Working with text II

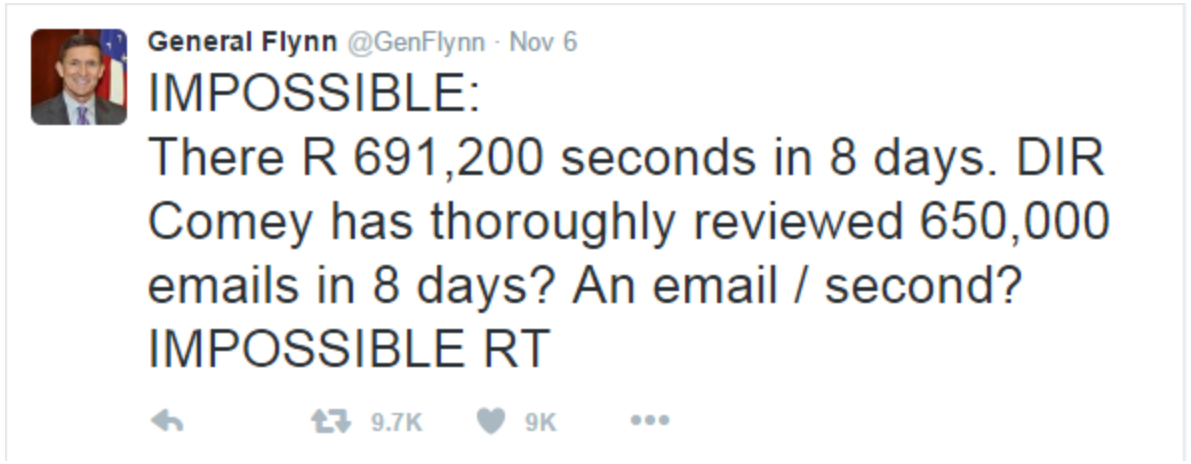
Jonathan Blaney
Christopher Ohge
Martin Steer

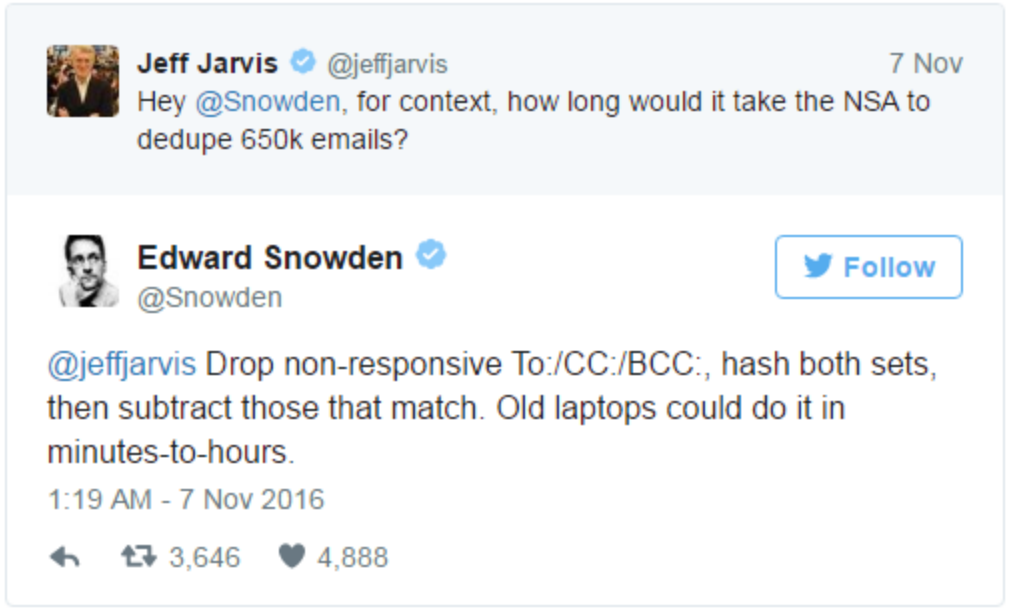
21 June 2018

Plan for today

- Bits and layers of representation
- The Command Line Interface (CLI)
- Intro to Regular Expressions
- Grep and regex
- CLI tool demo: Pandoc

Claim: You can’t review 650,000 emails in eight days.





Step 1: Search for following patterns:
To: Hillary Clinton
CC: Hillary Clinton
BCC: Hillary Clinton
From: Hillary Clinton
Step 2: De-duplicate copies from previous set.
Step 3: Examine remaining emails.

Plain text is best?

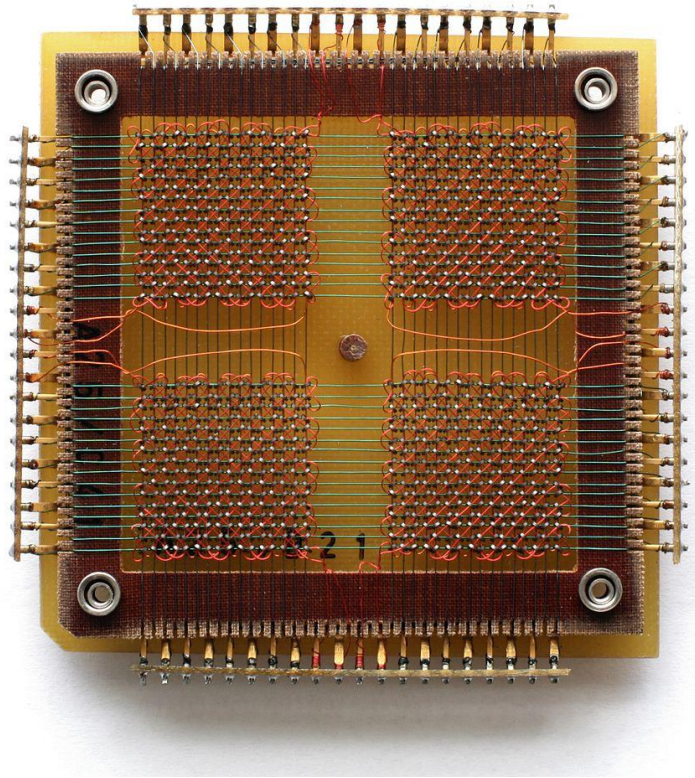
Plain text is best?

- Ladder of abstraction ==>

- Storage
  ||
  ||
  \/
- Applications

Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



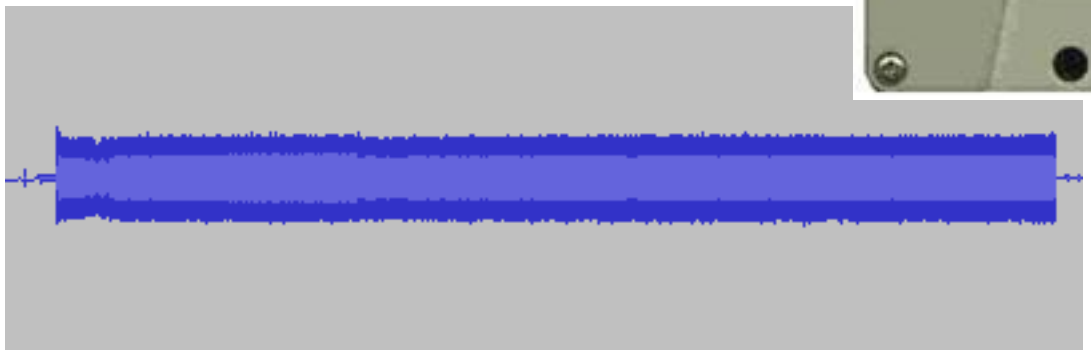
Ladder of abstraction

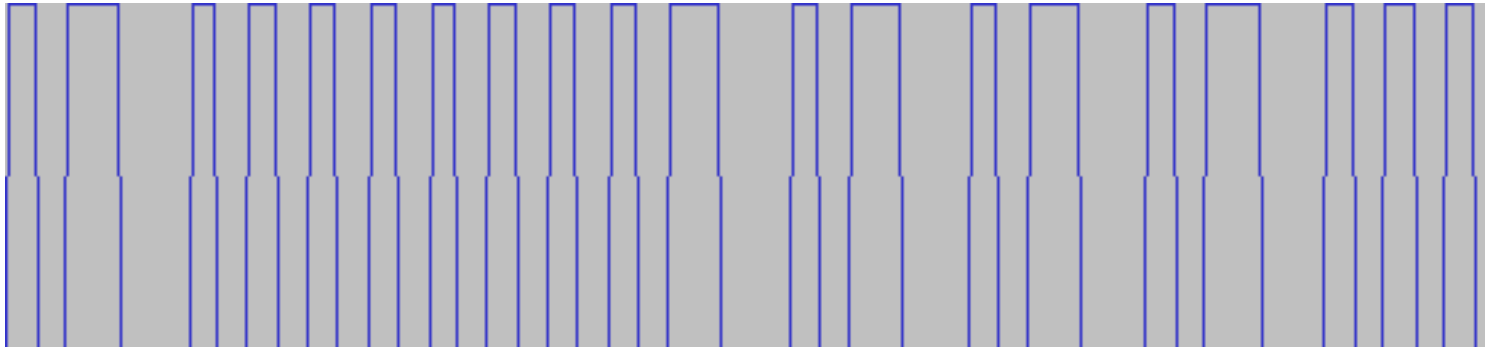
- Storage
- Encoding
- Formats
- Schemas
- Applications

https://en.wikipedia.org/wiki/Videodisc
https://flashbak.com/blank-vhs-cassette-packaging-design-trends-art-402545/

Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications

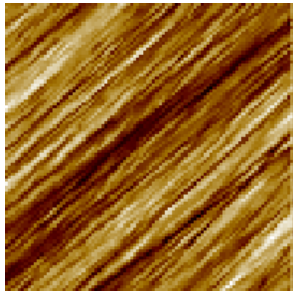


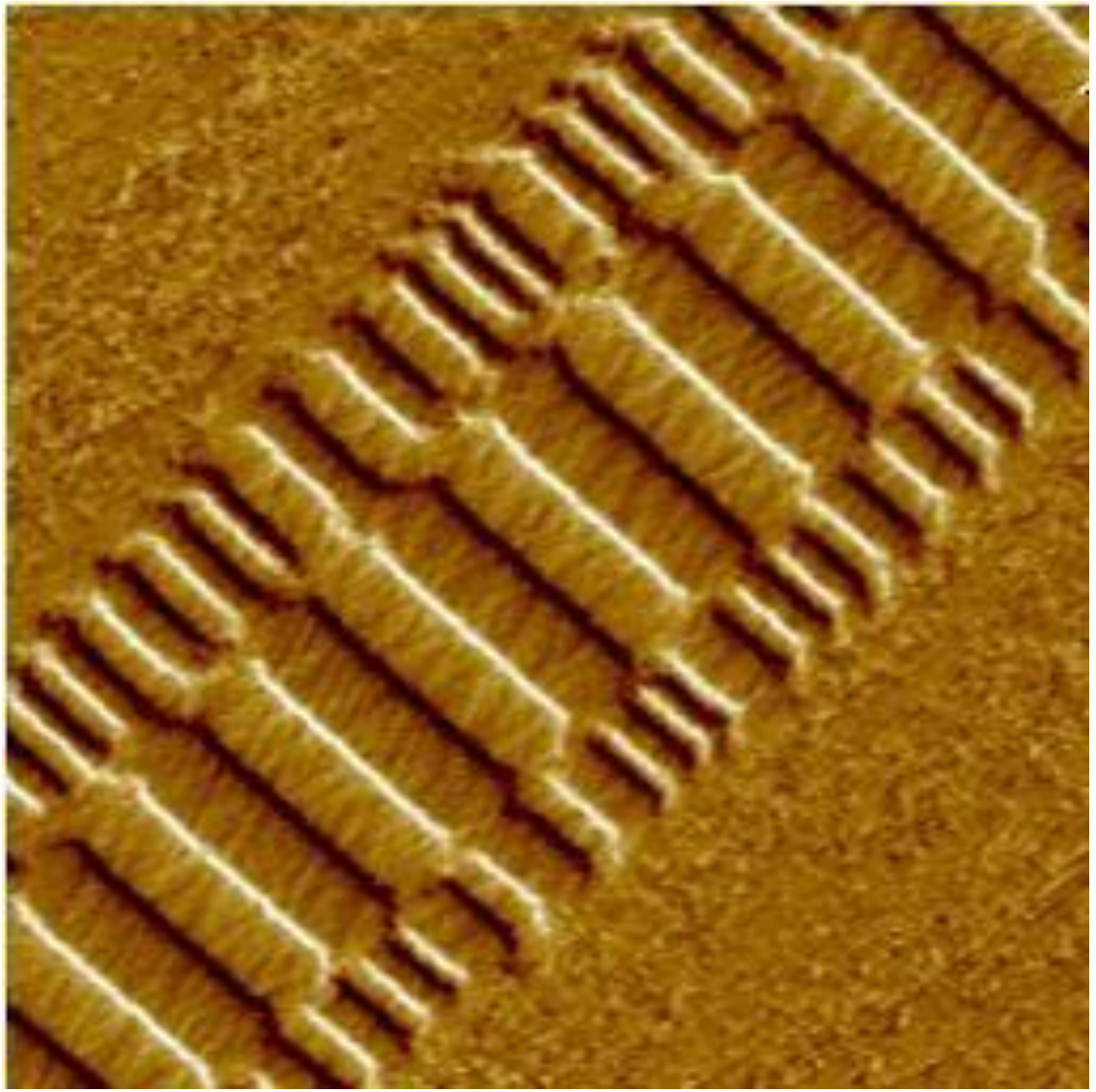


https://www.pagetable.com/?p=32

Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications

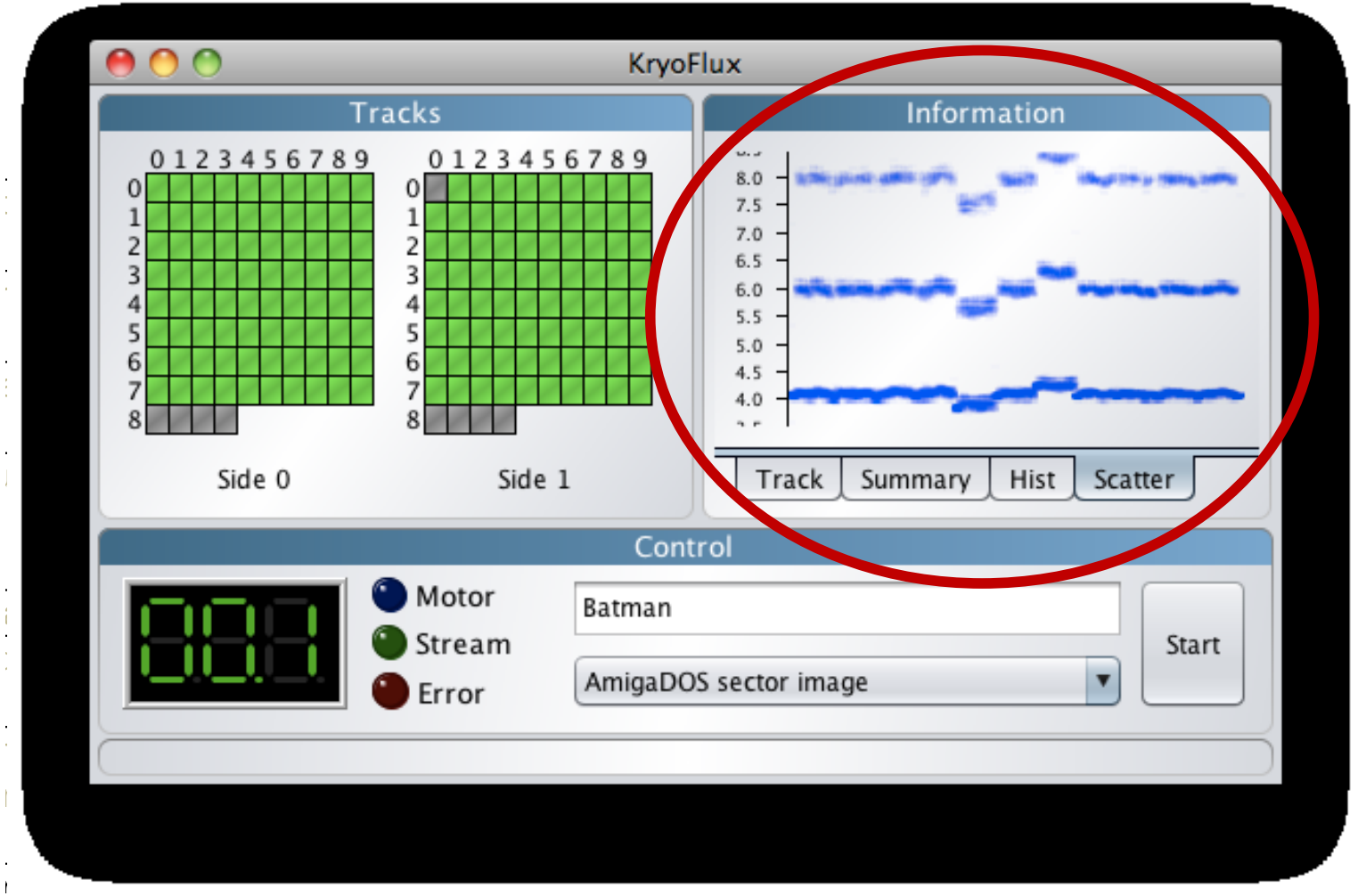




Magnetic Force Microscopy - https://www.engr.sjsu.edu/WofMatE/Mat%27sChar2.htm

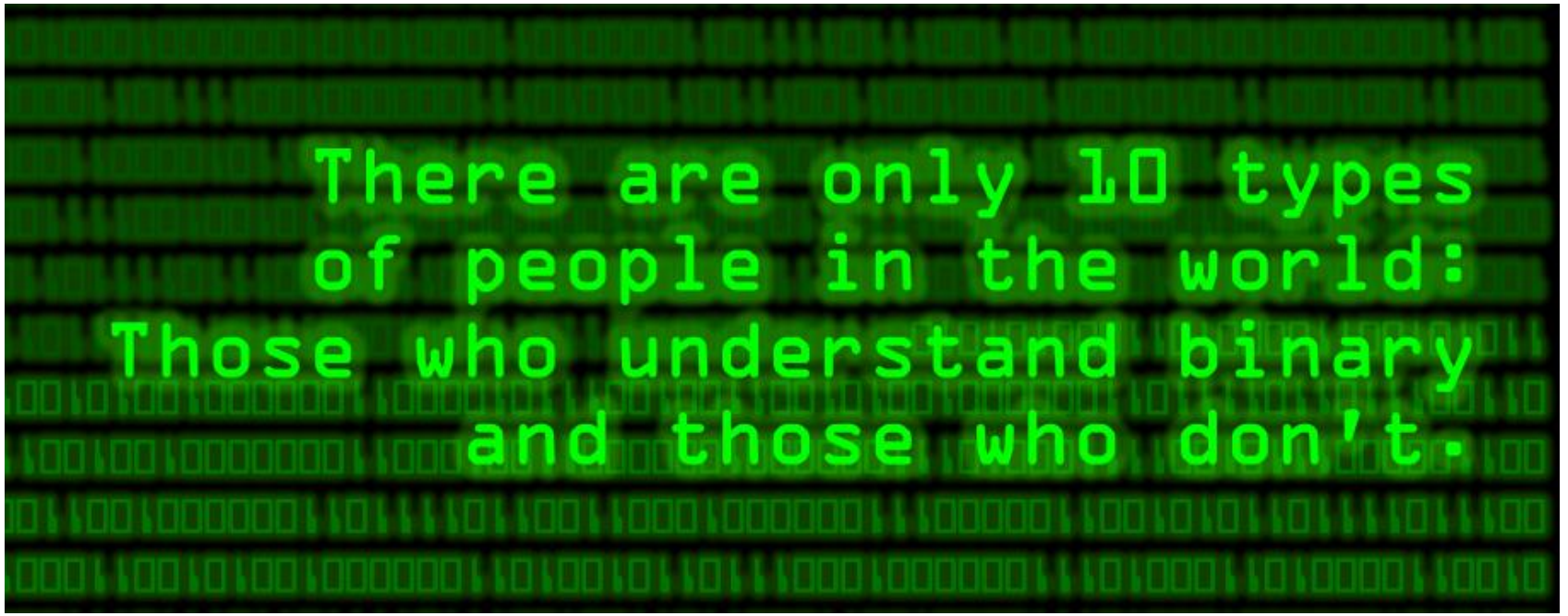
Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



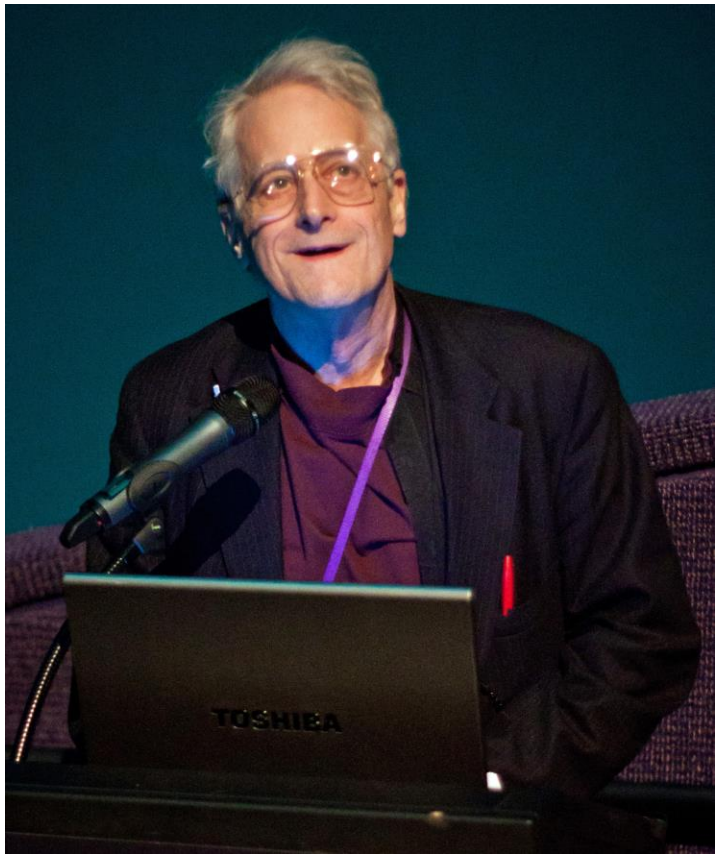
Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



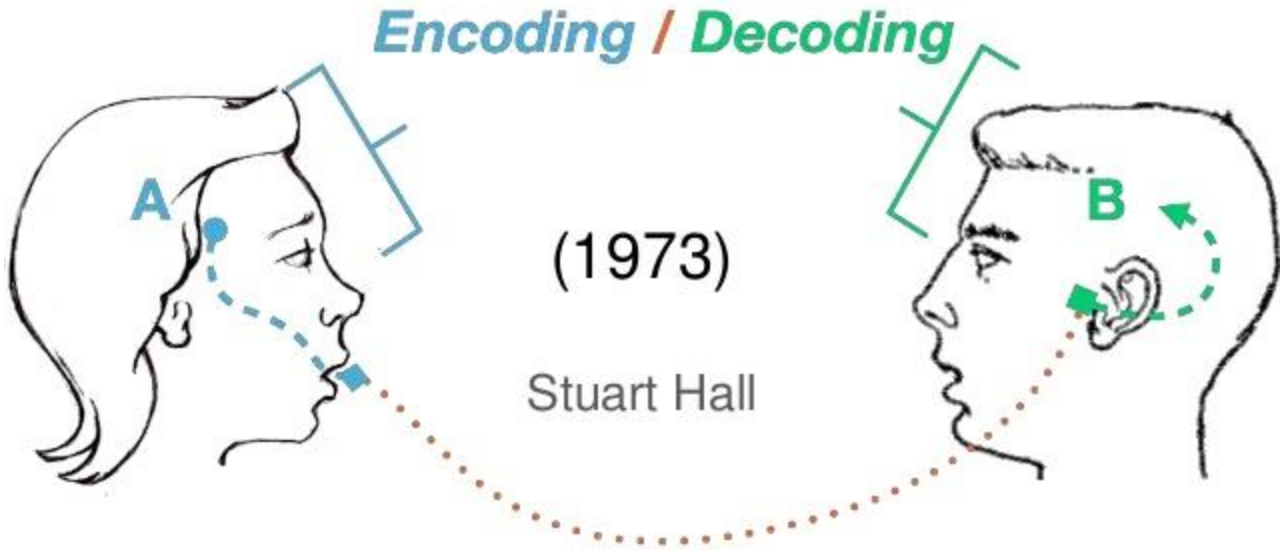
“Obsolete power corrupts obsoletely.” - Ted Nelson

The technology associated with interpreting the representation at each of the layers can change or become less available

https://en.wikipedia.org/wiki/Ted_Nelson

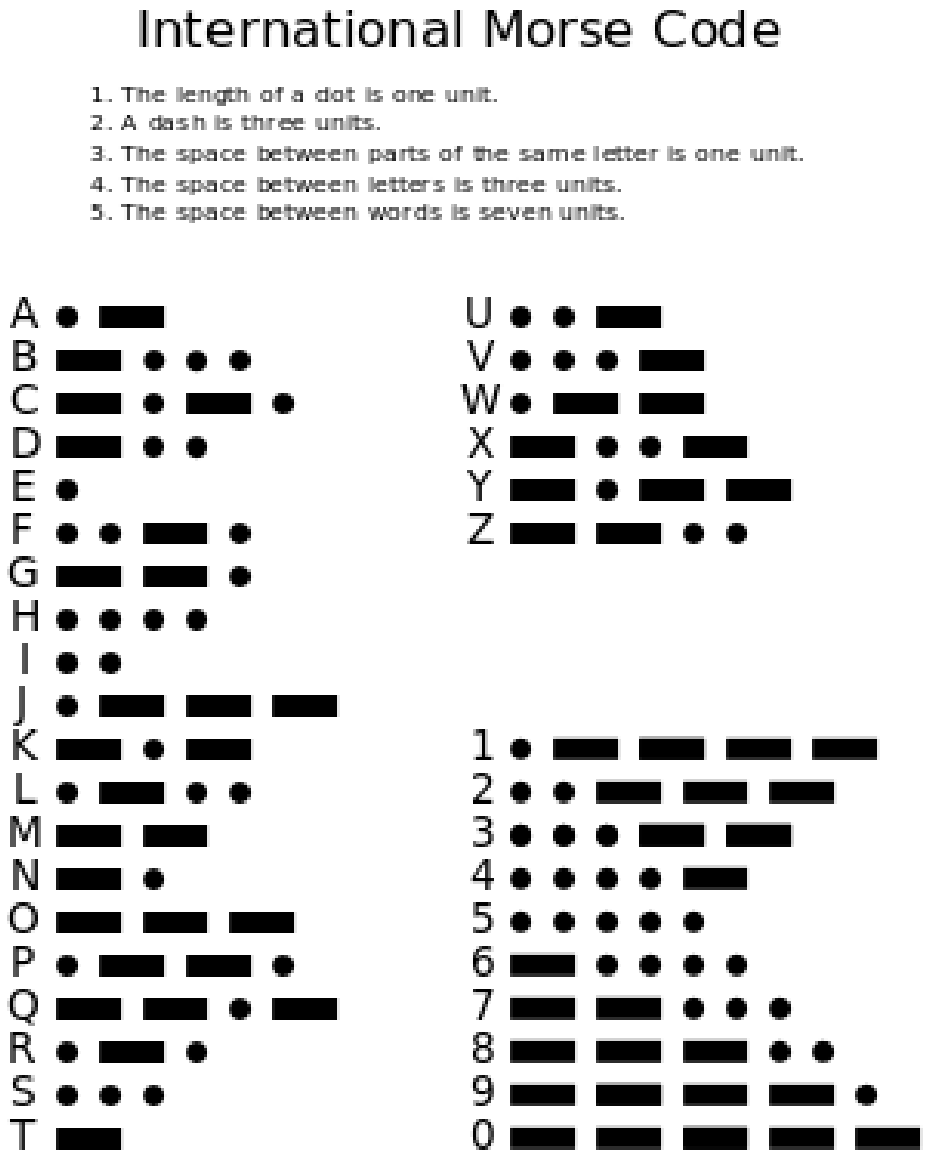
Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications

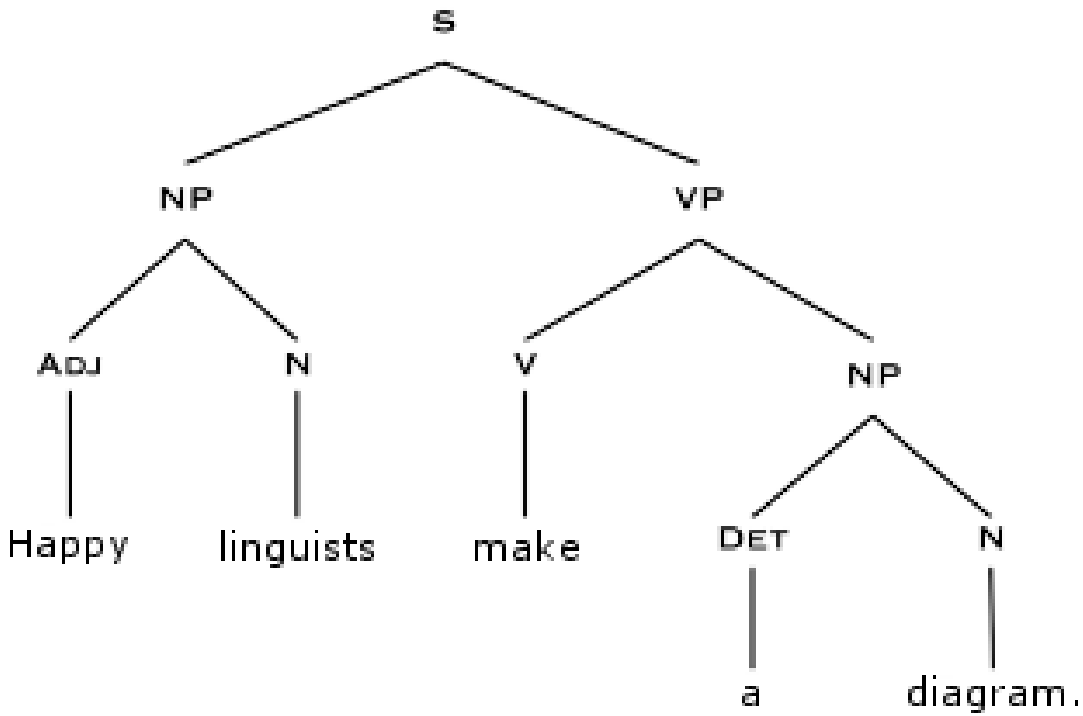


Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications

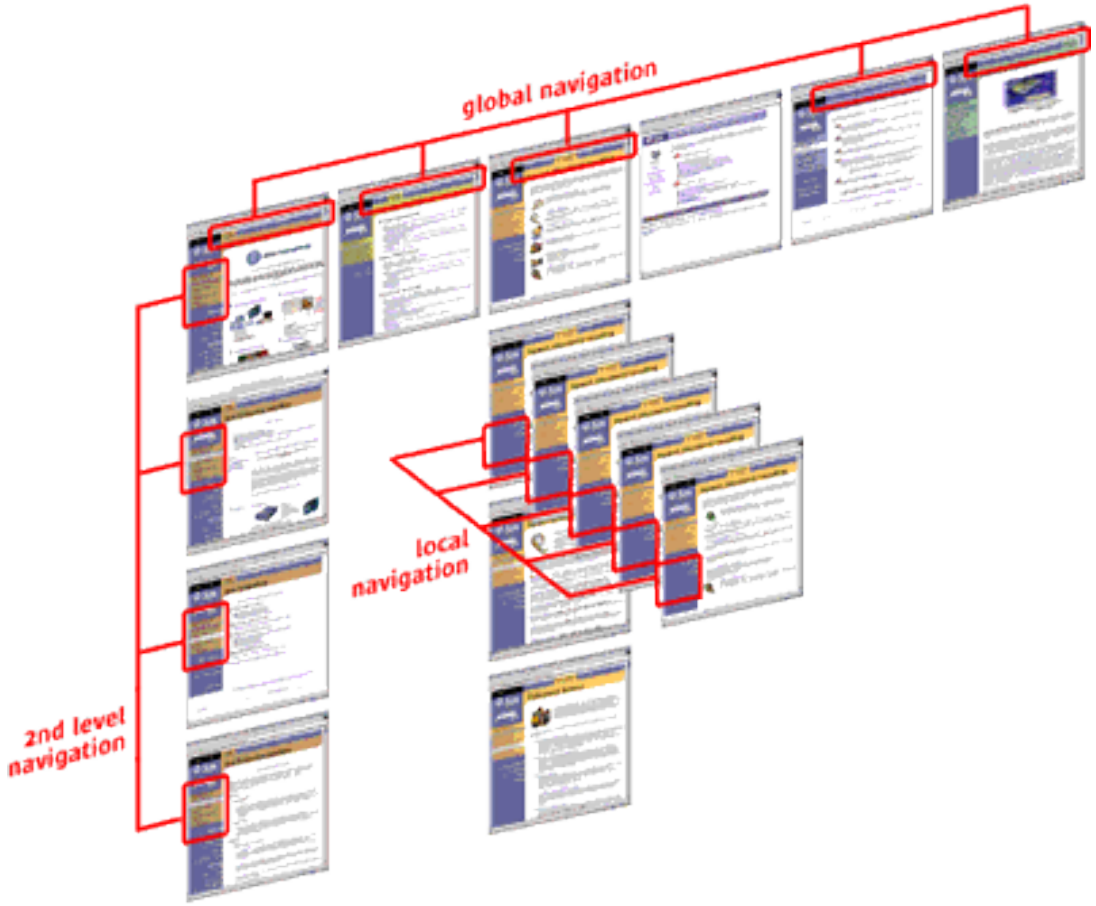
Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



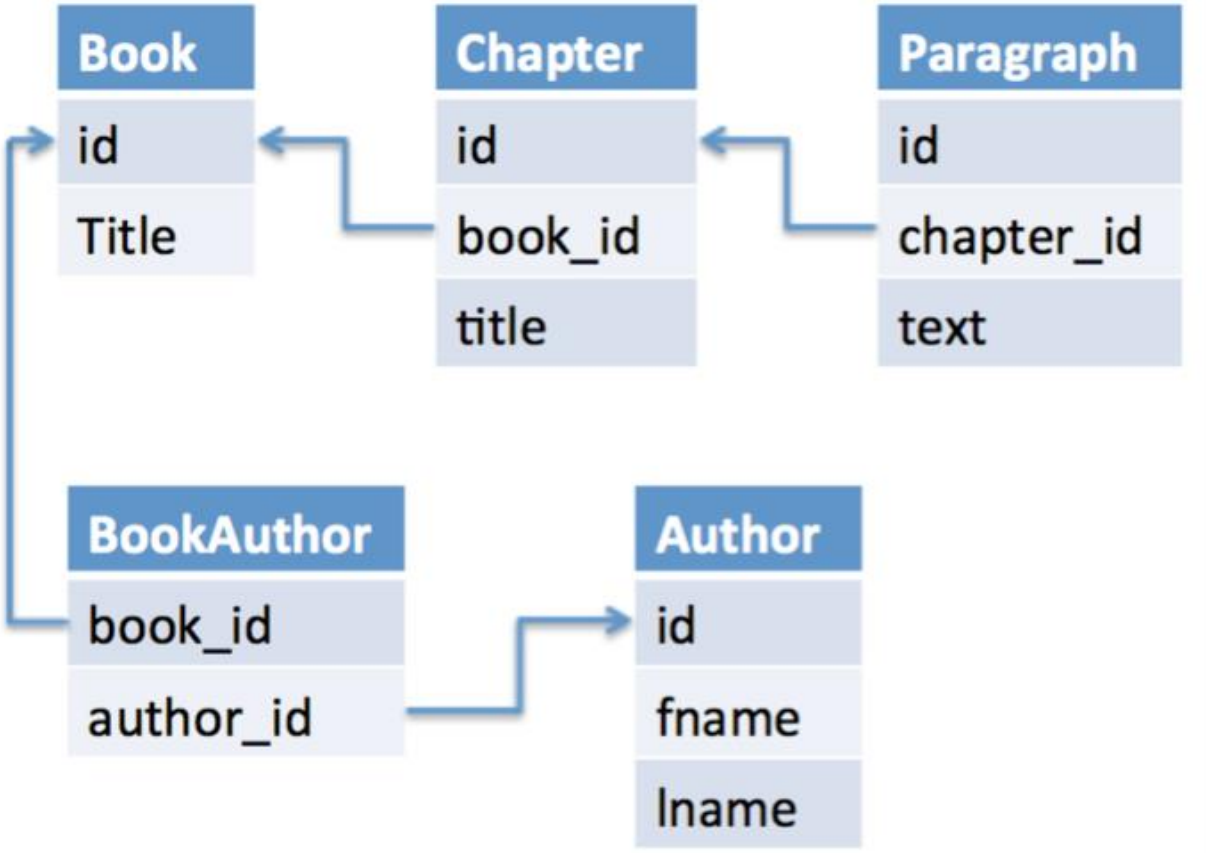
Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



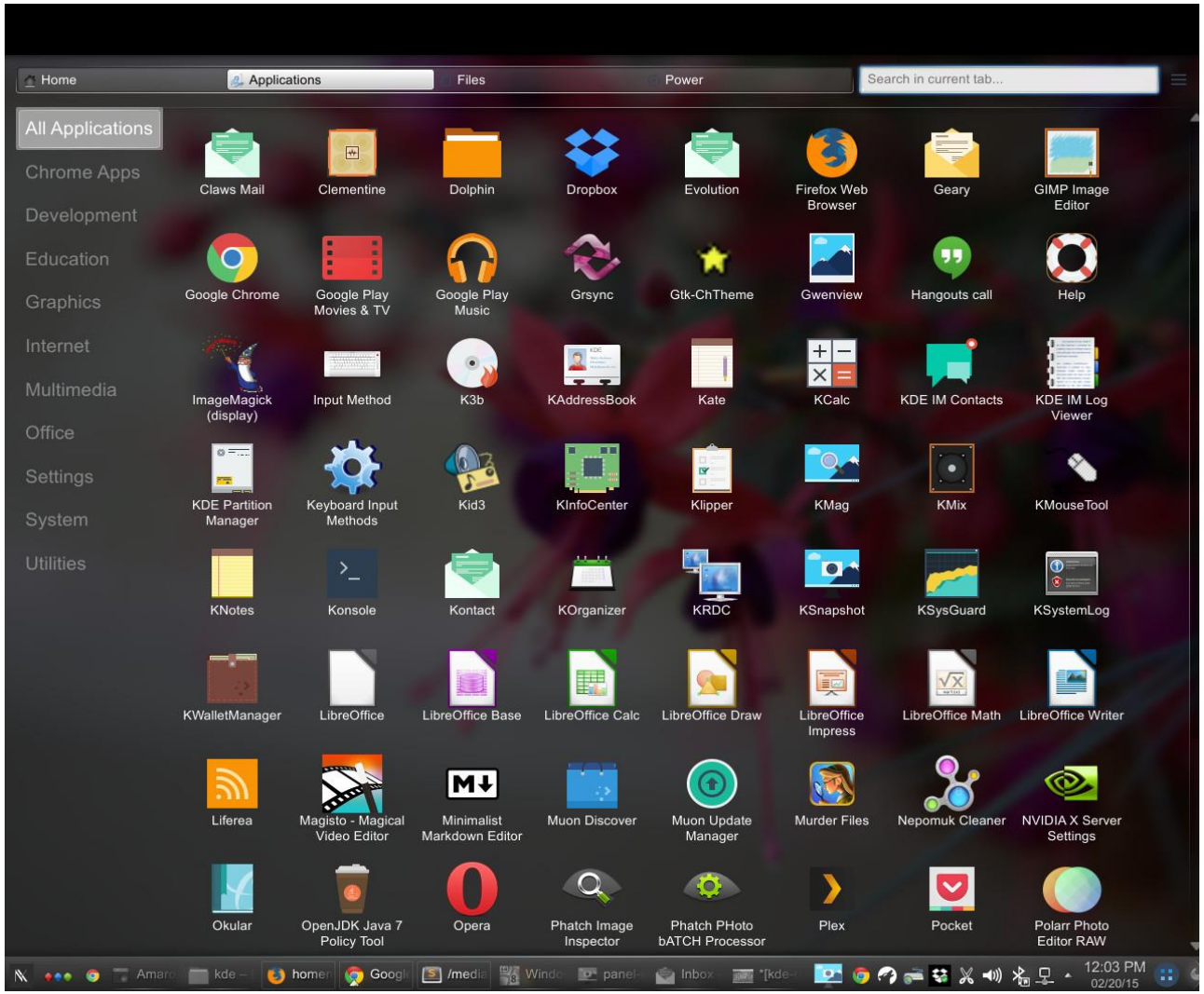
Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications



Ladder of abstraction

- Storage
- Encoding
- Formats
- Schemas
- Applications

Ladder of (text) abstraction

- Storage =>
- Encoding =>
- Formats =>
- Schemas =>
- Applications =>

Ladder of (text) abstraction

- Storage => Bits, Bytes, Binary
- Encoding => Coding schemes, character sets
- Formats => XML, JSON, TSV, Word, Excel, Zip, Text
- Schemas => HTML, RDF, TEI
- Applications => MS Word, MS Excel, MS Access, Text editors

Ladder of (text) abstraction

- Storage => Bits, Bytes, Binary
- Encoding => Coding schemes, character sets
- Formats => XML, JSON, TSV, Word, Excel, Zip, Text
- Schemas => HTML, RDF, TEI
- Applications => MS Word, MS Excel, MS Access, Text editors

Working with text methods and tools

Ladder of (text) abstraction

- Storage =
- Encoding = racter sets
- Formats = d, Excel, Zip, Text
- Schemas =
- Applications = MS

Wor ods

"Obsolete power corrupts obsoletely."
- Ted Nelson

The technology associated with interpreting the representation at each of the layers can change or become less available

https://en.wikipedia.org/wiki/Ted_Nelson

Storage

- Bits
- Bytes
- Binary
- Text

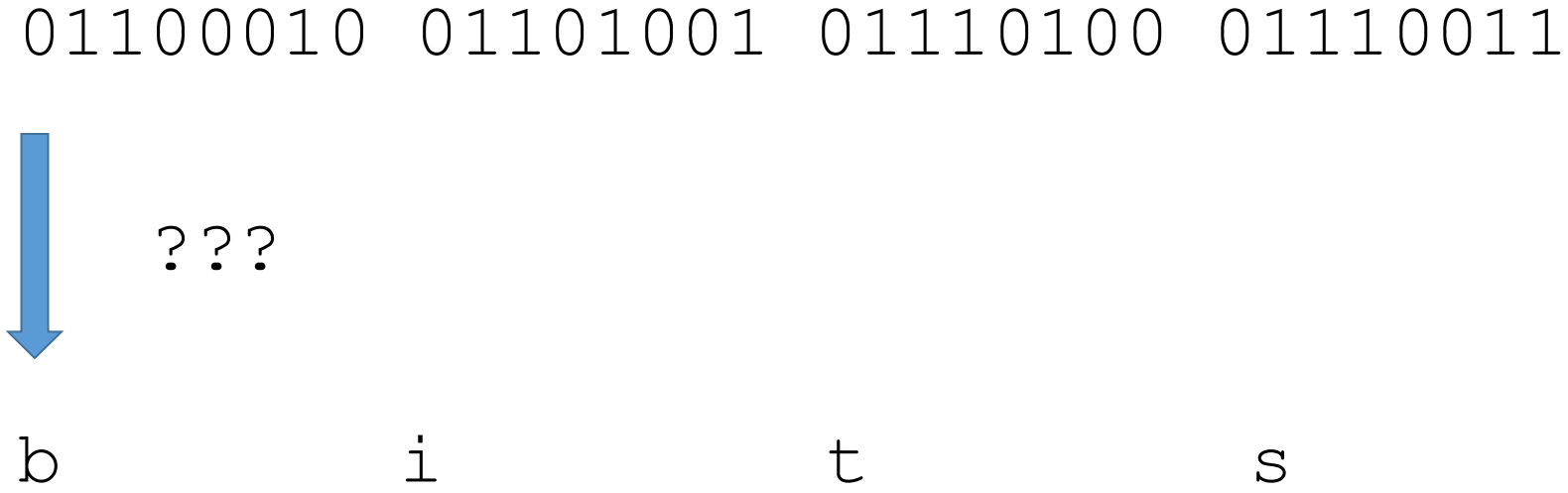
Storage

- Bits
- Bytes
- Binary
- Text

```
0 or 1
01100010
01100010 01101001 01110100 01110011
b        i        t        s
```

