Task one

Ctext-1: monoalphabetic cipher

Cipher Text:

qpmbihy rllhdi glqj vlhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rqystph mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqiptblk lg rlpqsdq eqpbkdi kdpqhy rljmhdtdhy rqystphhbkd bekdlus qlrfs suosdnudkt tl gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy

Plain Text:

rapidly cooled form volcanic rocks typically characterized by a small percentage of crystals or fragments set in a matrix of glass quenched or super cooled magma or finer grained crystalline materials if magmas never breach the surface to erupt and remain deep underground they cool much more slowly and thus allow ample time to sustain crystal precipitation and growth resulting in the formation of coarser grained nearly completely crystalline igneous rocks subsequent to final crystallization and solidification such rocks can be exhumed by

Frequency distribution graph:

Most frequent character in the string descending order:

```
-> f 1
d 45
p 43
q 38
l 34
t 31
b 30
k 30
s 27
i 16
u 15
y 14
a 11
g 11
m 5
f 3
n 2
```

a	b	c	d	e	f	g	h	i	j	k	1	m	n	o	p	q	r	S	t
p	o	r	i	d	gg	e	a	b	c	f	h	j	k	1	m	n	q	S	t

u	V	W	X	у	Z
u	V	W	X	у	Z

'D' = 'e':

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: KRYPTO — X qpmbihy rllhei glqj vlhrpkbr qlrfs tymbrphhy rapqprteqbzei oy p sjphh qpmbihy rllhdi glqj vlhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh
meqrektpee lg rqystphs lq gqpejekts set bk p jptqbx lg ehpss nuekraei mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi
lq sumeq rllhei jpejp lq gbkeq eqpbkei rqystphhbke jpteqbphs bg jpejps lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps
keveq oqepra tae suqgpre tl equmt pki qejpbk ieem ukieqeqluki taey rllh kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh
jura jlqe shlwhy pki taus phhlw pjmhe tbje tl sustpbk rqystph jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rqystph
mqerbmbtptblk pki eqlwta qesuhtbke bk tae glqjptblk lg rlpqseq mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqjptblk lg rlpqsdq
eqpbkei kepqhy rljmhetehy rqystphhbke bekelus qlrfs suosenuekt tl eqpbkdi kdpqhy rljmhdtdhy rqystphhbkd bekdlus qlrfs suosdnudkt tl
gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk oe exaujei oy gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy
- >

'P' is a single letter word most common is i or a, so try 'p' = 'a':

```
qambihy rllhei glqj ∨lhrakbr qlrfs tymbrahhy raaqarteqbzei oy a sjahh
qpmbihy rllhdi glqj ∨lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh
neqrektaee lg rqystahs lq gqaejekts set bk a jatqb× lg ehass nuekraei
ndgrdktped lg rgystphs lg ggpejdkts sdt bk p jptgbx lg ehpss nudkradi
lg sumeg rllhei jaeja lg gbkeg egabkei rgystahhbke jategbahs bg jaejas
lg sumdg rllhdi jpejp lg gbkdg egpbkdi rgystphhbkd jptdgbphs bg jpejps
keveq oqeara tae suqgare tl equmt aki qejabk ieem ukieqeqluki taey rllh
kdvdg ogdpra tad suggprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh
jura jlqe shlwhy aki taus ahhlw ajmhe tbje tl sustabk rqystah
jura jlgd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph
nqerbmbtatblk aki eqlwta qesuhtbke bk tae glqjatblk lg rlaqseq
ngdrbmbtptblk pki eglwta gdsuhtbke bk tad glgjptblk lg rlpgsdg
egabkei keaghy rljmhetehy rgystahhbke bekelus glrfs suosenuekt tl
egpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl
ıbkah rqystahhbzatblk aki slhbibgbratblk sura qlrfs rak oe exaujei oy
ybkph rgystphhbzptblk pki slhbibgbrptblk sura glrfs rpk od dxaujdi oy
```

'Tae' most common trigram is the so 'a' = 'h'

