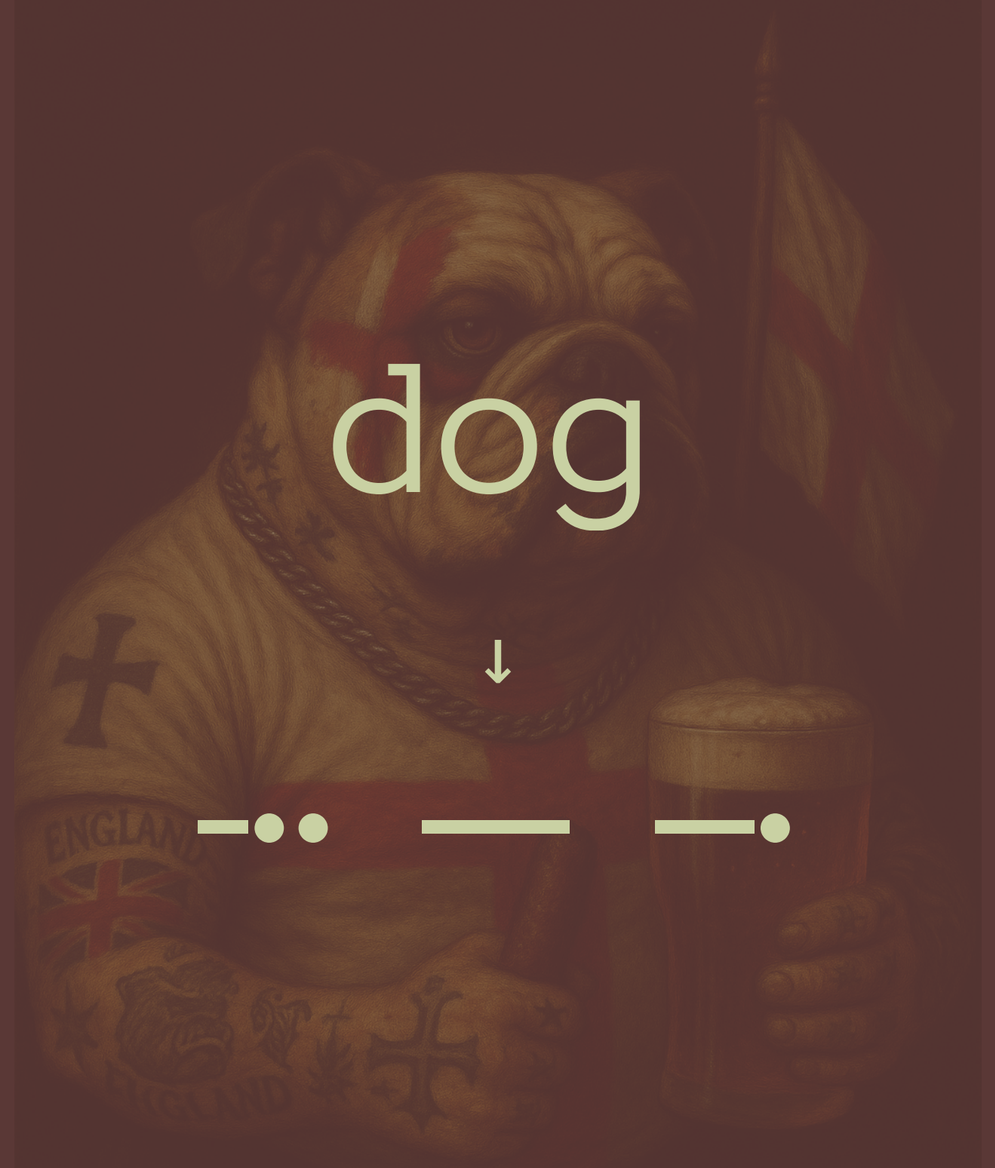

1/100


ENGLAND
ENGLAND

dog

dog

↓



dog

↓

⠙⠕⠛

dog

↓

[64 6f 67]