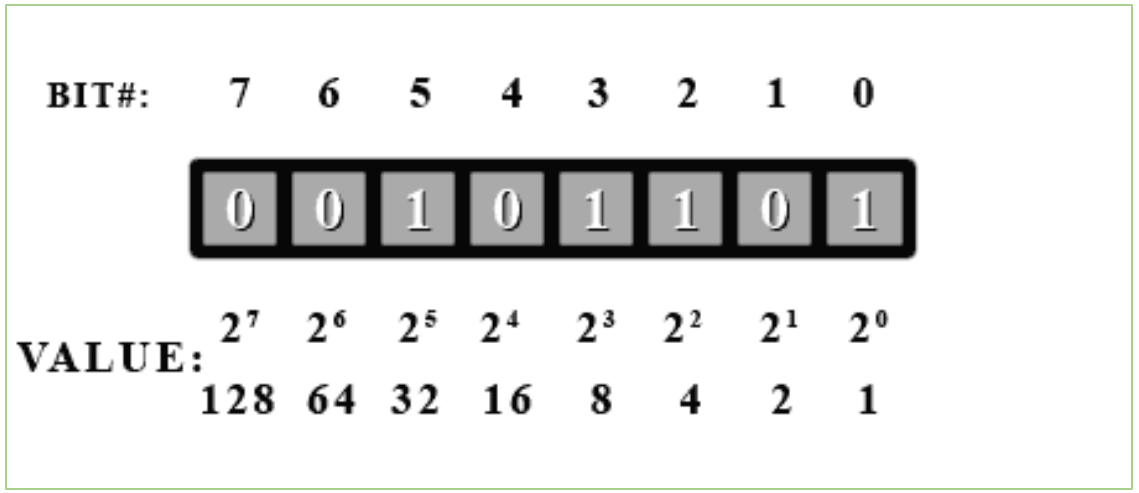
Storage

- Bits
- Bytes
- Binary
- Decimal
- Octal
- Hexadecimal
- Text



Storage

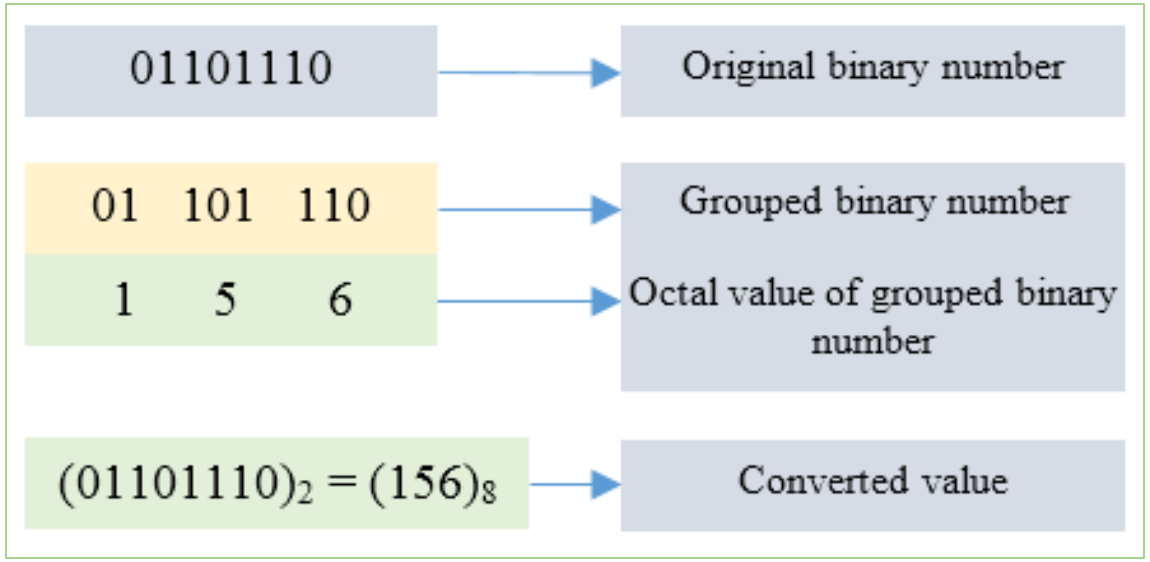
- Bits
- Bytes
- Binary
- Decimal
- Octal
- Hexadecimal
- Text



0 or 1			
01100010			
01100010	01101001	01110100	01110011
98	105	116	115
142	151	164	163
62	69	74	73
b	i	t	s

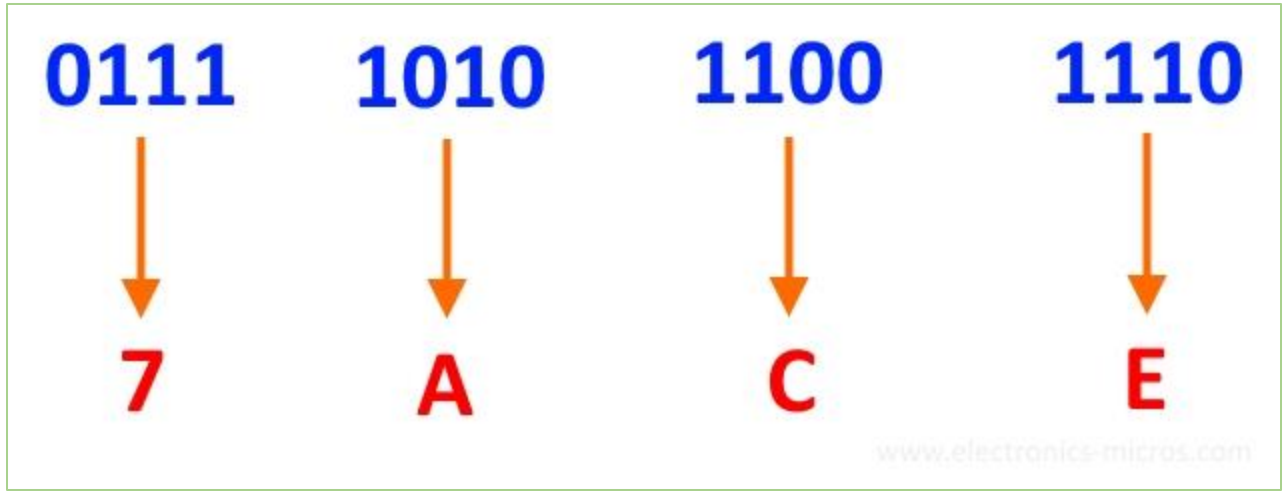
Storage

- Bits
- Bytes
- Binary
- Decimal
- Octal
- Hexadecimal
- Text




```
0 or 1
01100010
01100010 01101001 01110100 01110011
98       105      116      115
142      151      164      163
62       69       74       73
b        i        t        s
```

Storage

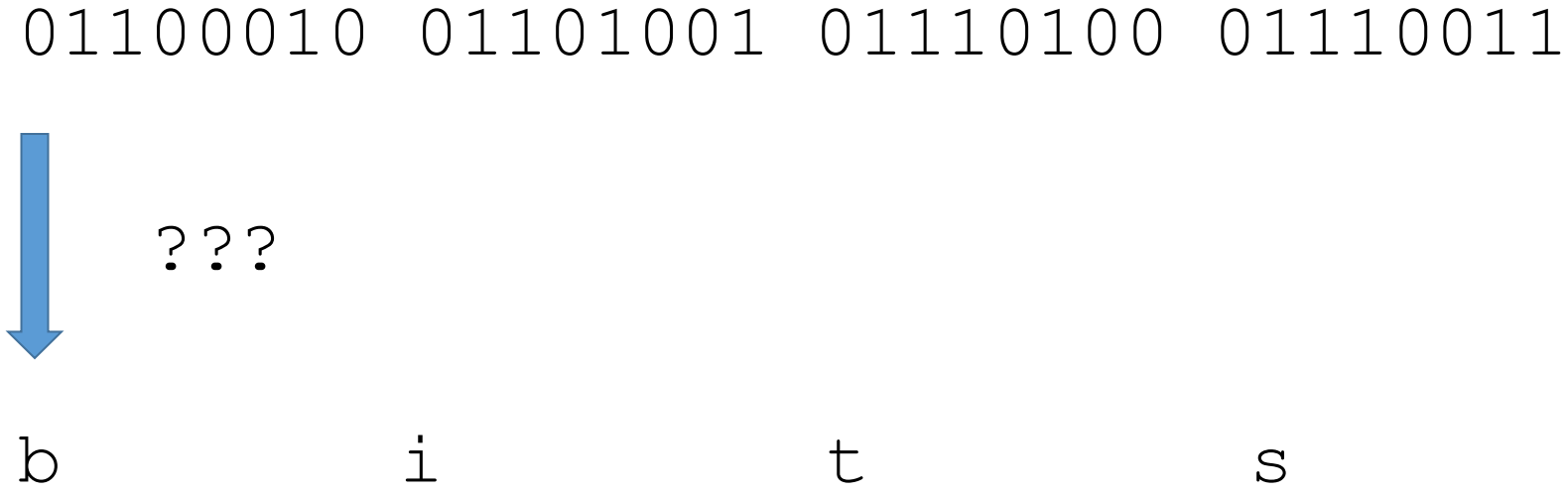


- Bits
- Bytes
- Binary
- Decimal
- Octal
- Hexadecimal
- Text

```
0 or 1
01100010
01100010 01101001 01110100 01110011
98       105      116      115
142      151      164      163
62       69       74       73
b        i        t        s
```

Storage

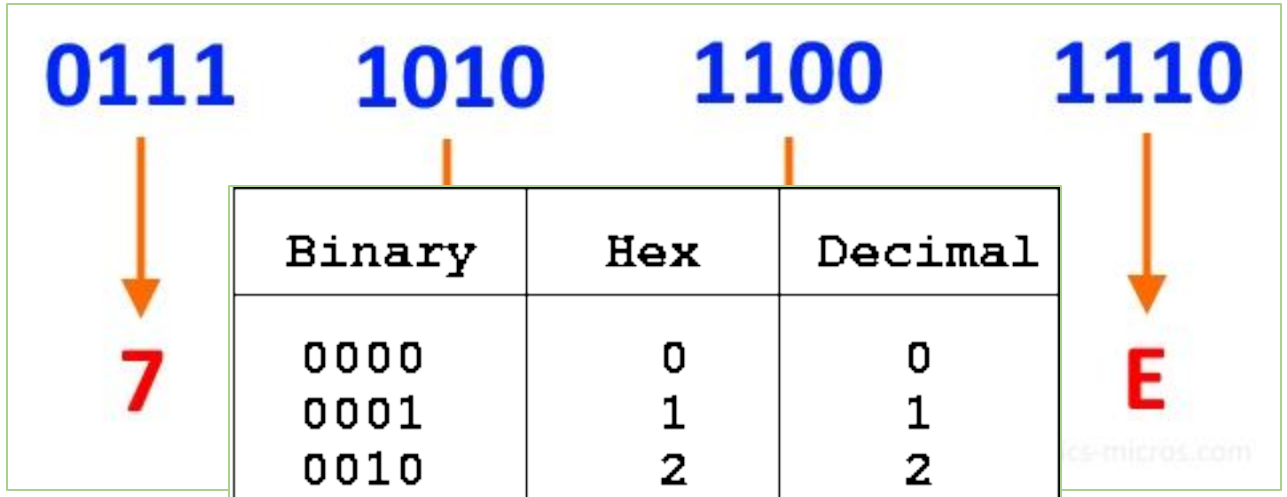
- Bits
- Bytes
- Binary
- Decimal
- Octal
- Hexadecimal
- Text



Storage

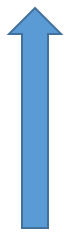
- Bits
- Bytes
- Binary
- Decimal
- Octal
- Hexadecimal
- Text

```
0 or 1
01100010
01100010 0110100
98       105
142      151
62       69
b        i
```



Binary	Hex	Decimal
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	A	10
1011	B	11
1100	C	12
1101	D	13
1110	E	14
1111	F	15

Encoding



Storage

Encoding

- Coding schemes
- Character sets

Encoding

- Coding schemes
- Character sets

- Definitions
  - encode – to convert into a coded form

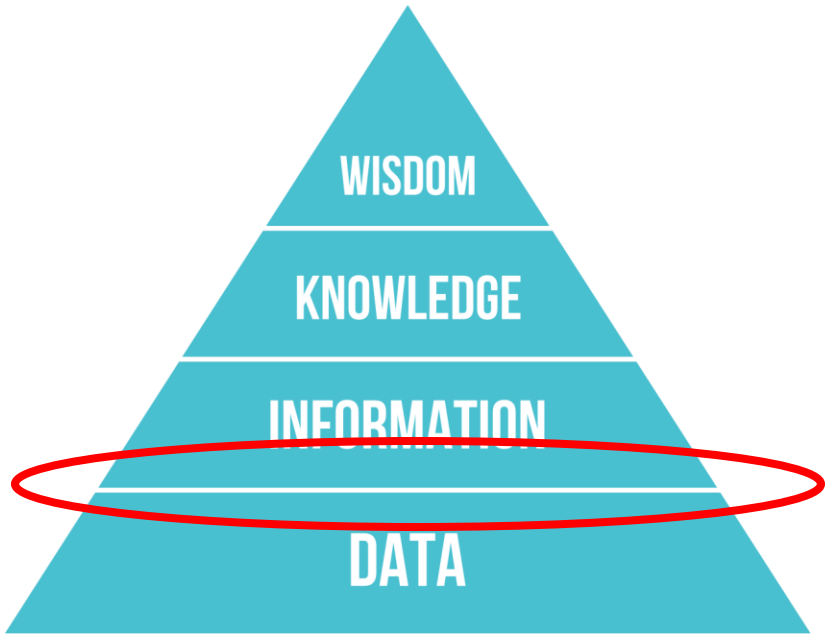
Encoding

- Coding schemes
- Character sets

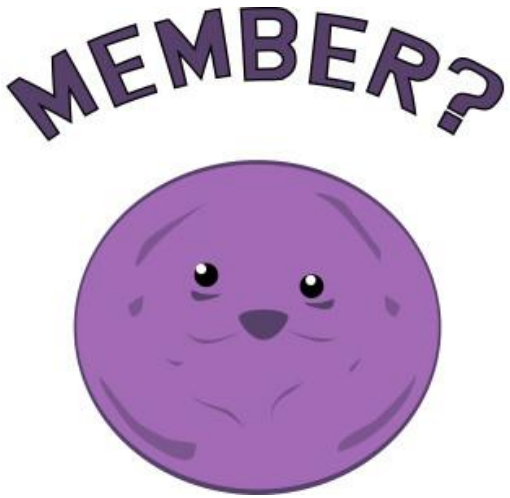
- Definitions
  - encode – to convert into a coded form
  - code – a system of words, letters, figures or symbols used to represent others

Encoding

- Coding schemes
- Character sets



- Definitions
  - encode – to convert into a coded form
  - code – a system of words, letters, figures or symbols used to represent others
  - Naming systems and structures!