T' = t'

qambihy rllhei glqj vlhrakbr qlrf's tymbrahhy rhaqarteqbzei oy a sjahh qpmbihy rllhdi glqj vlhrpkbr qlrf's tymbrphhy rapqprtdqbzdi oy p sjphh meqrektaee lg rqystahs lq gqaejekts set bk a jatqbx lg ehass nuekrhei mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi lq sumeq rllhei jaeja lq gbkeq eqabkei rqystahhbke jateqbahs bg jaejas lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps keveq oqearh the suqqare tl equmt aki qejabk ieem ukieqeqluki they rllh

keveq oqearh the suqgare tl equmt aki qejabk ieem ukieqeqluki they rllf kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllf

jurh jlqe shlwhy aki thus ahhlw ajmhe tbje tl sustabk rqystah jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rqystph

mqerbmbtatblk aki eqlwth qesuhtbke bk the glqjatblk lg rlaqseq mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqjptblk lg rlpqsdq

eqabkei keaqhy rljmhetehy rqystahhbke bekelus qlrfs suosenuekt tl eqpbkdi kdpqhy rljmhdtdhy rqystphhbkd bekdlus qlrfs suosdnudkt tl

gbkah rqystahhbzatblk aki slhbibgbratblk surh qlrfs rak oe exhujei oy gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy

^{&#}x27;Surh' most relatable word will be 'such', 'r' = 'c'

```
qambihy cllhei glqj vlhcakbc qlcfs tymbcahhy chaqacteqbzei oy a sjahh
qpmbihy rllhdi glqj vlhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh
meqcektaee lg cqystahs lq gqaejekts set bk a jatqbx lg ehass nuekchei
mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi
lq sumeq cllhei jaeja lq gbkeq eqabkei cqystahhbke jateqbahs bg jaejas
lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps
keveq oqeach the suqgace tl equmt aki qejabk ieem ukieqeqluki they cll
kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rlll
juch jlge shlwhy aki thus ahhlw ajmhe tbje tl sustabk cgystah
jura jlgd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph
mqecbmbtatblk aki eqlwth qesuhtbke bk the glqjatblk lg claqseq
mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqjptblk lg rlpqsdq
eqabkei keaqhy cljmhetehy cqystahhbke bekelus qlcfs suosenuekt tl
eqpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl
gbkah cqystahhbzatblk aki slhbibgbcatblk such qlcfs cak oe exhujei oy
qbkph rqystphhbzptblk pki slhbibqbrptblk sura qlrfs rpk od dxaujdi oy
'Aki' most common trigram that starts with a is 'and', 'k' = 'n', 'i' = 'd:
gambdhy cllhed glqj vlhcanbc qlcfs tymbcahhy chagacteqbzed oy a sjahh
qpmbihy rllhdi glqj ∨lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh
meqcentaee lg cqystahs lq gqaejents set bn a jatqbx lg ehass nuenched
mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi
lq sumeq cllhed jaeja lq gbneq eqabned cqystahhbne jateqbahs bg jaejas
lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps
neveg ogeach the suggace tl equmt and gejabn deem undegeglund they cllh
kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh
juch jlge shlwhy and thus ahhlw ajmhe tbje tl sustabn cgystah
jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rqystph
mgecbmbtatbln and eglwth gesuhtbne bn the glgjatbln lg clagseg
mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqjptblk lg rlpqsdq
eqabned neaghy cljmhetehy cgystahhbne benelus glcfs suosenuent tl
egpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl
gbnah cqystahhbzatbln and slhbdbgbcatbln such qlcfs can oe exhujed oy
gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy
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```
ramidhy cllhed qlrj vlhcanic rlcfs tymicahhy characterized oy a sjahh
qpmbihy rllhdi glqj ∨lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh
mercentaee lg crystahs lr graejents set in a jatrix lg ehass nuenched
mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi
lr sumer cllhed jaeja lr giner erained crystahhine jateriahs ig jaejas
lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps
never oreach the surgace tl erumt and rejain deem undererlund they cllh
kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh
juch jlre shlwhy and thus ahhlw ajmhe tije tl sustain crystah
jura jlgd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph
mrecimitatiln and erlwth resuhtine in the glrjatiln lg clarser
mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqjptblk lg rlpqsdq
erained nearhy cljmhetehy crystahhine ienelus rlcfs suosenuent tl
egpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl
ginah crystahhizatiln and slhidigicatiln such rlcfs can oe exhujed oy
gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy
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Tymically, the most relatable word is typically, m = p, h = 1:

```
rapidly cllled glrj vllcanic rlcfs typically characterized oy a sjall
gpmbihy rllhdi glgj vlhrpkbr glrfs tymbrphhy rapgprtdgbzdi oy p sjphh
percentaee lg crystals lr graejents set in a jatrix lg elass nuenched
mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi
lr super cllled jaeja lr giner erained crystalline jaterials ig jaejas
lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps
never oreach the surgace tl erupt and rejain deep undererlund they clll
kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh
juch jlre sllwly and thus alllw ajple tije tl sustain crystal
jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph
precipitatiln and erlwth resultine in the glrjatiln lg clarser
mgdrbmbtptblk pki eglwta gdsuhtbke bk tad glgjptblk lg rlpgsdg
erained nearly cljpletely crystalline ienelus rlcfs suosenuent tl
egpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl
ginal crystallizatiln and sllidigicatiln such rlcfs can oe exhujed oy
gbkph rgystphhbzptblk pki slhbibgbrptblk sura glrfs rpk od dxaujdi oy
```

rapidly cooled gorj volcanic rocfs typically characterized oy a sjall qpmbihy rllhdi glqj ∪lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh percentaee og crystals or graejents set in a jatrix og elass nuenched mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi or super cooled jaeja or giner erained crystalline jaterials ig jaejas lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps never oreach the surgace to erupt and rejain deep undereround they cool kd∨dq oqdpra tad suqqprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rll} juch jore slowly and thus allow ajple tije to sustain crystal jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph precipitation and erowth resultine in the gorjation og coarser mgdrbmbtptblk pki eglwta gdsuhtbke bk tad glgjptblk lg rlpgsdg erained nearly cojpletely crystalline ieneous rocfs suosenuent to egpbkdi kdpqhy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl ginal crystallization and solidigication such rocfs can oe exhujed oy qbkph rqystphhbzptblk pki slhbibqbrptblk sura qlrfs rpk od dxaujdi oy

Percentaee most relatable word is percentage, e = g:

rapidly cooled gorj volcanic rocfs typically characterized oy a sjall qpmbihy rllhdi glqj ∨lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh percentage og crystals or gragjents set in a jatrix og glass nuenched mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi or super cooled jagja or giner grained crystalline jaterials ig jagjas lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps never oreach the surgace to erupt and rejain deep underground they cool kdvdq oqdpra tad suqqprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh juch jore slowly and thus allow ajple tije to sustain crystal jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph precipitation and growth resulting in the gorjation og coarser mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqjptblk lg rlpqsdq grained nearly cojpletely crystalline igneous rocfs suosenuent to egpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl ginal crystallization and solidigication such rocfs can oe exhujed oy gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy

rapidly cooled forj volcanic rocfs typically characterized oy a sjall qpmbihy rllhdi glqj ∨lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh percentage of crystals or fragjents set in a jatrix of glass nuenched mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi or super cooled jagja or finer grained crystalline jaterials if jagjas lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps never oreach the surface to erupt and rejain deep underground they cool kd∨dq oqdpra tad suqqprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rll} juch jore slowly and thus allow ajple tije to sustain crystal jura jlgd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph precipitation and growth resulting in the forjation of coarser mgdrbmbtptblk pki eglwta gdsuhtbke bk tad glgjptblk lg rlpgsdg grained nearly cojpletely crystalline igneous rocfs suosenuent to eqpbkdi kdpqhy rljmhdtdhy rqystphhbkd bekdlus qlrfs suosdnudkt tl final crystallization and solidification such rocfs can oe exhujed oy qbkph rqystphhbzptblk pki slhbibqbrptblk sura qlrfs rpk od d×aujdi oy

Fragients relatable word is fragments, j = m:

rapidly cooled form volcanic rocfs typically characterized oy a small qpmbihy rllhdi glqj vlhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh percentage of crystals or fragments set in a matrix of glass nuenched mdgrdktped lg rgystphs lg ggpejdkts sdt bk p jptgbx lg ehpss nudkradi or super cooled magma or finer grained crystalline materials if magmas lq sumdq rllhdi jpejp lq qbkdq eqpbkdi rqystphhbkd jptdqbphs bq jpejps never oreach the surface to erupt and remain deep underground they cool kdvdq oqdpra tad suqqprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rll} much more slowly and thus allow ample time to sustain crystal jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph precipitation and growth resulting in the formation of coarser mgdrbmbtptblk pki eglwta gdsuhtbke bk tad glgjptblk lg rlpgsdg grained nearly completely crystalline igneous rocfs suosenuent to egpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl final crystallization and solidification such rocfs can oe exhumed oy gbkph rgystphhbzptblk pki slhbibgbrptblk sura glrfs rpk od d×au.jdi oy

Characterized oy a small, oy = by, o = b:

rapidly cooled form ∨olcanic rocfs typically characterized by a small qpmbihy rllhdi qlqj ∨lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh percentage of crystals or fragments set in a matrix of glass nuenched mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi or super cooled magma or finer grained crystalline materials if magmas lg sumdg rllhdi jpejp lg gbkdg egpbkdi rgystphhbkd jptdgbphs bg jpejps never breach the surface to erupt and remain deep underground they cool kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh much more slowly and thus allow ample time to sustain crystal jura jlgd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph precipitation and growth resulting in the formation of coarser mqdrbmbtptblk pki eqlwta qdsuhtbke bk tad glqjptblk lg rlpqsdq grained nearly completely crystalline igneous rocfs subsenuent to egpbkdi kdpghy rljmhdtdhy rgystphhbkd bekdlus glrfs suosdnudkt tl final crystallization and solidification such rocfs can be exhumed by gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy

Nuenched most relatable word is quenched, n = q:

rapidly cooled form volcanic rocfs typically characterized by a small qpmbihy rllhdi glqj ∨lhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh percentage of crystals or fragments set in a matrix of glass guenched mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi or super cooled magma or finer grained crystalline materials if magmas lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps never breach the surface to erupt and remain deep underground they cool kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh much more slowly and thus allow ample time to sustain crystal jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph precipitation and growth resulting in the formation of coarser mgdrbmbtptblk pki eglwta gdsuhtbke bk tad glgjptblk lg rlpgsdg grained nearly completely crystalline igneous rocfs subsequent to eqpbkdi kdpqhy rljmhdtdhy rqystphhbkd bekdlus qlrfs suosdnudkt tl final crystallization and solidification such rocfs can be exhumed by qbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy

Rocfs most relatable word is rocks, f = k:

rapidly cooled form volcanic rocks typically characterized by a small qpmbihy rllhdi glqj vlhrpkbr qlrfs tymbrphhy rapqprtdqbzdi oy p sjphh

percentage of crystals or fragments set in a matrix of glass quenched mdqrdktped lg rqystphs lq gqpejdkts sdt bk p jptqbx lg ehpss nudkradi

or super cooled magma or finer grained crystalline materials if magmas lq sumdq rllhdi jpejp lq gbkdq eqpbkdi rqystphhbkd jptdqbphs bg jpejps

never breach the surface to erupt and remain deep underground they cool kdvdq oqdpra tad suqgprd tl dqumt pki qdjpbk iddm ukidqeqluki tady rllh

much more slowly and thus allow ample time to sustain crystal jura jlqd shlwhy pki taus phhlw pjmhd tbjd tl sustpbk rgystph

precipitation and growth resulting in the formation of coarser mgdrbmbtptblk pki eglwta gdsuhtbke bk tad glgjptblk lg rlpgsdg

grained nearly completely crystalline igneous rocks subsequent to eqpbkdi kdpqhy rljmhdtdhy rqystphhbkd bekdlus qlrfs suosdnudkt tl

final crystallization and solidification such rocks can be exhumed by gbkph rqystphhbzptblk pki slhbibgbrptblk sura qlrfs rpk od dxaujdi oy

Ctext-2: Vigenère cipher

Checking the index of coincidence based on length:

Length 1 to 4:

```
-> i 1
IC = 0.042
Average = 0.042
-> i Z
IC = 0.043
IC = 0.039
Average = 0.041
-> i 3
IC = 0.042
IC = 0.043
IC = 0.044
Average = 0.043
-> i 4̄
IC = 0.044
IC = 0.039
IC = 0.042
IC = 0.039
Average = 0.041
```

Length: 5 to 7:

```
-> i 5
IC = 0.037
IC = 0.047
IC = 0.046
IC = 0.037
IC = 0.048
Average = 0.043
-> i 6
IC = 0.044
IC = 0.041
IC = 0.043
IC = 0.041
IC = 0.041
IC = 0.040
Average = 0.042
-> i 7̄
IC = 0.057
IC = 0.063
IC = 0.070
IC = 0.065
IC = 0.067
IC = 0.060
IC = 0.077
Average = 0.066
```

Length 8:

```
-> i 8

IC = 0.044

IC = 0.037

IC = 0.034

IC = 0.042

IC = 0.041

IC = 0.043

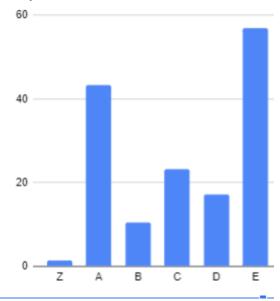
IC = 0.036

Average = 0.040

->
```

As you can see from the outcome the average IC of length 7 is more than 0.65, but the average IC of length 8 & 6 is less than 0.65. Therefore the keyword length should be 7.

We will use the frequency of letter of the alphabet in the English language but starting from Z to E only.

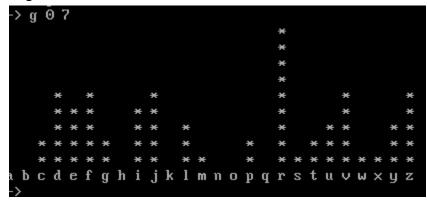


Z = low, A = high, B = low, C & D = medium, E = high.

 \rightarrow g i 7, i=0, 1, 2, 3, 4, 5, 6 to give the seven sub alphabets.

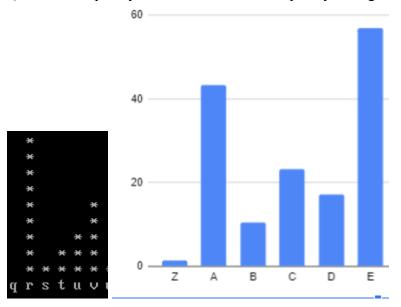
In this group, the most frequently used letter is "A". Making assumption that this letter "A" (in ciphertext) is actually letter 'e' (in plaintext), we then check the rest to verify that the corresponding letters are sensible.

-> g 0 7



Based on the graph for the first sub alphabet:

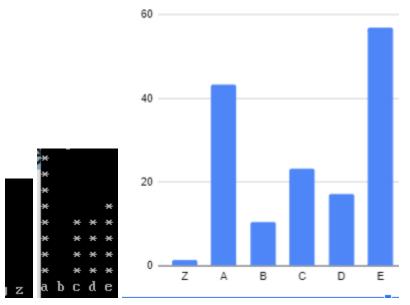
QRSTUV frequency looks similar to the frequency of english.



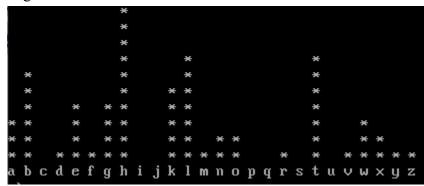
Comparing side by side it looks similar, therefore the first sub alphabet is 'R'

Based on the graph for the second sub alphabet:

ZABCDE frequency looks similar to the frequency of english.



Comparing side by side it looks similar, therefore the first sub alphabet is 'A'