🐈 dogs.txt

Hund
Ha'DIbaH
abwo
alabai
anjing
ashun
aso
cane
cão
câin
câine
câini
chien
chó
cyn
dog
emba
ghaddu
gom
hond
hondur
hualp
huan
hund
imba
imbua
imbwe
inu
it
jindo
kelb
khuy
klèb
koer
koira
kotta
køter
kutya
kutta
köpek
köpeği
mbula
mbwa
mbwagh
mbwá
mbwene
mbʉ
njau
njoka
pa
perro
pes
pies
qen
qeni
sag
sagol
sobaka
suns
szczeniak
tz’i’
ukudla
welpe
xolo
zwin
āso
āšun
šuo
אבו
כלב
كلب
कुत्ता
ฆ่า
犬
狗
ᛕᛁᚦ
łéédchąą’í


- Ye Olde Encodings
- Unicode Unleashed
- Oracle Through The Ages
- Oracle CharacterSet

ascii

ascii	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x	<nul>	<soh>	<stx>	<etx>	<eot>	<enq>	<ack>	<bel>	<bs>	<tab>	<lf>	<vt>	<ff>	<cr>	<so>	<si>
1x	<dle>	<dc1>	<dc2>	<dc3>	<dc4>	<nak>	<syn>	<etb>	<can>		<sub>	<esc>	<fs>	<gs>	<rs>	<us>
2x		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~

"WOOF"→[01010111 01001111 01001111 01000110]
"woof"→[01110111 01101111 01101111 01100110]

"HAU"→[1001000 1000001 1010101]
"hau"→[1101000 1100001 1110101]

```
→ encode.py ascii < 80dogs.txt
✅ ascii: 53 good dogs
  Hund  Ha'DIbaH  abwo  alabai  anjing  ashun  aso  cane
  chien  cyn  dog  emba  ghaddu  gom  hond  hondur
  hualp  huan  hund  imba  imbua  imbwe  inu  it
  jindo  kelb  khuy  koer  koira  kotta  kutya  kutta
  mbula  mbwa  mbwagh  mbwene  njau  njoka  pa  perro
  pes  pies  qen  qeni  sag  sagol  sobaka  suns
  szczeniak  ukudla  welpe  xolo  zwin
❌ ascii: 27 bad dogs
  cão  câin  câine  câini  chó  klèb  køter  köpek
  köpeğI  mbwá  mbʉ  tz’i’  āso  āšun  šuo  אבו
कुत्ता  ฆ่า  犬  狗  ᛕᛁᛜ  łéétchąą’í  كلب  כלב
  🦯  🐕  🐶
✅ ascii: 240 chars encoded in 240 bytes, 1.00 bytes per char
```

Huan

→[48 75 61 6e] (ascii)

Ha'DIbaH

➜[48 61 27 44 49 62 61 48] (ascii)

iso-8859

Standard	Alias	Region	Year
iso-8859-1	**latin1**	**Western Europe**	1987
iso-8859-2	**latin2**	**Central & Eastern Europe**	1987
iso-8859-3	latin3	South Europe	1988
iso-8859-4	latin4	North Europe	1988
iso-8859-5	cyrillic		1988
iso-8859-6	arabic		1987
iso-8859-7	greek		1987
iso-8859-8	hebrew		1988
iso-8859-9	latin5	Turkish	1989
iso-8859-10	latin6	Nordic	1992
iso-8859-11	thai		2001
iso-8859-13	latin7	Baltics	1998
iso-8859-14	latin8	Celtic	1998
iso-8859-15	**latin9**	**Western Europe (Improved)**	1999
iso-8859-16	latin10	South-Eastern Europe	2001

ascii	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x																
9x																
ax																
bx																
cx																
dx																
ex																
fx																

