvni mkd ymibrut jx irhx wi bpr riirkvr jx
ymbinlmtmipw utn qmumbr dj w ipmhh but bj rhnvwdmbr bpr
yjeryrkbi jx bpr qmbm mvvjudwko bj yt wkbrusurbmbwjk
lmird jk xjubt trmui jx ibndt
wb wi kjb mk rmit bmiq bj rashmwk rmvp yjeryrkb mkd wbi
iwokwxwvmkvr mkd ijyr ynib urymwk nkrashmwkrd bj ower m
vjyshrbr rashmkmbwjk jkr cjnhd pmer bj lr fnmhwxwrd mkd
wkiswurd bj invp mk rabrkb bpmb pr vjnhd urmvp bpr ibmbr
jx rkhwopbrkrd ywkd vmsmlhr jx urvjokwgwko ijnkdhrii
ijnkd mkd ipmsrhrii ipmsr w dj kjb drry ytirhx bpr xwkmh
mnbpjuwbt lnb yt rasruwrkvr cwbp qmbm pmi hrxb kj djnlb
bpmb bpr xjhhjcwko wi bpr sujsru msshwvmbwjk mkd
wkbrusurbmbwjk w jxxru yt bprjuwri wk bpr pjsr bpmb bpr
riirkvr jx jqwkmcmk qmumbr cwhh urymwk wkbmvb
```

Source code I wrote for finding the frequency, blue text are comments
Can copy and paste to run after having the .txt file above created above in the same folder

```
#include <iostream>
#include <fstream>
using namespace std;
int main(){
        char letter = 'a';//used for starting letters
        char letterAr[26];//array to hold char 'a' to 'z'
        int amountAr[26];//holds the number each char appears
        char check;//getting char value from file
        int totalLetters;

        for(int i=0;i<26;i++){//filling letter array with char from a-z
                letterAr[i]=static_cast<char>(letter+i);
        }
        for(int i=0;i<26;i++){//clear array in case there's random garbage in it
                amountAr[i]=0;
        }

        fstream myfile("toDecrypt.txt",fstream::in);//finding total amount of letters used for finding frequency
        while(myfile>>check)totalLetters++;
        myfile.close();

        for (int i=0;i<26; i++){
                fstream myfile("toDecrypt.txt",fstream::in);//open file and close each reiteration to start beginning of file
                while(myfile>>check){
```

```
                    if(check==letterAr[i]) amountAr[i]++;//check if the char are equal. if it is, increase counter
                }
                myfile.close();
        }

        for(int i=0;i<26;i++){//printing all result
                float frequency=(float)amountAr[i]/(float)totalLetters*100;//getting the frequency percantage
                cout<<letterAr[i]<<":"<<amountAr[i]<<" frequency= "<<frequency<<endl;
        }

        return 0;
}
```

The result of the code for finding the frequency. Read output as
(Alphabet letter) : (amount of letters found) frequency=%
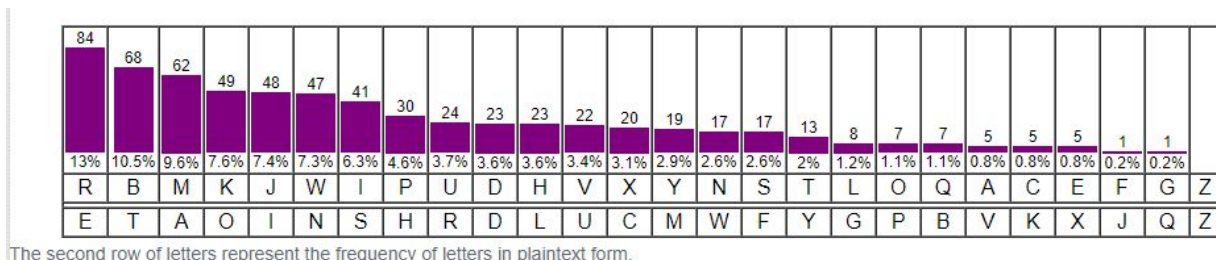
```
a:5 frequency= 0.773994
b:68 frequency= 10.5263
c:5 frequency= 0.773994
d:23 frequency= 3.56037
e:5 frequency= 0.773994
f:1 frequency= 0.154799
g:1 frequency= 0.154799
h:23 frequency= 3.56037
i:41 frequency= 6.34675
j:48 frequency= 7.43034
k:49 frequency= 7.58514
l:8 frequency= 1.23839
m:62 frequency= 9.59752
n:17 frequency= 2.63158
o:7 frequency= 1.08359
p:30 frequency= 4.64396
q:7 frequency= 1.08359
r:84 frequency= 13.0031
s:17 frequency= 2.63158
t:13 frequency= 2.01238
u:24 frequency= 3.71517
v:22 frequency= 3.40557
w:47 frequency= 7.27554
x:20 frequency= 3.09598
y:19 frequency= 2.94118
z:0 frequency= 0
_____
```

After that, for convenience sake I use
http://www.brianveitch.com/maze-runner/frequency-analysis/index.html
to help organize the frequency neatly to help decrypt it.

84	68	62	49	48	47	41	30	24	23	23	22	20	19	17	17	13	8	7	7	5	5	5	1	1	
13%	10.5%	9.6%	7.6%	7.4%	7.3%	6.3%	4.6%	3.7%	3.6%	3.6%	3.4%	3.1%	2.9%	2.6%	2.6%	2%	1.2%	1.1%	1.1%	0.8%	0.8%	0.8%	0.2%	0.2%	
R	B	M	K	J	W	I	P	U	D	H	V	X	Y	N	S	T	L	O	Q	A	C	E	F	G	Z
E	T	A	O	I	N	S	H	R	D	L	U	C	M	W	F	Y	G	P	B	V	K	X	J	Q	Z

The second row of letters represent the frequency of letters in plaintext form.

I started out trying to replace some common letters that are aligned with their respective high frequency and looking at letters that only have 1 to 2 letters in them initially and see if they can create a word that makes sense. Then move onto words with higher letter count until words starting to piece together and swap those in.

End result of decryption:
because the practice of the basic movements of kata is
the focus and mastery of self is the essence of
matsubayashi ryu karate do i shall try to elucidate the
movements of the kata according to my interpretation
based on forty years of study
it is not an easy task to explain each movement and its
significance and some must remain unexplained to give a
complete explanation one would have to be qualified and
inspired to such an extent that he could reach the state
of enlightened mind capable of recognizing soundless
sound and shapeless shape i do not deem myself the final
authority but my experience with kata has left no doubt
that the following is the proper application and
interpretation i offer my theories in the hope that the
essence of okinawan karate will remain intact

Letters that were replaced into: encrypted cipher letters -> decrypted plaintext letters
R - e
M - a
W - i
D - d
J - o
B - t
P - h
V - c
K - n
I - s
T - y
Y - m
N - u
U - r
H - l
X - f
S - p
A - x
L - b
E - v
O - g
Q - k
C - w
G - z
F - q