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SMS Encoding Rules: the rules are written bellow the table for each row

Question 1

To what extent did you rely on a common understanding of SMS shorthand? Answer: to some extent because most people can understand it, I also wrote some words with fewer letters for instance home and hom are read the same way so there is no point in using that extra letter. More on this, is explained under the

Original Message	Original Size	Compressed Message	Compressed Message Size	Compression %	Good	Fair	Poor
I would like to see you tomorrow, lets meet at starbucks at 12	50	Meet u 2morow @ 12, Sbux	18	(50-18)/50 =0.64 =64%	4	0	1
I am going to see my friend Hannah today; I will be a bit late.	49	I C Hannah 2day,im L8	17	(49-17)/49= 0.653 =65.3%	5	0	0
Can you help me with my Programming and Matrix Algebra homework?	54	Can u hlp me w/ my coding & Mtrx HW?	27	(54-27) /54= 0.5=50%	3	2	0
Could you please, grab a bottle of red Shiraz wine on your way home?	55	Can u get a red Shraz on ur way hom?	26	(55-26) /55= 0.527=52.7%	4	0	1
I am going out to the movie theater with my friends	41	Im going 2 movie w/ frinds	21	(41-21)/41=0.488 =48.8%	1	2	2

RULES for row #1
"I would like to see you" => "Meet u"
"tomorrow"=> "2morow"
"at" => "@"
"starbucks" => "Sbux"

RULES for row #2
"see" => "C"
"today"=> "2day"
"I will be a bit late" => "im L8"

RULES for row #3
"you" => "u"
"help" => "hlp"

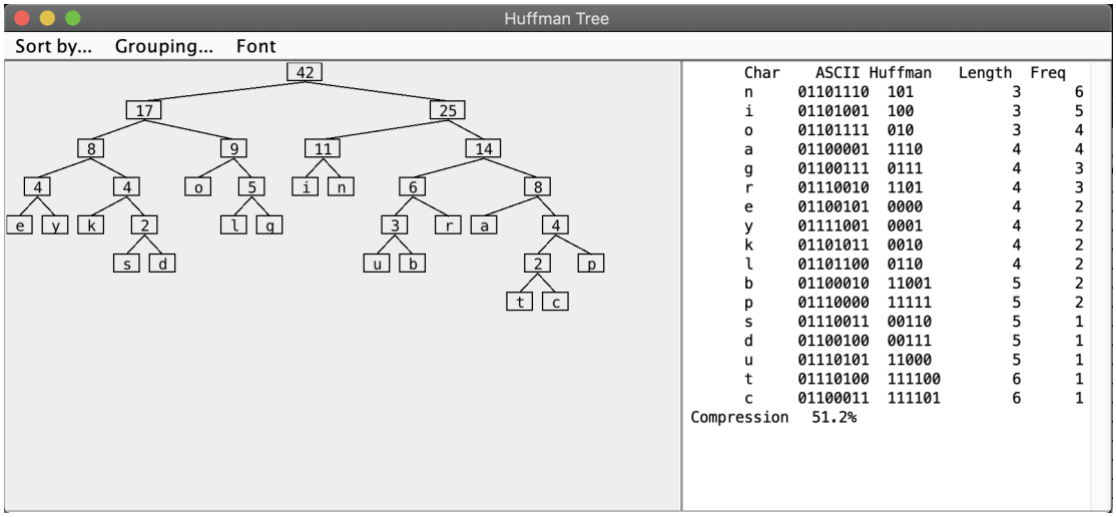
“with” => “w/”
“programming” => “coding”
“and” => “&”
“Matrix algebra” => “Mtrx”
“homework” => “HW”

RULES for row #4
“could” => “can”
“you” => “u”
“please” => “”
“grab” => “get”
“Shiraz” => “Shraz”
“your” => “ur”
“home” => “hom”

RULES for row #5
“I am” => “Im”
“going out” => “going”
“to” => “2”
“movie theater” => “movie”
“with” => “w/”
“my friends” => “frinds”