latin2	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x																
9x																
ax		ˇ	˘	Ł	¤	Ľ	Ś	Š	Ş	Ť	Ź	¡	¸	·	˝	Ů
bx	ź	‘	’	“	”	•	–	—	™							
cx	Ą	ˇ	Ď	Đ	Ë	Ę	Ě	Í	Î	Ï	˝	Ł	Ń	Ň	Ó	Ô
dx	Ő	Œ	Ŕ	Ř	Ŗ	Ś	Ş	Š	Ţ	Ť	Ź	Ż	Ž			
ex	ą	˛	ď	đ	ë	ę	ě	í	î	ï	˝	ł	ń	ň	ó	ô
fx	ő	œ	ŕ	ř	ŗ	ś	ş	š	ţ	ť	ź	ż	ž	ÿ		

```
→ encode.py ascii latin2 < 80dogs.txt
✅ ascii ✅ latin2: 53 dogs
  Ha'DIbaH  Hund  abwo  alabai  anjing  ashun  aso  cane
  chien  cyn  dog  emba  ghaddu  gom  hond  hondur
  hualp  huan  hund  imba  imbua  imbwe  inu  it
  jindo  kelb  khuy  koer  koira  kotta  kutta  kutya
  mbula  mbwa  mbwagh  mbwene  njau  njoka  pa  perro
  pes  pies  qen  qeni  sag  sagol  sobaka  suns
  szczeniak  ukudla  welpe  xolo  zwin
❌ ascii ✅ latin2: 7 dogs
  chó  câin  câine  câini  köpek  mbwá  šuo
❌ ascii ❌ latin2: 20 dogs
  cão  klèb  köpeği  køter  mbʉ  tz’i’  āso  āšun
  łéédchąą’í  كلب  כלב  אבו  कुत्ता  ฆ่า  ᏦᎯᎾ  犬
  狗  🛕  🦮  🐶

✅ ascii→latin2: 53→60 good dogs
✅ ascii: 240 chars encoded in 240 bytes, 1.00 bytes per char
✅ latin2: 269 chars encoded in 269 bytes, 1.00 bytes per char
```

köpek

→[6b f6 70 65 6b] (latin2)


câine
➜[b9 75 6f] (latin2)

windows-1250

latin2	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x																
9x																
ax		Ą	˘	Ł	¤	Ľ	Ś	§	¨	Š	Ş	Ť	Ź		Ž	Ż
bx	°	ą	˛	ł	´	ľ	ś	ˇ	¸	š	ş	ť	ź	”	ž	ż
cx	Ŕ	Á	Â	Ă	Ä	Ĺ	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
dx	Đ	Ń	Ň	Ó	Ô	Ő	Ö	×	Ř	Ů	Ú	Ű	Ü	Ý	Ţ	ß
ex	ŕ	á	â	ă	ä	Í	ć	ç	č	é	ę	ë	ě	í	î	ď
fx	đ	ń	ň	ó	ô	ő	ö	÷	ř	ů	ú	ű	ü	ý	ţ	˙

win-1250	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x	€	``	‚	``	„	…	†	‡	``	‰	Š	‹	Ś	Ť	Ž	Ź
9x	``	‘	’	“	”	•	–	—	``	™	š	›	ś	ť	ž	ź
ax		ˇ	˘	Ł	¤	Ą	¦	§	¨	©	Ş	«	¬		®	Ż
bx	°	±	˛	ł	´	µ	¶	·	¸	ą	ş	»	Ľ	”	l'	ż
cx	Ŕ	Á	Â	Ă	Ä	Ĺ	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
dx	Đ	Ń	Ň	Ó	Ô	Ő	Ö	×	Ř	Ů	Ú	Ű	Ü	Ý	Ţ	ß
ex	ŕ	á	â	ă	ä	Í	ć	ç	č	é	ę	ë	ě	í	î	ď
fx	đ	ń	ň	ó	ô	ő	ö	÷	ř	ů	ú	ű	ü	ý	ţ	˙

```
→ encode.py latin2 cp1250 < 80dogs.txt
✅ latin2 ✅ cp1250: 60 dogs
  Ha'DIbaH  Hund  abwo  alabai  anjing  ashun  aso  cane
  chien  chó  cyn  câin  câine  câini  dog  emba
  ghaddu  gom  hond  hondur  hualp  huan  hund  imba
  imbua  imbwe  inu  it  jindo  kelb  khuy  koer
  koira  kotta  kutta  kutya  köpek  mbula  mbwa  mbwagh
  mbwene  mbwá  njau  njoka  pa  perro  pes  pies
  qen  qeni  sag  sagol  sobaka  suns  szczeniak  ukudla
  welpe  xolo  zwin  šuo
❌ latin2 ✅ cp1250: 2 dogs
  tz’i’  łééchąą’í
❌ latin2 ❌ cp1250: 18 dogs
  cão  klèb  köpeği  køter  mbʉ  āso  āšun  אבו
कुत्ता  ฆ่า  ЌИӨ  犬  狗  ⛪  كلب  כלב
  🐕  🐶

✅ latin2→cp1250: 60→62 good dogs
✅ latin2: 269 chars encoded in 269 bytes, 1.00 bytes per char
✅ cp1250: 283 chars encoded in 283 bytes, 1.00 bytes per char
```


chó
➜[63 68 f3] (latin2)
➜[63 68 f3] (cp1250)