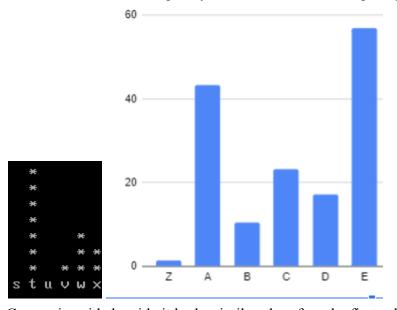
Based on the graph for the third sub alphabet:

ZABCDE \rightarrow Z = low, A = high but B = higher than A, therefore unlikely.

DEFGHI-> E is the lowest, therefore unlikely

JKLMNO-> L supposedly is B is the highest, therefore unlikely

However, STUVWX frequency looks similar to the frequency of english.



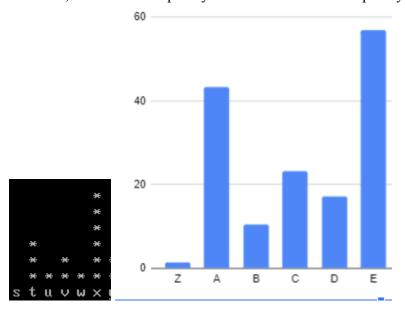
Comparing side by side it looks similar, therefore the first sub alphabet is 'T'

Based on the graph for the forth sub alphabet:

ABCDEF -> F supposedly E is the lowest.

DEFGHI-> E is the lowest, therefore unlikely

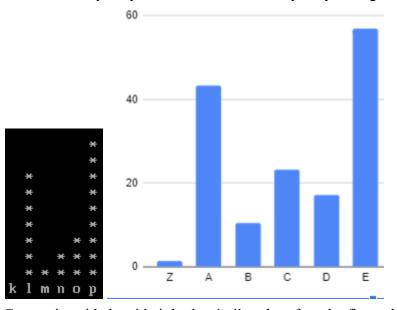
FGHIJK & JKLMNO-> G or K supposedly is B is the highest therefore unlikely However, STUVWX frequency looks similar to the frequency of english.



Comparing side by side it looks similar, therefore the first sub alphabet is 'T'

Based on the graph for the fifth sub alphabet:

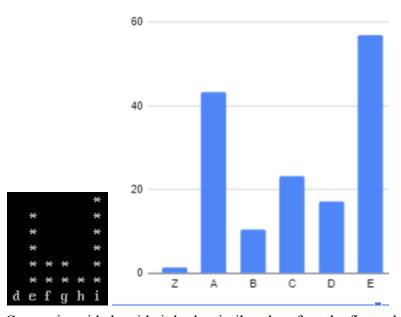
KLMNOP frequency looks similar to the frequency of english.



Comparing side by side it looks similar, therefore the first sub alphabet is 'L'

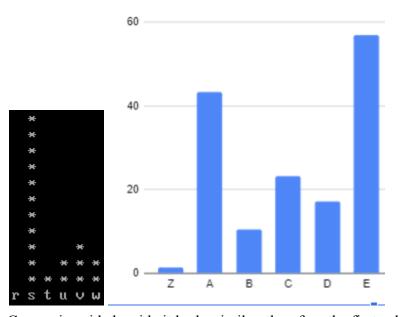
Based on the graph for the fifth sub alphabet:

HIJKLM -> J supposedly B is the same as C & D, therefore unlikely QRSTUV-> S supposedly E is lowest, therefore unlikely UVWXYZ-> W supposedly is B is the highest therefore unlikely However, DEFGHI frequency looks similar to the frequency of english.



Comparing side by side it looks similar, therefore the first sub alphabet is 'E'

Based on the graph for the fifth sub alphabet: CDEFGH -> H supposedly E is the lowest, therefore unlikely IJKLMN-> N supposedly E is lowest, therefore unlikely However, RSTUVW frequency looks similar to the frequency of english.



Comparing side by side it looks similar, therefore the first sub alphabet is 'S'

Therefore the keyword is: RATTLES