Encoding

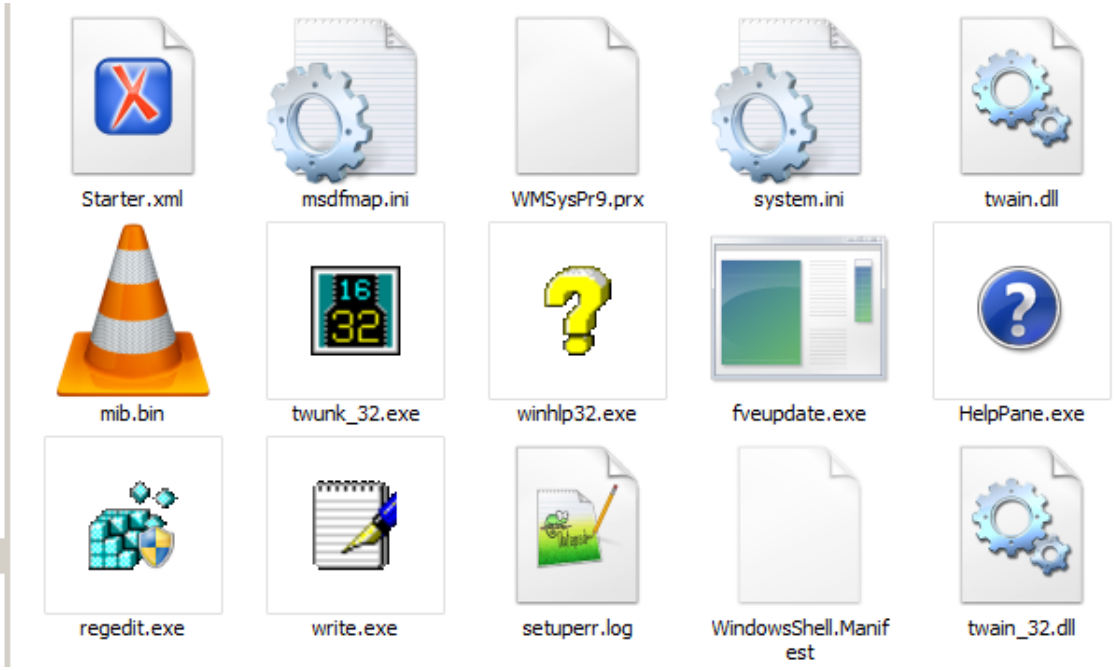
- Coding schemes
- Character sets

Binary	Hex	Decimal
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	A	10
1011	B	11
1100	C	12
1101	D	13

- Schemes
  - Numeric - Binary, Decimal, Octal, Hexadecimal

Encoding

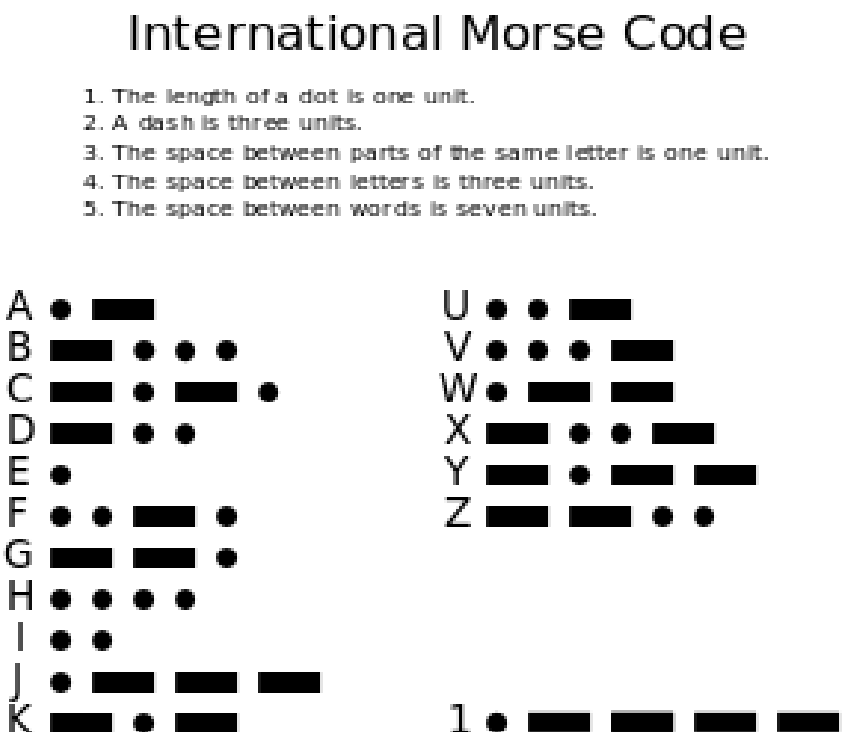
- Coding schemes
- Character sets



- Schemes
  - Numeric - Binary, Decimal, Octal, Hexadecimal
  - Binary – MP3, AVI, EXE

Encoding

- Coding schemes
- Character sets



- Schemes
  - Numeric - Binary, Decimal, Octal, Hexadecimal
  - Binary – MP3, AVI, EXE
  - Character – Braille, Morse code, ASCII, Unicode, ISO 8859-6 (Arabic)

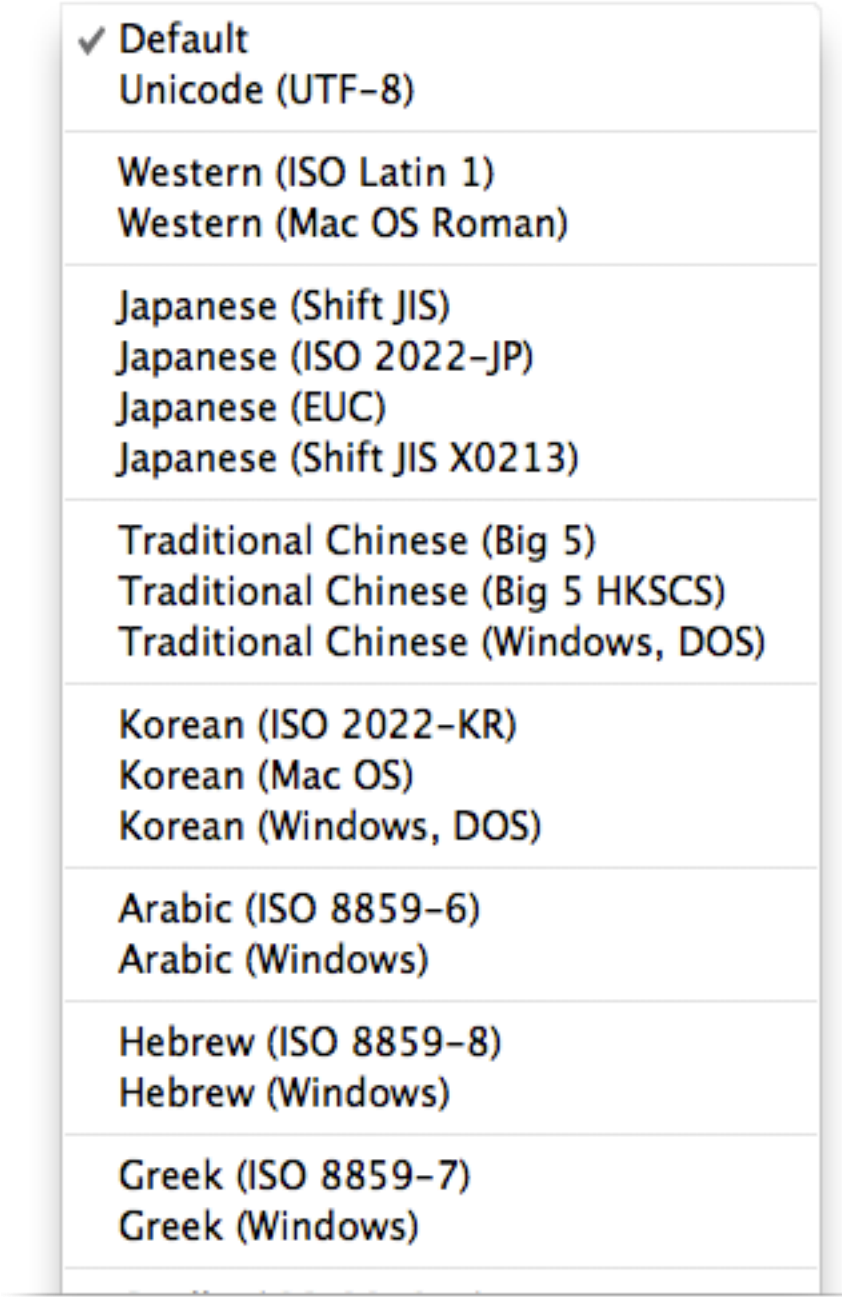
USASCII code chart

b_7 b_6 b_5 → / Bits					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b_4	b_3	b_2	b_1	Row ↓ Column →	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	|
1	1	0	1	13	CR	GS	-	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	_	o	DEL

Encoding

- Coding schemes
- Character sets

https://en.wikipedia.org/wiki/Character_encoding#Common_character_encodings



“ÉGÉìÉRÅ[ÉfÉBÉìÉOÇÕìÔÇµÇ≠Ç»Çȼ”

"エンコーディングは難しくない"

"Unicode replacement character" ﷽ (U+FFFD)

bits	encoding	characters
11000100 01000010	Windows Latin 1	ÄB
11000100 01000010	Mac Roman	ƒB
11000100 01000010	GB18030	腂

http://kunststube.net/encoding/

bits	encoding	characters
11000100 01000010	Windows Latin 1	ÄB
11000100 01000010	Mac Roman	*f*B
11000100 01000010	GB18030	腂

characters	encoding	bits
Føö	Windows Latin 1	01000110 11111000 11110110
Føö	Mac Roman	01000110 10111111 10011010
Føö	UTF-8	01000110 11000011 10111000 11000011 10110110

http://kunststube.net/encoding/

Encoding

- Coding schemes
- Character sets
  - ASCII
  - Unicode

Encoding

- Coding schemes
- Character sets
  - ASCII
  - Unicode

- Uses 7-bits
- 128 characters (‘code points’)
- 33 non-printing control characters
- 95 printable characters
  (incl. space and line break)

- Extended-ASCII uses 1-byte (8-bits) for 256 code points

ASCII TABLE

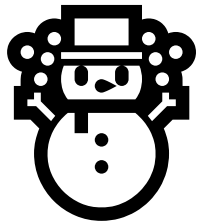
Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char
0	0	*[NULL]*	32	20	*[SPACE]*	64	40	@	96	60	`
1	1	*[START OF HEADING]*	33	21	!	65	41	A	97	61	a
2	2	*[START OF TEXT]*	34	22	"	66	42	B	98	62	b
3	3	*[END OF TEXT]*	35	23	#	67	43	C	99	63	c
4	4	*[END OF TRANSMISSION]*	36	24	$	68	44	D	100	64	d
5	5	*[ENQUIRY]*	37	25	%	69	45	E	101	65	e
6	6	*[ACKNOWLEDGE]*	38	26	&	70	46	F	102	66	f
7	7	*[BELL]*	39	27	'	71	47	G	103	67	g
8	8	*[BACKSPACE]*	40	28	(	72	48	H	104	68	h
9	9	*[HORIZONTAL TAB]*	41	29	)	73	49	I	105	69	i
10	A	*[LINE FEED]*	42	2A	*	74	4A	J	106	6A	j
11	B	*[VERTICAL TAB]*	43	2B	+	75	4B	K	107	6B	k
12	C	*[FORM FEED]*	44	2C	,	76	4C	L	108	6C	l
13	D	*[CARRIAGE RETURN]*	45	2D	-	77	4D	M	109	6D	m
14	E	*[SHIFT OUT]*	46	2E	.	78	4E	N	110	6E	n
15	F	*[SHIFT IN]*	47	2F	/	79	4F	O	111	6F	o
16	10	*[DATA LINK ESCAPE]*	48	30	0	80	50	P	112	70	p
17	11	*[DEVICE CONTROL 1]*	49	31	1	81	51	Q	113	71	q
18	12	*[DEVICE CONTROL 2]*	50	32	2	82	52	R	114	72	r
19	13	*[DEVICE CONTROL 3]*	51	33	3	83	53	S	115	73	s
20	14	*[DEVICE CONTROL 4]*	52	34	4	84	54	T	116	74	t
21	15	*[NEGATIVE ACKNOWLEDGE]*	53	35	5	85	55	U	117	75	u
22	16	*[SYNCHRONOUS IDLE]*	54	36	6	86	56	V	118	76	v
23	17	*[ENG OF TRANS. BLOCK]*	55	37	7	87	57	W	119	77	w
24	18	*[CANCEL]*	56	38	8	88	58	X	120	78	x
25	19	*[END OF MEDIUM]*	57	39	9	89	59	Y	121	79	y
26	1A	*[SUBSTITUTE]*	58	3A	:	90	5A	Z	122	7A	z
27	1B	*[ESCAPE]*	59	3B	;	91	5B	[	123	7B	{
28	1C	*[FILE SEPARATOR]*	60	3C	<	92	5C	\	124	7C	|
29	1D	*[GROUP SEPARATOR]*	61	3D	=	93	5D	]	125	7D	}
30	1E	*[RECORD SEPARATOR]*	62	3E	>	94	5E	^	126	7E	~
31	1F	*[UNIT SEPARATOR]*	63	3F	?	95	5F	_	127	7F	*[DEL]*

Encoding

- Coding schemes
- Character sets
  - ASCII
  - Unicode

- Multi-byte character encodings (UTF-8, UTF-16, UTF-32)
- 1,114,112 ‘code points’
- 135 modern and historic scripts

  and symbols

  9,731 stands for 
- Uses Code charts to organise

Encoding – different glyphs

and symbols

9,731 stands for 

- Uses Code charts to organise

and symbols

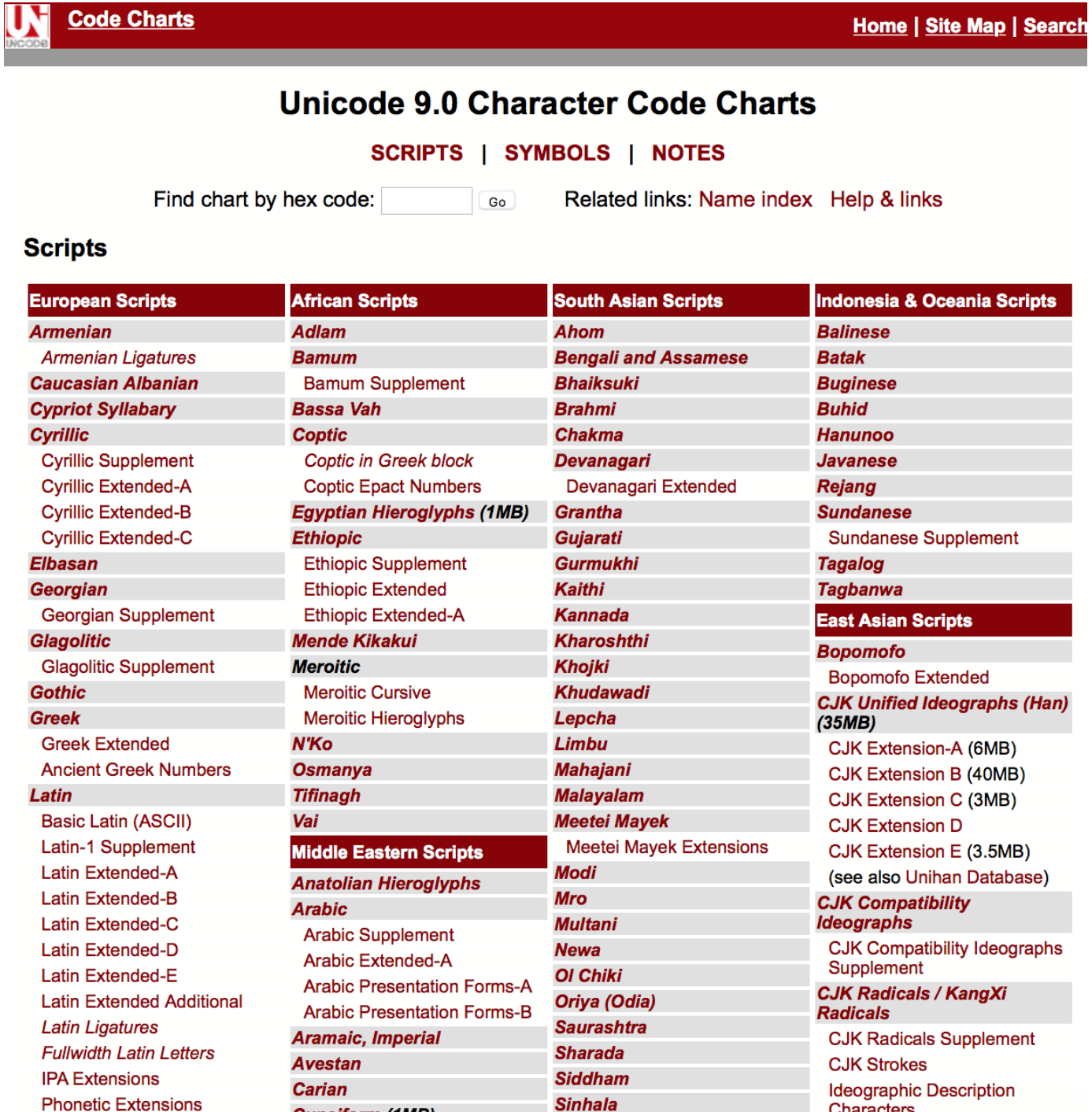
9,731 stands for 

- Uses Code charts to organise

Encoding

- Coding schemes
- Character sets
  - ASCII
  - Unicode

http://unicode.org/charts/



Code Charts

Home | Site Map | Search

Unicode 9.0 Character Code Charts

SCRIPTS | SYMBOLS | NOTES

Find chart by hex code: Go Related links: Name index Help & links

Scripts

European Scripts

- Armenian
- Armenian Ligatures
- Caucasian Albanian
- Cypriot Syllabary
- Cyrillic
- Cyrillic Supplement
- Cyrillic Extended-A
- Cyrillic Extended-B
- Cyrillic Extended-C
- Elbasan
- Georgian
- Georgian Supplement
- Glagolitic
- Glagolitic Supplement
- Gothic
- Greek
- Greek Extended
- Ancient Greek Numbers
- Latin
- Basic Latin (ASCII)
- Latin-1 Supplement
- Latin Extended-A
- Latin Extended-B
- Latin Extended-C
- Latin Extended-D
- Latin Extended-E
- Latin Extended Additional
- Latin Ligatures
- Fullwidth Latin Letters
- IPA Extensions
- Phonetic Extensions