šuo
➜[b9 75 6f] (latin2)
➜[9a 75 6f] (cp1250)

Standard	Alias	Windows Equivalent
iso-8859-1	latin1	windows-1252
iso-8859-2	latin2	windows-1250
iso-8859-5	cyrillic	windows-1251
iso-8859-6	arabic	windows-1256
iso-8859-7	greek	windows-1253
iso-8859-8	hebrew	windows-1255
iso-8859-9	latin5	windows-1254
iso-8859-11	thai	windows-874
iso-8859-13	latin7	windows-1257
iso-8859-15	latin9	windows-1252

gb2312

```
→ encode.py ascii gb2312 < 80dogs.txt
✅ ascii ✅ gb2312: 53 dogs
  Ha'DIbaH  Hund  abwo  alabai  anjing  ashun  aso  cane
  chien  cyn  dog  emba  ghaddu  gom  hond  hondur
  hualp  huan  hund  imba  imbua  imbwe  inu  it
  jindo  kelb  khuy  koer  koira  kotta  kutta  kutya
  mbula  mbwa  mbwagh  mbwene  njau  njoka  pa  perro
  pes  pies  qen  qeni  sag  sagol  sobaka  suns
  szczeniak  ukudla  welpe  xolo  zwin
❌ ascii ✅ gb2312: 7 dogs
  chó  klèb  mbwá  tz’i’  āso  犬  狗
❌ ascii ❌ gb2312: 20 dogs
  câin  câine  câini  cão  köpek  köpeği  køter  mbʉ
  āšun  łééchąą’í  šuo  كلب  כלב  אבו  कुत्ता  ฆ่า
  ꓘИꓳ  [illegible]  𓃡  🐶

✅ ascii→gb2312: 53→60 good dogs
✅ ascii: 240 chars encoded in 240 bytes, 1.00 bytes per char
✅ gb2312: 261 chars encoded in 269 bytes, 1.03 bytes per char
```


犬
→ [c8 ae]

Hund

➜ [48 75 6e 64] (gb2312)
➜ [48 75 6e 64] (ascii)


?
?
➜[?? ?? ?? ??] (gb2312)


cane
→[63 61 6e 65] (gb2312)

→[b9 b7 c8 ae] (gb2312)

?

```
➜[.. b9 b7 ..] (gb2312)
```


福
狗
→[.. b9 b7 ..] (gb2312)

肮发

→ [b0 b9 b7 a2] (gb2312)

Unicode

Unicode 1.0

Codepoint: `U+0000→U+FFFF`

Unicode 2.0+

Codepoint: `U+0000→U+10FFFF`

U+	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
000x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
001x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
002x		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
003x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
004x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
005x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
006x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
007x	p	q	r	s	t	u	v	w	x	y	z	{	¦	}	~	

Range	Block
U+0000→U+007F	ASCII
U+0080→U+00FF	Latin Supplement
U+0100→U+024F	Latin Extended
U+0250→U+02FF	Phonetic Symbols
U+0300→U+05FF	Greek, Cyrillic & Hebrew
U+0600→U+0FFF	Arabic & Indian
U+1000→U+17FF	S & SE Asian
U+1800→U+24FF	E Asian
U+2000→U+27FF	Symbols & Punctuation
U+2800→U+28FF	Braille & Basic Shapes
U+2E80→U+9FFF	Chinese
U+AC00→U+D7AF	Korean
U+D800→U+DBFF	High Surrogates
U+DC00→U+DFFF	Low Surrogates

Plane	Range	Plane Name	Abbreviation
0	U+0000→U+FFFF	Basic Multilingual	BMP
1	U+10000→U+1FFFF	Supplementary Multilingual	SMP
2	U+20000→U+2FFFF	Supplementary Ideographic	SIP
3	U+30000→U+3FFFF	Tertiary Ideographic Plane	TIP
4→13	U+40000→U+DFFFF	Reserved	
14	U+E0000→U+EFFFF	Supplementary Special-Purpose	SSP
15	U+F0000→U+FFFFF	Private Use Area A	
16	U+100000→U+10FFFF	Private Use Area B	