Question 2

Letter	Code	Equivalent Code
a	1110	01100001
b	11001	01100010
c	111101	01100011
d	00111	01100100
e	0000	01100101
f		
g	0111	01100111
h		
i	100	01101001
j		
k	0010	01101011
l	0110	01101100
m		
n	101	01101110
o	010	01101111
p	11111	01110000
q		
r	1101	01110010
s	00110	01110011
t	111100	01110100
u	11000	01110101
v		
w		
x		
y	0001	01111001
z		



Bar tending is no better (excluding space)= 1100111101101 11110000001010011111001010111 10000110 101010 1100100001111001111000000001101

Do you think that the Huffman codes obtained are unique? If not, can you think of any other equivalent codes that would give the same compression? Answer:
They are unique but there are several alternative to this table for the same input. For instance, the frequency of e and y is 2 and same length so we can swap them. If we swap e and y, we can get an alternative Huffman code for the exact same input.

Question 3

Frequencies from Document 1	Frequencies from Document 2	short sentence	Letter	Relative Frequencies Document 1	Relative Frequencies Document 2	Relative Frequencies Short sentence
16480	9714	4	a	0.0937322	0.08489923	0.081632653
2553	1873	1	b	0.0145205	0.0163698	0.020408163
7073	4832	2	c	0.0402286	0.04223112	0.040816327
5760	3435	1	d	0.0327608	0.0300215	0.020408163
19330	13432	3	e	0.109942	0.11739412	0.06122449
5363	2938	1	f	0.0305028	0.02567778	0.020408163
2987	2837	3	g	0.016989	0.02479505	0.06122449
6304	3755	1	h	0.0358549	0.03281826	0.020408163
16442	12173	3	I	0.0935161	0.1063906	0.06122449
333	212	1	j	0.001894	0.00185286	0.020408163
2444	1640	1	k	0.0139006	0.01433341	0.020408163
9110	5835	2	l	0.0518144	0.05099722	0.040816327
4570	2567	2	m	0.0259925	0.02243528	0.040816327
10890	8396	3	n	0.0619383	0.07338006	0.06122449
10266	5860	3	o	0.0583893	0.05121572	0.06122449
6211	4204	2	p	0.0353259	0.03674247	0.040816327
126	92	1	q	0.0007166	0.00080407	0.020408163
11366	6583	3	r	0.0646457	0.05753465	0.06122449
10988	7075	4	s	0.0624957	0.06183468	0.081632653
14930	9573	1	t	0.0849164	0.08366691	0.020408163
3401	1889	2	u	0.0193436	0.01650964	0.040816327
1479	979	1	v	0.008412	0.00855635	0.020408163
3815	2357	1	w	0.0216983	0.02059991	0.020408163
860	515	1	x	0.0048914	0.00450104	0.020408163
2419	1563	1	y	0.0137584	0.01366044	0.020408163
320	89	1	z	0.00182	0.00077785	0.020408163

The sentence I used is ‘How razorback-jumping frogs can level six piqued gymnasts’
C) I believe it’s a Zipfian distribution.
How many words were required to get a good estimate of the true frequencies? Answer:

My small sentence used each letter of alphabet and gave a good estimate for more frequent words but for the less frequent ones the relative frequencies were too high. So, I would assume that a thousand letters would be enough but at the end of the day it all depends on the subject of the article that you are getting the words from.

Question 4

Guess of Most Frequent Letter Pairs	Most Frequent Pairs as Computed by the Java Huffman Tree Application
Th	**re**
sh	**an**
is	**it**
re	**ti**
ch	**er**
er	**ef**
io	**le**
it	**as**
he	**th**
te	**st**

Average Compression using Single Letters	**46.9**
Average Compression using Letter-Pairs	**50.8**
Average Improvement in Compression	**3.9**

Can we expect to get ever better compression with increasing size of the combination? Answer:

We might assume that by increasing the number of letters while compressing the compression percentage would be higher, but we should also remember that this java program doesn't factor the fact that there might be spaces between letters.