

FICTION

A <=> 0 0 0 0 0	N <=> 0 1 1 0 1
B <=> 0 0 0 0 1	O <=> 0 1 1 1 0
C <=> 0 0 0 1 0	P <=> 0 1 1 1 1
D <=> 0 0 0 1 1	Q <=> 1 0 0 0 0
E <=> 0 0 1 0 0	R <=> 1 0 0 0 1
F <=> 0 0 1 0 1	S <=> 1 0 0 1 0
G <=> 0 0 1 1 0	T <=> 1 0 0 1 1
H <=> 0 0 1 1 1	U <=> 1 0 1 0 0
I <=> 0 1 0 0 0	V <=> 1 0 1 0 1
J <=> 0 1 0 0 1	W <=> 1 0 1 1 0
K <=> 0 1 0 1 0	X <=> 1 0 1 1 1
L <=> 0 1 0 1 1	Y <=> 1 1 0 0 0
M <=> 0 1 1 0 0	Z <=> 1 1 0 0 1

FACT = ASCII =

American Standard Code for Information Interchange

A <=> 0 1 0 0 0 0 0 1	N <=> 0 1 0 0 1 1 1 0
B <=> 0 1 0 0 0 0 1 0	O <=> 0 1 0 0 1 1 1 1
C <=> 0 1 0 0 0 0 1 1	P <=> 0 1 0 1 0 0 0 0
D <=> 0 1 0 0 0 1 0 0	Q <=> 0 1 0 1 0 0 0 1
E <=> 0 1 0 0 0 1 0 1	R <=> 0 1 0 1 0 0 1 0
F <=> 0 1 0 0 0 1 1 0	S <=> 0 1 0 1 0 0 1 1
G <=> 0 1 0 0 0 1 1 1	T <=> 0 1 0 1 0 1 0 0
H <=> 0 1 0 0 1 0 0 0	U <=> 0 1 0 1 0 1 0 1
I <=> 0 1 0 0 1 0 0 1	V <=> 0 1 0 1 0 1 1 0
J <=> 0 1 0 0 1 0 1 0	W <=> 0 1 0 1 0 1 1 1
K <=> 0 1 0 0 1 0 1 1	X <=> 0 1 0 1 1 0 0 0
L <=> 0 1 0 0 1 1 0 0	Y <=> 0 1 0 1 1 0 0 1
M <=> 0 1 0 0 1 1 0 1	Z <=> 0 1 0 1 1 0 1 0

ASCII?

A <=> F T F F F F F T	N <=> F T F F T T T F
B <=> F T F F F F T F	O <=> F T F F T T T T
C <=> F T F F F F T T	P <=> F T F T F F F F
D <=> F T F F F T F F	Q <=> F T F T F F F T
E <=> F T F F F T F T	R <=> F T F T F F T F
F <=> F T F F F T T F	S <=> F T F T F F T T
G <=> F T F F F T T T	T <=> F T F T F T F F
H <=> F T F F T F F F	U <=> F T F T F T F T
I <=> F T F F T F F T	V <=> F T F T F T T F
J <=> F T F F T F T F	W <=> F T F T F T T T
K <=> F T F F T F T T	X <=> F T F T T F F F
L <=> F T F F T T F F	Y <=> F T F T T F F T
M <=> F T F F T T F T	Z <=> F T F T T F T F

ASCII???

A <=> . _ _	N <=> . _ . . _ . .
B <=> . _ _	O <=> . _ . . _ . .
C <=> . _ _	P <=> . _ . _
D <=> . _ _	Q <=> . _ . _
E <=> . _ _	R <=> . _ _
F <=> . _ _	S <=> . _ . _
G <=> . _ _	T <=> . _ . _
H <=> . _ _	U <=> . _ . _
I <=> . _ _	V <=> . _ _
J <=> . _ _	W <=> . _ _
K <=> . _ _	X <=> . _ . _
L <=> . _ _	Y <=> . _ . _
M <=> . _ _	Z <=> . _ . _