African Scripts

- Adlam
- Bamum
- Bamum Supplement
- Bassa Vah
- Coptic
- Coptic in Greek block
- Coptic Epact Numbers
- Egyptian Hieroglyphs (1MB)
- Ethiopic
- Ethiopic Supplement
- Ethiopic Extended
- Ethiopic Extended-A
- Mende Kikakui
- Meroitic
- Meroitic Cursive
- Meroitic Hieroglyphs
- N'Ko
- Osmanya
- Tifinagh
- Vai

Middle Eastern Scripts

- Anatolian Hieroglyphs
- Arabic
- Arabic Supplement
- Arabic Extended-A
- Arabic Presentation Forms-A
- Arabic Presentation Forms-B
- Aramaic, Imperial
- Avestan
- Carian

South Asian Scripts

- Ahom
- Bengali and Assamese
- Bhaiksuki
- Brahmi
- Chakma
- Devanagari
- Devanagari Extended
- Grantha
- Gujarati
- Gurmukhi
- Kaithi
- Kannada
- Kharoshthi
- Khojki
- Khudawadi
- Lepcha
- Limbu
- Mahajani
- Malayalam
- Meetei Mayek
- Meetei Mayek Extensions
- Modi
- Mro
- Multani
- Newa
- Ol Chiki
- Oriya (Odia)
- Saurashtra
- Sharada
- Siddham
- Sinhala

Indonesia & Oceania Scripts

- Balinese
- Batak
- Buginese
- Buhid
- Hanunoo
- Javanese
- Rejang
- Sundanese
- Sundanese Supplement
- Tagalog
- Tagbanwa

East Asian Scripts

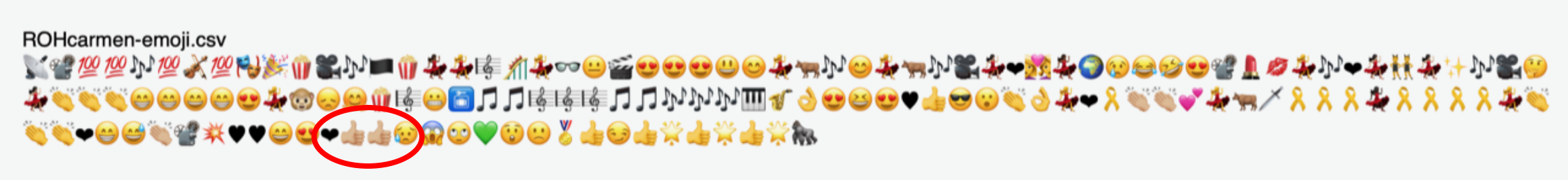
- Bopomofo
- Bopomofo Extended
- CJK Unified Ideographs (Han) (35MB)
- CJK Extension-A (6MB)
- CJK Extension B (40MB)
- CJK Extension C (3MB)
- CJK Extension D
- CJK Extension E (3.5MB)
- (see also Unihan Database)
- CJK Compatibility Ideographs
- CJK Compatibility Ideographs Supplement
- CJK Radicals / KangXi Radicals
- CJK Radicals Supplement
- CJK Strokes
- Ideographic Description Characters

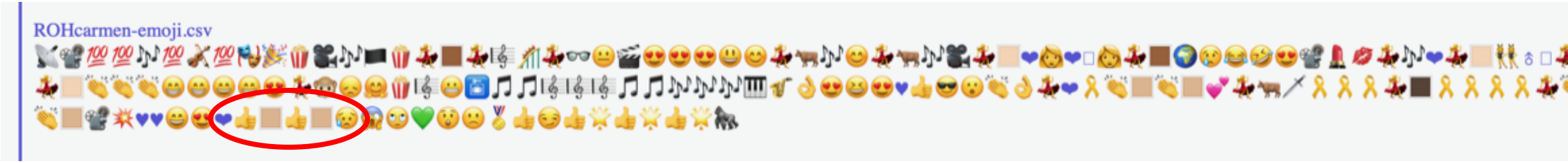
What Every Programmer Absolutely, Positively Needs To Know About Encodings And Character Sets To Work With Text

If you are dealing with text in a computer, you need to know about encodings. Period. Yes, even if you are just sending emails. Even if you are just *receiving* emails. You don't need to understand every last detail, but you must at least know what this whole "encoding" thing is about. And the good news first: while the topic *can* get messy and confusing, the basic idea is really, really simple.

David C. Zentgraf, http://kunststube.net/encoding/

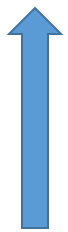
MS Outlook can corrupt multi-byte emoji





Could this encoding error be considered racist?

Formats



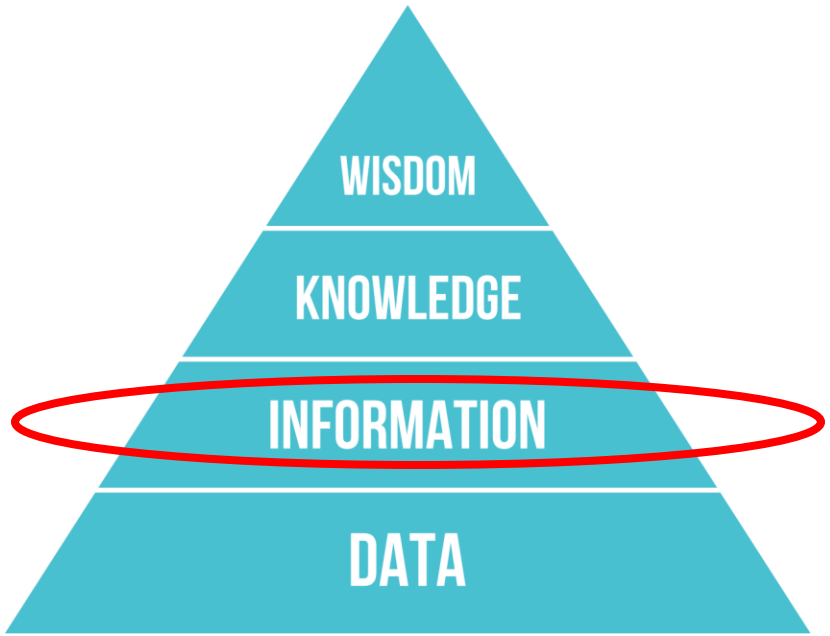
Encoding

Formats

- Information
- Informative

Formats

- Information
- Informative



Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text

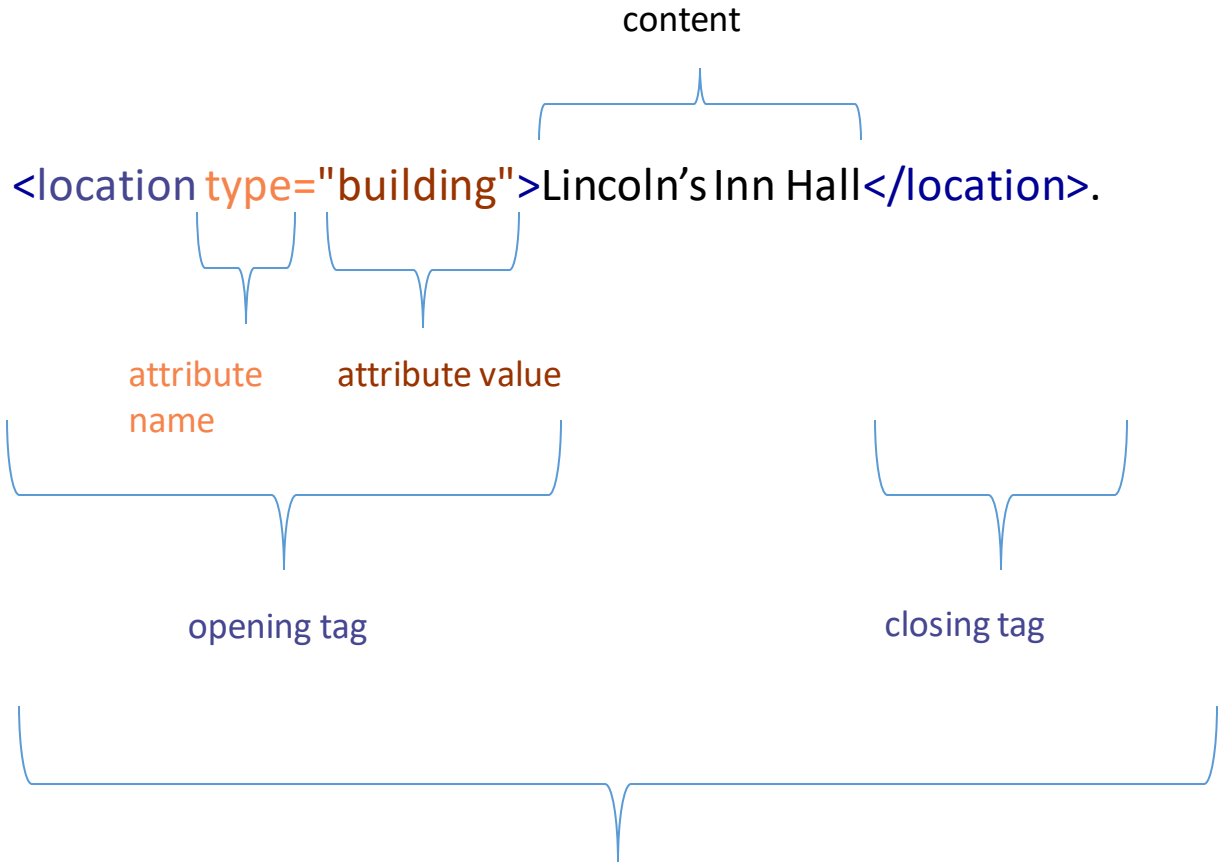
Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text

```
<publications>
 <publication>
  <pub_id>808</pub_id>
  <comp_id>70396</comp_id>
  <pagescans>
   <page order="1" number="vii" filename="scans/0808_0007_roman.png" title="Page vii"/>
   <page order="2" number="viii" filename="scans/0808_0008_roman.png" title="Page viii"/>
   <page order="3" number="ix" filename="scans/0808_0009_roman.png" title="Page ix"/>
   <page order="4" number="x" filename="scans/0808_0010_roman.png" title="Page x"/>
   <page order="5" number="xi" filename="scans/0808_0011_roman.png" title="Page xi"/>
   <page order="6" number="xii" filename="scans/0808_0012_roman.png" title="Page xii"/>
   <page order="7" number="xiii" filename="scans/0808_0013_roman.png" title="Page xiii"/>
   <page order="8" number="xiv" filename="scans/0808_0014_roman.png" title="Page xiv"/>
   <page order="9" number="xv" filename="scans/0808_0015_roman.png" title="Page xv"/>
   <page order="10" number="xvi" filename="scans/0808_0016_roman.png" title="Page xvi"/>
  </pagescans>
 </publication>
 <publication>
  <pub_id>808</pub_id>
  <comp_id>70397</comp_id>
  <pagescans>
   <page order="1" number="1" filename="scans/0808_0001_arabic.png" title="Page 1"/>
   <page order="2" number="2" filename="scans/0808_0002_arabic.png" title="Page 2"/>
  </pagescans>
 </publication>
```

Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text



XML Anatomy

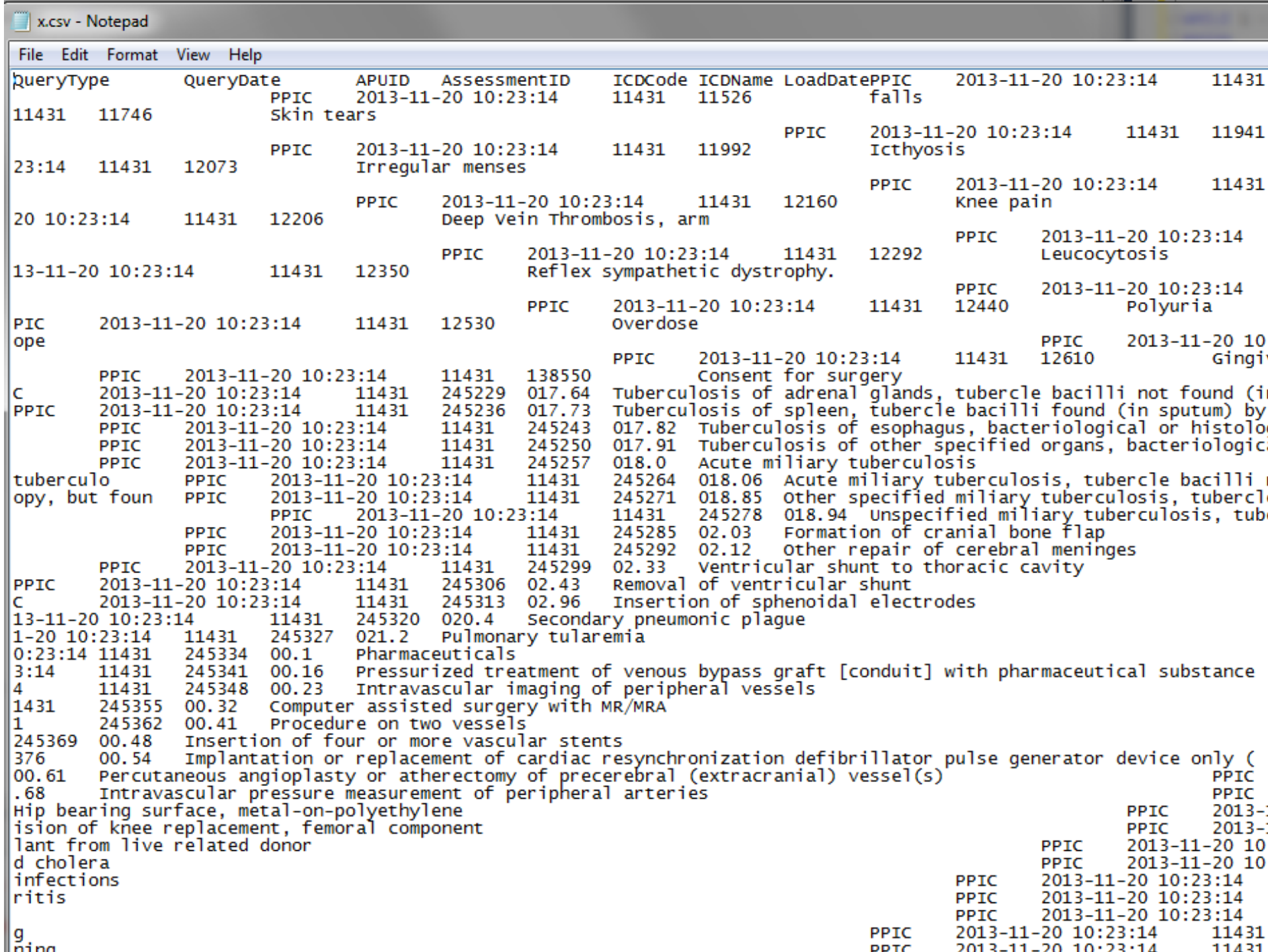
Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text


```
{
  "firstName": "John",
  "lastName": "Smith",
  "isAlive": true,
  "age": 25,
  "address": {
    "streetAddress": "21 2nd Street",
    "city": "New York",
    "state": "NY",
    "postalCode": "10021-3100"
  },
  "phoneNumbers": [
    {
      "type": "home",
      "number": "212 555-1234"
    },
    {
      "type": "office",
      "number": "646 555-4567"
    },
    {
      "type": "mobile",
      "number": "123 456-7890"
    }
  ],
  "children": [],
  "spouse": null
}
```