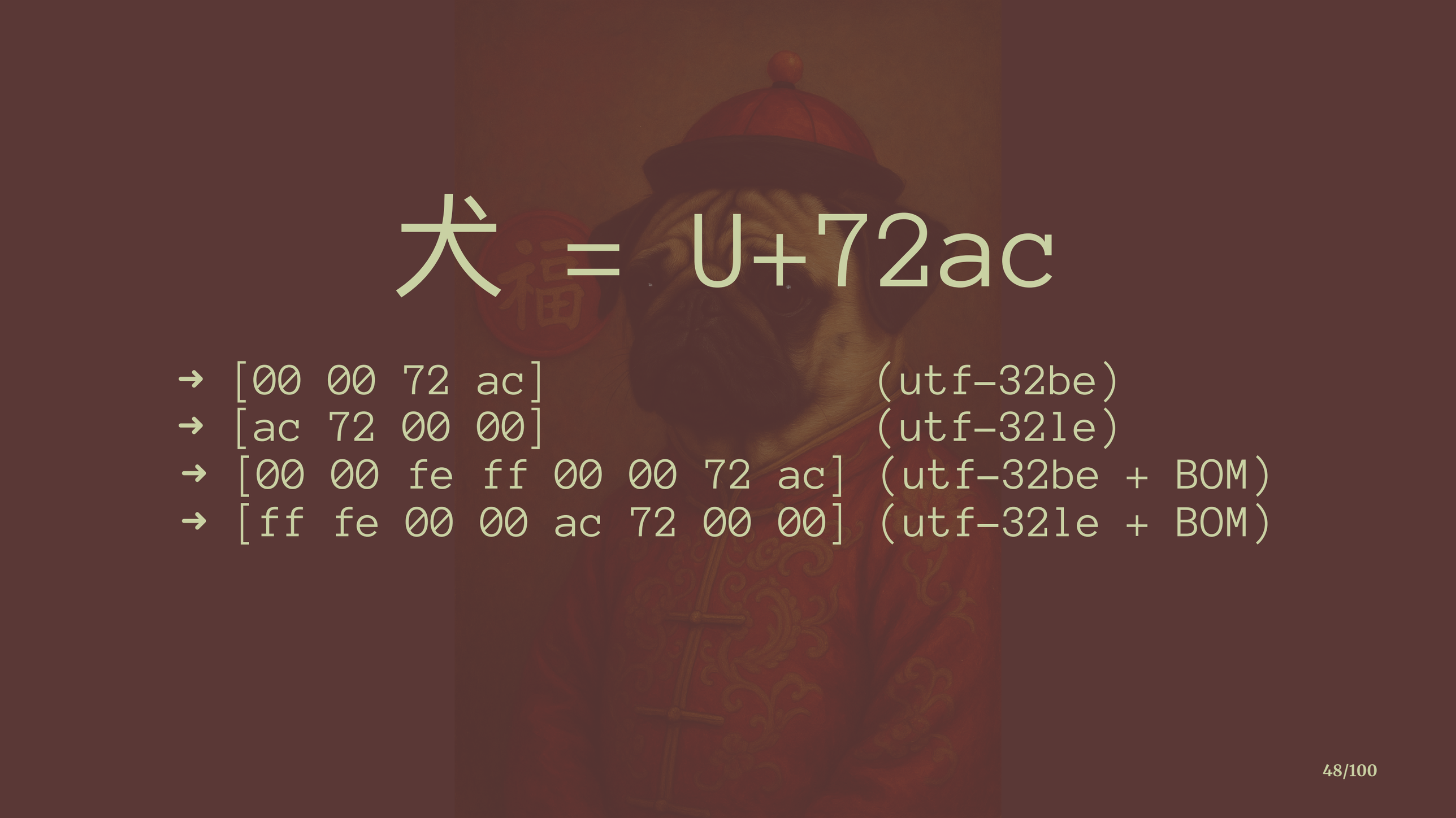
Unicode Encodings

- UTF-32
- UTF-16
- UTF-8

Unicode Encodings

- **UTF-32**
- UTF-16
- UTF-8

```
→ encode.py utf-32be < 80dogs.txt
✅ utf-32be: 80 good dogs
✅ utf-32be: 338 chars encoded in 1352 bytes, 4.00 bytes per char
```



犬 = U+72ac

```
→ [00 00 72 ac]                   (utf-32be)
→ [ac 72 00 00]                   (utf-32le)
→ [00 00 fe ff 00 00 72 ac] (utf-32be + BOM)
→ [ff fe 00 00 ac 72 00 00] (utf-32le + BOM)
```