MORSE CODE

A	·-·
B	-····
C	-·-··
D	-···
E	·
F	··-··
G	-···
H	·····
I	····
J	·-··-·
K	-··-·
L	·-···
M	--··

N	--·
O	---·
P	·-···
Q	-··-·
R	·-··
S	····
T	-··
U	··-·
V	··-··
W	·-··-
X	-··-·
Y	-··-·
Z	--···

GEM = - - - · · · - - -

MORSE CODE

A	·-·
B	-····
C	-·-··
D	-···
E	·
F	··-··
G	-···
H	·····
I	····
J	·-··-·
K	-··-·
L	·-···
M	--··

N	--·
O	---·
P	·-···
Q	-··-·
R	·-··
S	····
T	-··
U	··-·
V	··-··
W	·-··-
X	-··-·
Y	-··-·
Z	--···

MEAT = - - - · · · - - -

GEM = - - - · · · - - -

MORSE CODE

A	·-·
B	-····
C	-·-··
D	-···
E	·
F	··-··
G	-···
H	·····
I	····
J	·-··-·
K	-··-·
L	·-···
M	--··

N	--·
O	---·
P	·-···
Q	-··-·
R	·-··
S	····
T	-··
U	··-·
V	··-··
W	·-··-
X	-··-·
Y	-··-·
Z	--···

MEAT = - - - · · · - - -

GEM = - - - · · · - - -

AMBIGUITIES WITH VARIABLE LENGTH CODES

A \Leftrightarrow 1	N \Leftrightarrow 14
B \Leftrightarrow 2	O \Leftrightarrow 15
C \Leftrightarrow 3	P \Leftrightarrow 16
D \Leftrightarrow 4	Q \Leftrightarrow 17
E \Leftrightarrow 5	R \Leftrightarrow 18
F \Leftrightarrow 6	S \Leftrightarrow 19
G \Leftrightarrow 7	T \Leftrightarrow 20
H \Leftrightarrow 8	U \Leftrightarrow 21
I \Leftrightarrow 9	V \Leftrightarrow 22
J \Leftrightarrow 10	W \Leftrightarrow 23
K \Leftrightarrow 11	X \Leftrightarrow 24
L \Leftrightarrow 12	Y \Leftrightarrow 25
M \Leftrightarrow 13	Z \Leftrightarrow 26

What is
1251419?

AMBIGUITIES WITH VARIABLE LENGTH CODES

A \Leftrightarrow 1	N \Leftrightarrow 1 4
B \Leftrightarrow 2	O \Leftrightarrow 1 5
C \Leftrightarrow 3	P \Leftrightarrow 1 6
D \Leftrightarrow 4	Q \Leftrightarrow 1 7
E \Leftrightarrow 5	R \Leftrightarrow 1 8
F \Leftrightarrow 6	S \Leftrightarrow 1 9
G \Leftrightarrow 7	T \Leftrightarrow 2 0
H \Leftrightarrow 8	U \Leftrightarrow 2 1
I \Leftrightarrow 9	V \Leftrightarrow 2 2
J \Leftrightarrow 1 0	W \Leftrightarrow 2 3
K \Leftrightarrow 1 1	X \Leftrightarrow 2 4
L \Leftrightarrow 1 2	Y \Leftrightarrow 2 5
M \Leftrightarrow 1 3	Z \Leftrightarrow 2 6

What is
1251419?

12 5 14 19 or
12 5 1 4 19?

ASCII Codes

A	01000001	a	01100001	blank	00100000
B	01000010	b	01100010	!	00100001
C	01000011	c	01100011	"	00100010
D	01000100	d	01100100	#	00100011
E	01000101	e	01100101	\$	00100100
F	01000110	f	01100110	%	00100101
G	01000111	g	01100111	&	00100110
H	01001000	h	01101000	(00101000
I	01001001	i	01101001)	00101001
J	01001010	j	01101010	*	00101010
K	01001011	k	01101011	,	00101100
L	01001100	l	01101100	-	00101101
M	01001101	m	01101101	.	00101110
N	01001110	n	01101110	0	00110000
O	01001111	o	01101111	1	00110001
P	01010000	p	01110000	2	00110010
Q	01010001	q	01110001	3	00110011
R	01010010	r	01110010	4	00110100
S	01010011	s	01110011	5	00110101
T	01010100	t	01110100	6	00110110
U	01010101	u	01110101	7	00110111
V	01010110	v	01110110	8	00111000
W	01010111	w	01110111	9	00111001
X	01011000	x	01111000	tab	00001001
Y	01011001	y	01111001	line feed	00001010
Z	01011010	z	01111010	Carr. rtn.	00001101

ENCODING USING DECIMAL DIGITS

A \Leftrightarrow 1 0	N \Leftrightarrow 2 3
B \Leftrightarrow 1 1	O \Leftrightarrow 2 4
C \Leftrightarrow 1 2	P \Leftrightarrow 2 5
D \Leftrightarrow 1 3	Q \Leftrightarrow 2 6
E \Leftrightarrow 1 4	R \Leftrightarrow 2 7
F \Leftrightarrow 1 5	S \Leftrightarrow 2 8
G \Leftrightarrow 1 6	T \Leftrightarrow 2 9
H \Leftrightarrow 1 7	U \Leftrightarrow 3 0
I \Leftrightarrow 1 8	V \Leftrightarrow 3 1
J \Leftrightarrow 1 9	W \Leftrightarrow 3 2
K \Leftrightarrow 2 0	X \Leftrightarrow 3 3
L \Leftrightarrow 2 1	Y \Leftrightarrow 3 4
M \Leftrightarrow 2 2	Z \Leftrightarrow 3 5

How many
symbols can
be encoded
using pairs
of digit?