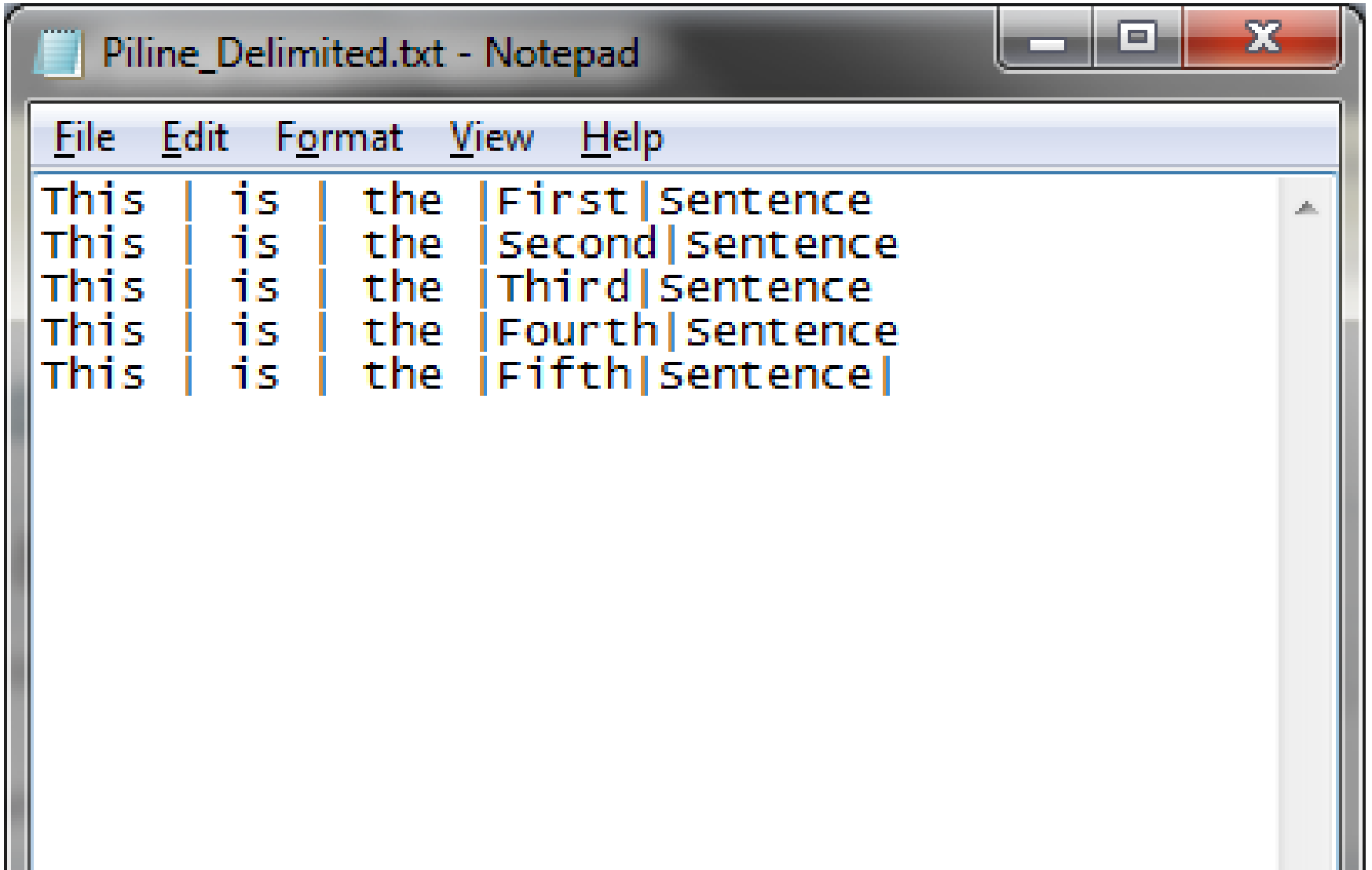
Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text



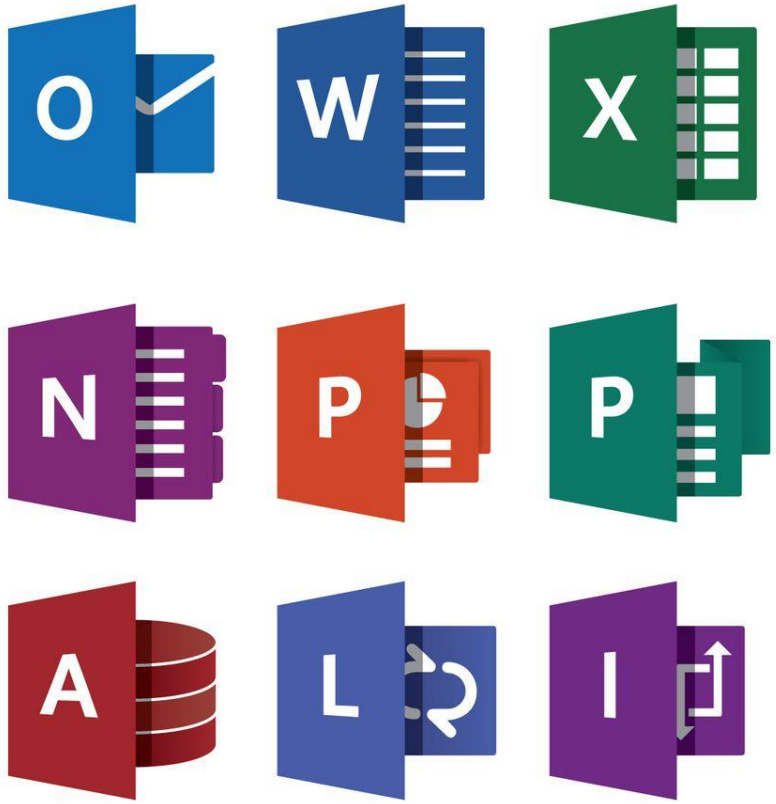
Formats

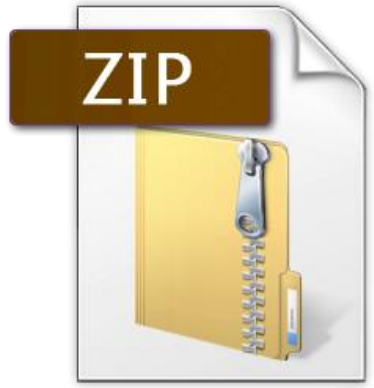
- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text



Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text





Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text

Proprietary formats
Binary encoding

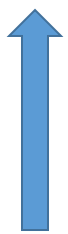
Formats

- XML
- JSON
- TSV
- Word
- Excel
- PDF
- Zip
- Text

Open formats
Text encoding

demo (head and tail)

Schema



Formats

Schema

- Data

schema

/ˈskiːmə/

noun
noun: **schema**; plural noun: **schemata**; plural noun: **schemas**

1. *technical*
   a representation of a plan or theory in the form of an outline or model.
   "a schema of scientific reasoning"
2. LOGIC
   a syllogistic figure.
3. (in Kantian philosophy) a conception of what is common to all members of a class; a general or essential type or form.

Origin

GREEK

skhēma → schema
form, figure — *late 18th century*

late 18th century (as a term in philosophy): from Greek *skhēma* 'form, figure'.

Translate schema to Choose language

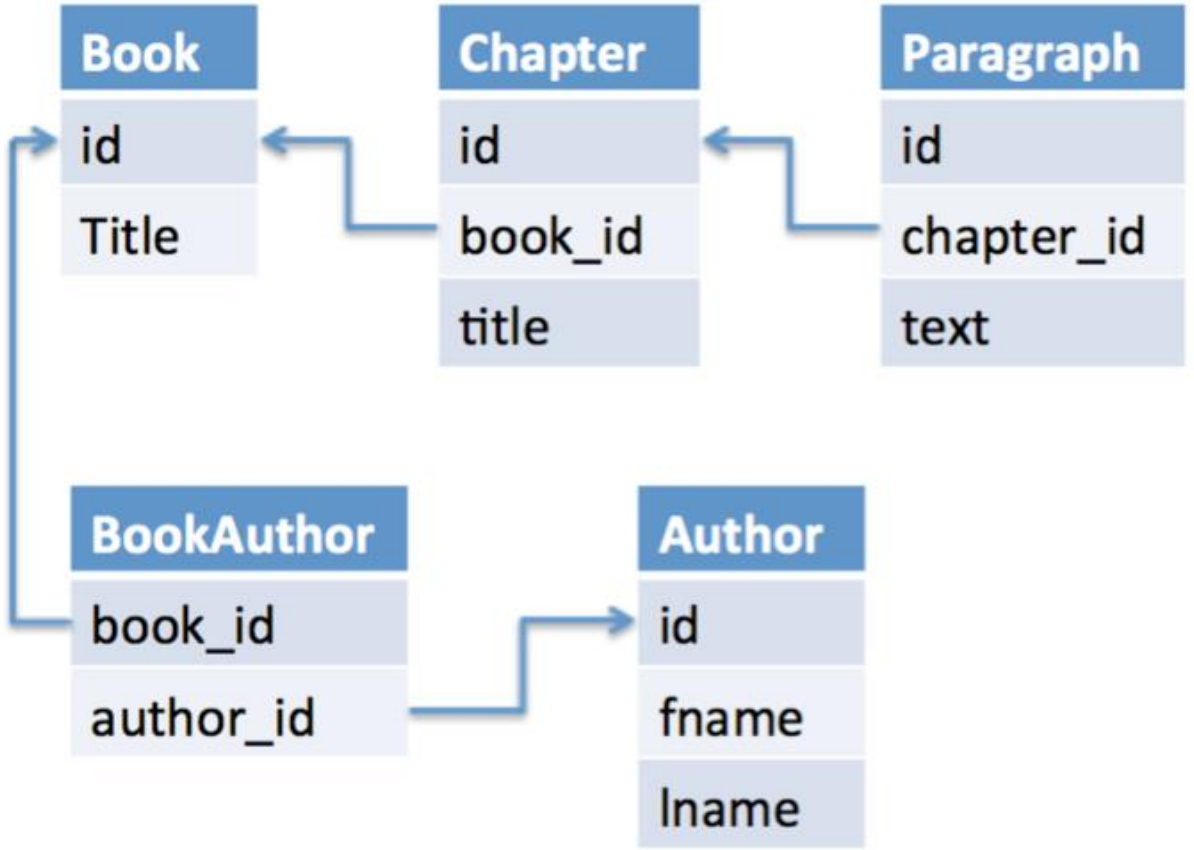
Use over time for: schema

Schema

- Data
- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values

Schema

- Data
- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values



Schema (text)

- HTML
- RDF
- TEI

Schema

- HTML
- RDF
- TEI

- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values

What is HTML?

HTML is the Web's core language for creating content for everyone to use anywhere.

```
<!DOCTYPE html>
<html>
<title>Story</title>
<h1>My Story</h1>
<p>One upon a time,
  …</p>
</html>
```

Fig 1. HTML source code

Schema

- HTML
- RDF
- TEI

- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values

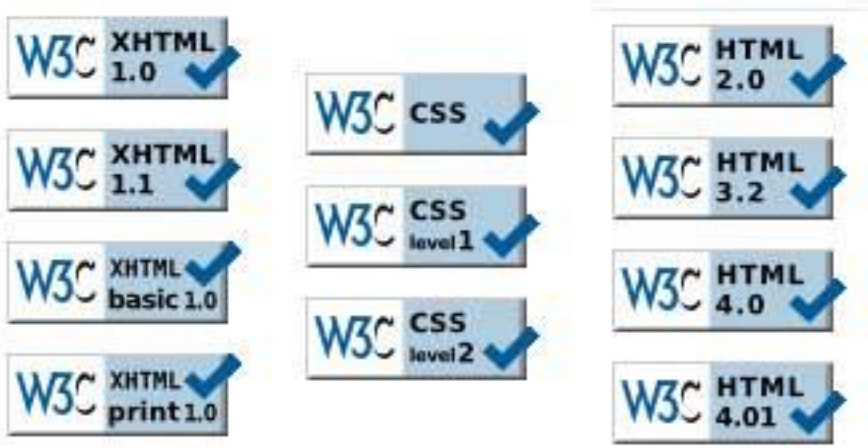
```
<!DOCTYPE html>
<html>
<title>Story</title>
<h1>My Story</h1>
<p>One upon a time,
  …</p>
</html>
```

Fig 1. HTML source code

Schema

- HTML
- RDF
- TEI

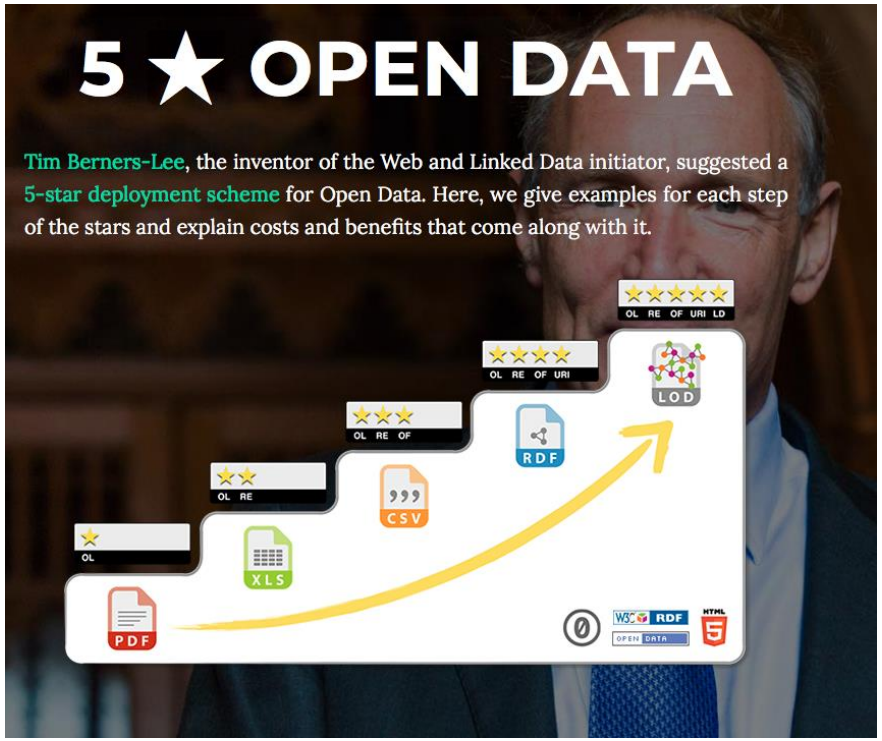
- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values



https://www.w3.org

Schema

- HTML
- RDF
- TEI



- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values

In standard N-Triples format, this RDF can be written as:

```
<http://www.w3.org/People/EM/contact#me> <http://www.w3.org/2000/10/swap/pim/contact#fullName> "Eric Miller" .
<http://www.w3.org/People/EM/contact#me> <http://www.w3.org/2000/10/swap/pim/contact#mailbox>
<mailto:e.miller123(at)example> .
<http://www.w3.org/People/EM/contact#me> <http://www.w3.org/2000/10/swap/pim/contact#personalTitle> "Dr." .
<http://www.w3.org/People/EM/contact#me> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type>
<http://www.w3.org/2000/10/swap/pim/contact#Person> .
```