Unicode Encodings

- UTF-32
- **UTF-16**
- UTF-8

```
→ encode.py utf-16be < 80dogs.txt
✅ utf-16be: 80 good dogs
utf-16be: 338 chars encoded in 682 bytes, 2.02 bytes per char
```

犬 = U+72ac

- [72 ac] (utf-16be)
- [ac 72] (utf-16le)
  - [fe ff 72 ac] (utf-16be + BOM)
  - [ff fe ac 72] (utf-16le + BOM)

 = U+1f436

→ [?? ??] (utf-16)

Range	Block
U+0000→U+007f	Latin Basic
U+0080→U+00ff	Latin Supplement
U+0100→U+024f	Latin Extended
U+0250→U+02ff	Phonetics
U+0300→U+05ff	Greek, Cyrillic, Hebrew
U+0600→U+0Fff	Arabic, Indian
U+1000→U+17ff	S & SE Asian
U+1800→U+24ff	E Asian
U+2000→U+27ff	Symbols
U+2800→U+28ff	Braille, Shapes
U+2e80→U+9Fff	Chinese
U+ac00→U+D7af	Korean
U+d800→U+dBff	**High Surrogates**
U+dc00→U+dfff	**Low Surrogates**
U+e000→U+f8ff	Private Use

🐶 = U+1f436 - 0x10000 = 0x0f436

= 0b0000111110100000110110

= [0b0000111101][0b0000110110]

= [0x003d] [0x0036]

+[0xd800] +[0xdc00]

= [0xd83d] [0xdc36]

→ U+d83d U+dc36

 = U+1f436

```
➜   U+d83d      U+dc36
  ➜ [72 ad  d8] [3d  dc 36 ] (utf-16)
```

Unicode Encoding UTF-8

```
→ encode.py utf-8 < 80dogs.txt
✅ utf-8: 80 good dogs
✅ utf-8: 338 chars encoded in 413 bytes, 1.22 bytes per char
```

U+0000→U+007F
→[0xxxxxxx]

U+0080→U+07FF
→[110xxxxx 10xxxxxx]

U+0800→U+FFFF
→[1110xxxx 10xxxxxx 10xxxxxx]

U+10000→U+10FFFF
→[11110xxx 10xxxxxx 10xxxxxx 10xxxxxx]

```
→ encode.py utf-8 Ł
utf-8:   "Ł"=[c5 81]

U+0141 ('Ł')
 =  00101000001
 =     00101   000001
    110xxxxx 10xxxxxx
 → [11000101 10000001]
    =    [c5       81]
```

```
[0xxxxxxx]
[110xxxxx 10xxxxxx]
[1110xxxx 10xxxxxx 10xxxxxx]
[11110xxx 10xxxxxx 10xxxxxx 10xxxxxx]

[0xxxxxxx] ASCII
[10xxxxxx] Continuation
[110xxxxx] Lead of 2 byte sequence
[1110xxxx] Lead of 3 byte sequence
[11110xxx] Lead of 4 byte sequence

[...10100011 10100011 11000011 10100011 01010101...]
```


pies
→[70 69 65 73] (ascii)
→[70 69 65 73] (utf-8)


cão
→[63 c3 a3 6f] (utf-8)


福
狗
→[e7 8b 97]

```
➜[f0 9f 90 b6]]
```

```
➜ encode.py utf-8 -d cão,狗,
✅ utf-8: Good cão 63 c3 a3 6f
✅ utf-8: Good 狗 e7 8b 97
✅ utf-8: Good 🐶 f0 9f 90 b6
```

Encoding	Good Dogs	Chars	Bytes	Bytes per Char
ascii	53	237	237	1.0
latin1	62	278	278	1.0
latin2	60	269	269	1.0
win-1252	64	286	286	1.0
win-1250	62	283	283	1.0
gb2312	60	261	269	1.0
ucs-2	77	332	664	2.0
utf-8	80	338	413	1.2
utf-16	80	338	682	2.0
utf-32	80	338	1352	4.0

Encoding	Bytes per Character	BMP	All Planes	Self Synchronizing
ascii	1	❌	❌	
latin1	1	❌	❌	
latin2	1	❌	❌	
win-1252	1	❌	❌	
win-1250	1	❌	❌	
gb2312	1,2	❌	❌	❌
ucs-2	2	✅	❌	
utf-8	1→4	✅	✅	✅
utf-16	2,4	✅	✅	
utf-32	4	✅	✅	

ChatGPT 4o >

what encoding did oracle the oracle database use prior to version 6?