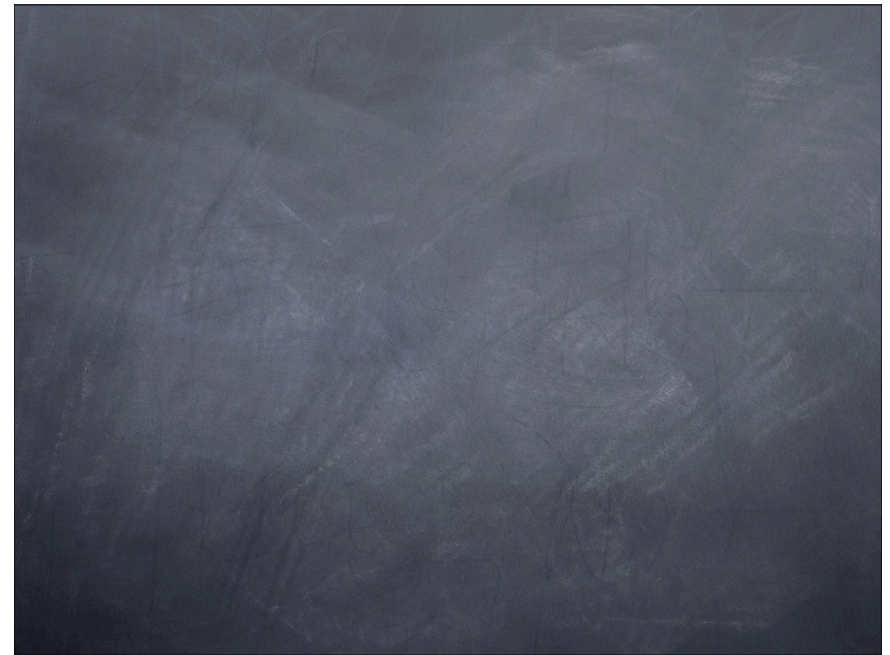
ENCODING ONE ALPHABET USING ANOTHER

A \Leftrightarrow a a	N \Leftrightarrow e a
B \Leftrightarrow a e	O \Leftrightarrow e e
C \Leftrightarrow a i	P \Leftrightarrow e i
D \Leftrightarrow a o	Q \Leftrightarrow e o
E \Leftrightarrow a u	R \Leftrightarrow e u
F \Leftrightarrow a h	S \Leftrightarrow e h
G \Leftrightarrow a k	T \Leftrightarrow e k
H \Leftrightarrow a l	U \Leftrightarrow e l
I \Leftrightarrow a m	V \Leftrightarrow e m
J \Leftrightarrow a n	W \Leftrightarrow e n
K \Leftrightarrow a p	X \Leftrightarrow e p
L \Leftrightarrow a w	Y \Leftrightarrow e w
M \Leftrightarrow a `	Z \Leftrightarrow e `

How many
symbols can
be encoded
using pairs
of Hawaiian
letters?

Structure in the ASCII Code

A	01000001	a	01100001	blank	00100000
B	01000010	b	01100010	!	00100001
C	01000011	c	01100011	"	00100010
D	01000100	d	01100100	#	00100011
E	01000101	e	01100101	\$	00100100
F	01000110	f	01100110	%	00100101
G	01000111	g	01100111	&	00100110
H	01001000	h	01101000	(00101000
I	01001001	i	01101001)	00101001
J	01001010	j	01101010	*	00101010
K	01001011	k	01101011	,	00101100
L	01001100	l	01101100	-	00101101
M	01001101	m	01101101	.	00101110
N	01001110	n	01101110	0	00110000
O	01001111	o	01101111	1	00110001
P	01010000	p	01110000	2	00110010
Q	01010001	q	01110001	3	00110011
R	01010010	r	01110010	4	00110100
S	01010011	s	01110011	5	00110101
T	01010100	t	01110100	6	00110110
U	01010101	u	01110101	7	00110111
V	01010110	v	01110110	8	00111000
W	01010111	w	01110111	9	00111001
X	01011000	x	01111000	tab	00001001
Y	01011001	y	01111001	line feed	00001010
Z	01011010	z	01111010	Carr. retn.	00001101



Extra Slides

ENCODING USING DECIMAL DIGITS

A	<=> 1 0	N	<=> 2 3
B	<=> 1 1	O	<=> 2 4
C	<=> 1 2	P	<=> 2 5
D	<=> 1 3	Q	<=> 2 6
E	<=> 1 4	R	<=> 2 7
F	<=> 1 5	S	<=> 2 8
G	<=> 1 6	T	<=> 2 9
H	<=> 1 7	U	<=> 3 0
I	<=> 1 8	V	<=> 3 1
J	<=> 1 9	W	<=> 3 2
K	<=> 2 0	X	<=> 3 3
L	<=> 2 1	Y	<=> 3 4
M	<=> 2 2	Z	<=> 3 5

What is
112432?