Prior to Oracle Database version 6 (released in 1988), Oracle used **7-bit US-ASCII** as the default and primary character encoding. This encoding was sufficient at the time because Oracle's early customer base was predominantly English-speaking, and multilingual or multibyte character support was not a focus.

Oracle Pre-6

» US7ASCII

```
US   7 ASCII


WE   8 ISO8859P1
WE   8 ISO8859P2

WE   8 MSWIN1252
EE   8 MSWIN1250

ZHS 16 CGB231280

AL  16 UTF16
AL  32 UTF8
```

Oracle 6

- Selectable charset
  - **WE8ISO8859P1**
  - …

Oracle 7

- NLS framework introduced
- New Encodings
  - `WE8ISO8859P2`
  - `WE8MSWIN1252`
  - `ZHS16CGB231280`
  - `...`

Oracle 8

- New Encodings
  - `EE8MSWIN1250`
  - `UTF8` (≠ `UTF-8`)
  - `...`

UTF8 (≠ UTF-8)

U+0000→U+007F
[0xxxxxxx]

U+0080→U+07FF
[110xxxxx 10xxxxxx]

U+0800→U+FFFF
[1110xxxx 10xxxxxx 10xxxxxx]

~~U+10000→U+10FFFF~~
~~[11110xxx 10xxxxxx 10xxxxxx 10xxxxxx]~~

Oracle 8i

- National Character Set
- Character Sets
  - `UTF8` (Beyond BMP)
  - `AL16UTF16`

UTF8 (Improved?)

U+0000→U+007F
[0xxxxxxx]

U+0080→U+07FF
[110xxxxx 10xxxxxx]

U+0800→U+FFFF
[1110xxxx 10xxxxxx 10xxxxxx]

~~U+10000→U+10FFFF~~
~~[11110xxx–10xxxxxx–10xxxxxx–10xxxxxx]~~

 = U+1f436

→ U+d83d U+dc36

→ [ed a0 bd ed b0 b6]

Oracle 9i

- Character Sets
  - `AL32UTF8`
  - `...`
- Length Semantics

National Character Set

- `AL16UTF16/UTF8`
- `NCHAR,NVARCHAR2,NCLOB`

(Doc ID 276914.1)


AL32UTF8
THIS IS THE ENCODING YOU ARE LOOKING FOR
imgflip.com

Byte/Char Semantics

```
NLS_LENGTH_SEMANTICS = BYTE (default)| CHAR
```

```
SQL> create table doggie(name nvarchar2(1 char));

ORA-00907: missing right parenthesis

SQL> create table doggie(name nvarchar2(1))

SQL> Table DOGGIE created.

SQL> insert into doggie values ('🐶');

SQL Error: ORA-12899: value too large for column "PDBADMIN"."DOGGIE"."NAME" (actual: 2, maximum: 1)
```

```
SQL> select length(n'🐶'), rawtohex(n'🐶');

   LENGTH(U'\D83D\DC36') RAWTOHEX(U'\D83D\DC36')
_______________________ ____________________________
                      2 D83DDC36
```

```
SQL> create table longdog (name varchar2(4001 byte));

ORA-00910: specified length too long for its datatype

SQL> create table longdog (name varchar2(4000 char));

Table LONGDOG created.

SQL> insert into longdog values (rpad('🐶', 4000, '🐶'));

1 row inserted.

SQL> select length(name), lengthb(name) from longdog;

   LENGTH(NAME)    LENGTHB(NAME)
--------------- ----------------
           1000             4000
```

Oracle 11g

» `AL32UTF8` recommended

Oracle 12c

- `AL32UTF8` default
- Database Migration Assistant for Unicode (DMU)

ascii	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	‹	=	›	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x																
9x																
ax																
bx																
cx																
dx																
ex																
fx																

latin1	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	–	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	‹	=	›	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x																
9x																
ax	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	-	°
bx	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	
cx	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
dx	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
ex	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
fx	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

```
→ encode.py ascii latin1 < 80dogs.txt
✅ ascii ✅ latin1: 53 dogs
  Ha'DIbaH  Hund  abwo  alabai  anjing  ashun  aso  cane
  chien  cyn  dog  emba  ghaddu  gom  hond  hondur
  hualp  huan  hund  imba  imbua  imbwe  inu  it
  jindo  kelb  khuy  koer  koira  kotta  kutta  kutya
  mbula  mbwa  mbwagh  mbwene  njau  njoka  pa  perro
  pes  pies  qen  qeni  sag  sagol  sobaka  suns
  szczeniak  ukudla  welpe  xolo  zwin
❌ ascii ✅ latin1: 9 dogs
  chó  câin  câine  câini  cão  klèb  köpek  køter
  mbwá
❌ ascii ❌ latin1: 18 dogs
  köpeğI  mbʉ  tz'i'  āso  āšun  łééchąą'í  šuo  אבו
कुत्ता  ฆ่า  ᛕᛁᛜ  犬  狗  ⛪  كلب  כלב
  🐕  🐶

✅ ascii→latin1: 53→62 good dogs
✅ ascii: 240 chars encoded in 240 bytes, 1.0 bytes per char
✅ latin1: 278 chars encoded in 278 bytes, 1.0 bytes per char
```


cão
→[63 e3 6f] (latin1)

köpek

→[6b f6 70 65 6b] (latin1)

bcdic-a

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0x		1	2	3	4	5	6	7	8	9	0	#	@	:	>	√
1x	₺	/	S	T	U	V	W	X	Y	Z	≠	,	%	ɣ	\	₩
2x	–	J	K	L	M	N	O	P	Q	R	!	⌗	*	]	;	Δ
3x	&	A	B	C	D	E	F	G	H	I	?	.	⌑	[	<	⍰

windows-1252

latin1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	–	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	‹	=	›	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x																
9x																
Ax	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	-	°
Bx	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	
Cx	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
Dx	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
Ex	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
Fx	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

win-1252	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0x	‹nul›	‹soh›	‹stx›	‹etx›	‹eot›	‹enq›	‹ack›	‹bel›	‹bs›	‹tab›	‹lf›	‹vt›	‹ff›	‹cr›	‹so›	‹si›
1x	‹dle›	‹dc1›	‹dc2›	‹dc3›	‹dc4›	‹nak›	‹syn›	‹etb›	‹can›	‹em›	‹sub›	‹esc›	‹fs›	‹gs›	‹rs›	‹us›
2x		!	"	#	$	%	&	'	(	)	*	+	,	–	.	/
3x	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4x	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5x	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6x	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7x	p	q	r	s	t	u	v	w	x	y	z	{	`	`	}	~
8x	€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ		Ž	
9x		‘	’	“	”	•	–	—	˜	™	š	›	œ		ž	Ÿ
Ax	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	-	°
Bx	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	
Cx	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
Dx	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
Ex	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
Fx	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

```
➜ encode.py latin1 cp1252 < 80dogs.txt
✅ latin1 ✅ cp1252: 62 dogs
  Ha'DIbaH  Hund  abwo  alabai  anjing  ashun  aso  cane
  chien  chó  cyn  câin  câine  câini  cão  dog
  emba  ghaddu  gom  hond  hondur  hualp  huan  hund
  imba  imbua  imbwe  inu  it  jindo  kelb  khuy
  klèb  koer  koira  kotta  kutta  kutya  köpek  køter
  mbula  mbwa  mbwagh  mbwene  mbwá  njau  njoka  pa
  perro  pes  pies  qen  qeni  sag  sagol  sobaka
  suns  szczeniak  ukudla  welpe  xolo  zwin
❌ latin1 ✅ cp1252: 2 dogs
  tz’i’  šuo
❌ latin1 ❌ cp1252: 16 dogs
  köpeği  mbʉ  āso  āšun  łééchąą’í  كلب  כלב  אבו
  कुत्ता  ฆ่า  ꓘИϴ  犬  狗  [illegible]  𓃡  🐶

✅ latin1→cp1252: 62→64 good dogs
✅ latin1: 278 chars encoded in 278 bytes, 1.0 bytes per char
✅ cp1252: 286 chars encoded in 286 bytes, 1.0 bytes per char
```


cão
→[63 e3 6f] (latin1)
→[63 e3 6f] (cp1252)


šuo
➜ ❌Bad šuo❌(latin1)
➜[b9 75 6f] (latin2)
➜[9a 75 6f] (cp1252)


福
狗
→ [b9 b7]