Equivalently, it can be written in standard Turtle (syntax) format as:

```
@prefix eric:    <http://www.w3.org/People/EM/contact#> .
@prefix contact: <http://www.w3.org/2000/10/swap/pim/contact#> .
@prefix rdf:     <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .

eric:me contact:fullName "Eric Miller" .
eric:me contact:mailbox <mailto:e.miller123(at)example> .
eric:me contact:personalTitle "Dr." .
eric:me rdf:type contact:Person .
```

Or, it can be written in RDF/XML format as:

```
<?xml version="1.0" encoding="utf-8"?>
<rdf:RDF xmlns:contact="http://www.w3.org/2000/10/swap/pim/contact#" xmlns:eric="http://www.w3.org/People/EM/contact#"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">
  <rdf:Description rdf:about="http://www.w3.org/People/EM/contact#me">
    <contact:fullName>Eric Miller</contact:fullName>
  </rdf:Description>
  <rdf:Description rdf:about="http://www.w3.org/People/EM/contact#me">
    <contact:mailbox rdf:resource="mailto:e.miller123(at)example"/>
  </rdf:Description>
  <rdf:Description rdf:about="http://www.w3.org/People/EM/contact#me">
    <contact:personalTitle>Dr.</contact:personalTitle>
  </rdf:Description>
  <rdf:Description rdf:about="http://www.w3.org/People/EM/contact#me">
    <rdf:type rdf:resource="http://www.w3.org/2000/10/swap/pim/contact#Person"/>
  </rdf:Description>
</rdf:RDF>
```

Schema

- HTML
- RDF
- TEI https://en.wikipedia.org/wiki/Text_Encoding_Initiative

- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values

Schema

- HTML
- RDF
- TEI

- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values

Prose tags [edit]

TEI allows texts to be marked up syntactically at any level of granularity, or mixtur
sentences (s) and clauses (cl).[8]

```
<s>
 <cl>It was about the beginning of September, 1664,
 <cl>that I, among the rest of my neighbours,
      heard in ordinary discourse
  <cl>that the plague was returned again to Holland; </cl
  </cl>
 </cl>
 <cl>for it had been very violent there, and particularly
    Amsterdam and Rotterdam, in the year 1663, </cl>
 <cl>whither, <cl>they say,</cl> it was brought,
 <cl>some said</cl> from Italy, others from the Levant, a
 <cl>which were brought home by their Turkey fleet;</cl>
 </cl>
 <cl>others said it was brought from Candia;
    others from Cyprus. </cl>
</s>
<s>
 <cl>It mattered not <cl>from whence it came;</cl>
 </cl>
 <cl>but all agreed <cl>it was come into Holland again.</
 </cl>
</s>
```

Schema

- HTML
- RDF
- TEI

- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values

Verse [edit]

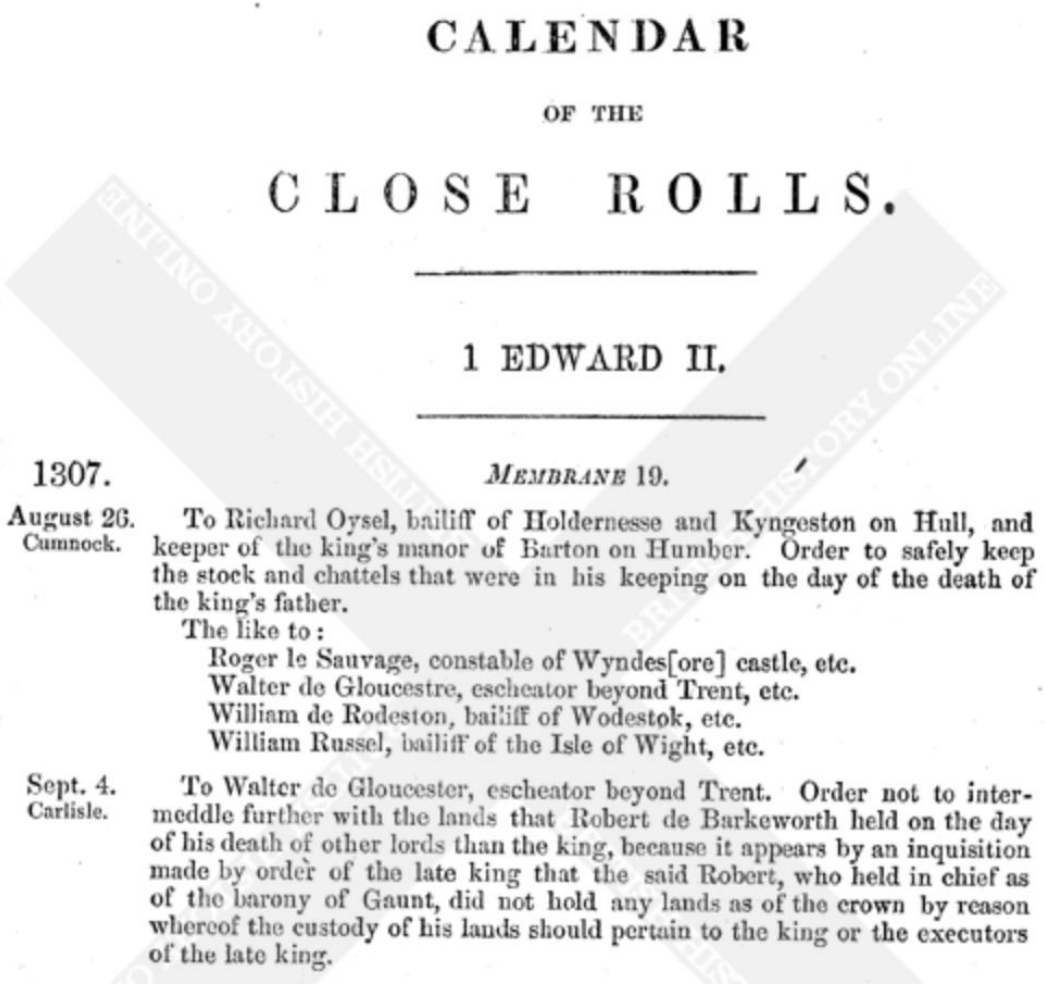
TEI has tags for marking up verse. This example (taken from the French translation

```
<div type="sonnet">
 <lg type="quatrain">
  <l>Les amoureux fervents et les savants austères</l>
  <l> Aiment également, dans leur mûre saison,</l>
  <l> Les chats puissants et doux, orgueil de la maison,</l
  <l> Qui comme eux sont frileux et comme eux sédentaires.<
 </lg>
 <lg type="quatrain">
  <l>Amis de la science et de la volupté</l>
  <l> Ils cherchent le silence et l'horreur des ténèbres ;<
  <l> L'Érèbe les eût pris pour ses coursiers funèbres,</l>
  <l> S'ils pouvaient au servage incliner leur fierté.</l>
 </lg>
 <lg type="tercet">
  <l>Ils prennent en songeant les nobles attitudes</l>
  <l>Des grands sphinx allongés au fond des solitudes,</l>
  <l>Qui semblent s'endormir dans un rêve sans fin ;</l>
 </lg>
 <lg type="tercet">
  <l>Leurs reins féconds sont pleins d'étincelles magiques,
  <l> Et des parcelles d'or, ainsi qu'un sable fin,</l>
  <l>Étoilent vaguement leurs prunelles mystiques.</l>
 </lg>
</div>
```

Schema

- HTML
- RDF
- TEI

- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values
  - Syntax, Marks, Typographical structures



CALENDAR

OF THE

CLOSE ROLLS.

1 EDWARD II.

1307. *Membrane* 19.

August 26. Cumnock. To Richard Oysel, bailiff of Holdernesse and Kyngeston on Hull, and keeper of the king's manor of Barton on Humber. Order to safely keep the stock and chattels that were in his keeping on the day of the death of the king's father.

The like to:

Roger le Sauvage, constable of Wyndes[ore] castle, etc.
Walter de Gloucestre, escheator beyond Trent, etc.
William de Rodeston, bailiff of Wodestok, etc.
William Russel, bailiff of the Isle of Wight, etc.

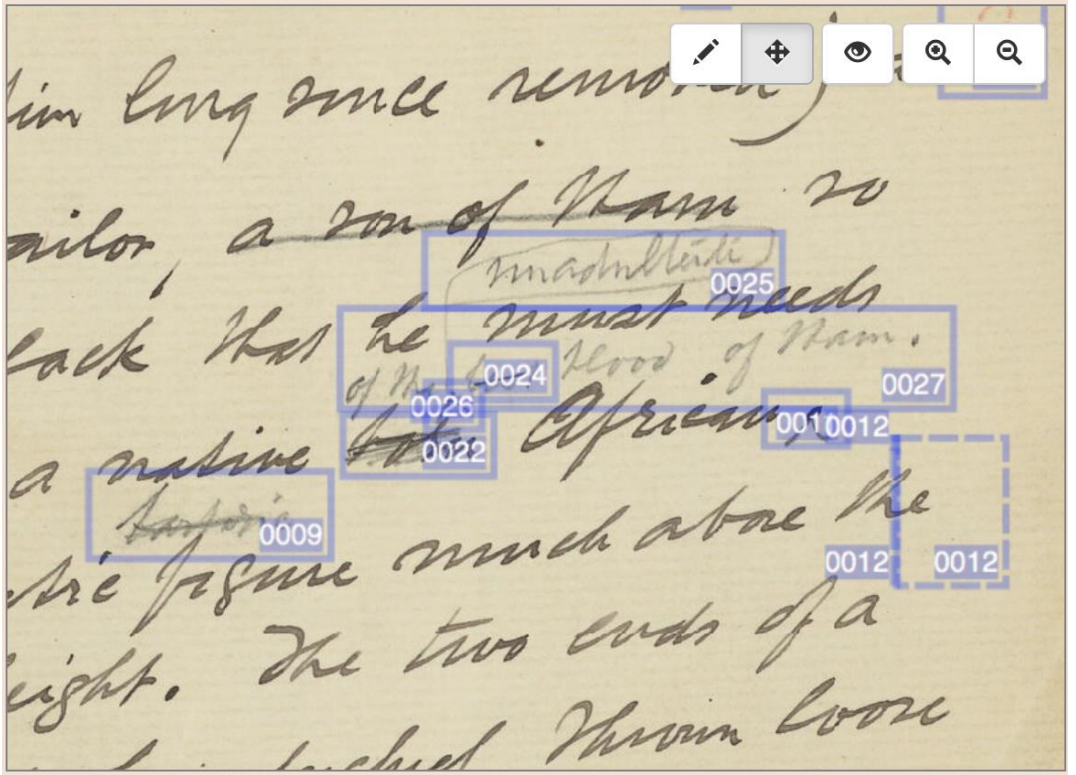
Sept. 4. Carlisle. To Walter de Gloucester, escheator beyond Trent. Order not to intermeddle further with the lands that Robert de Barkeworth held on the day of his death of other lords than the king, because it appears by an inquisition made by order of the late king that the said Robert, who held in chief as of the barony of Gaunt, did not hold any lands as of the crown by reason whereof the custody of his lands should pertain to the king or the executors of the late king.

http://www.british-history.ac.uk/cal-close-rolls/edw2/vol1/p1

Schema

- HTML
- RDF
- TEI

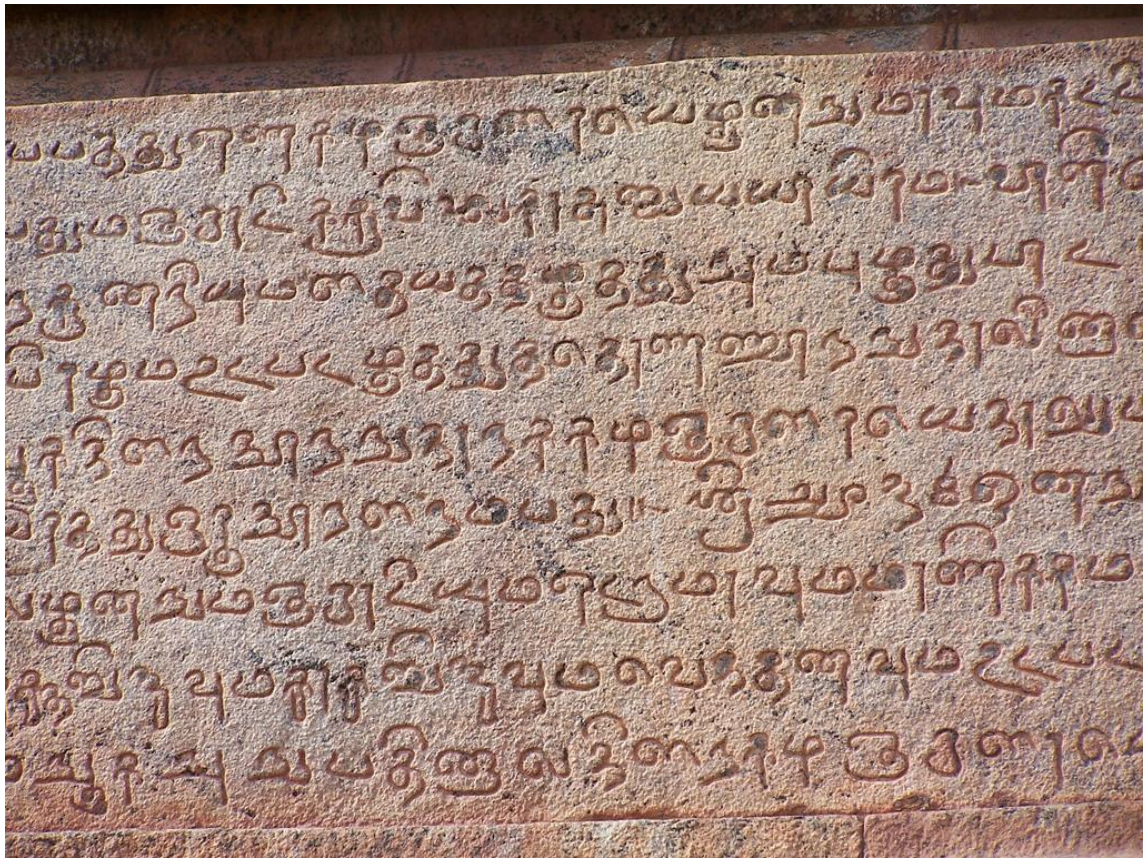
- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values
  - Syntax, Content



Schema

- HTML
- RDF
- TEI

- Standards for representing
  - Structures, Relationships
  - Entities, Attributes, Values
  - Syntax, Content
  - + encoding



https://en.wikipedia.org/wiki/Linguistics#/media/File:Ancient_Tamil_Script.jpg

Code Charts

Home | Site Map | Search

Unicode 9.0 Character Code Charts

http://www.unicode.org/charts/PDF/U0B80.pdf

SCRIPTS | SYMBOLS | NOTES

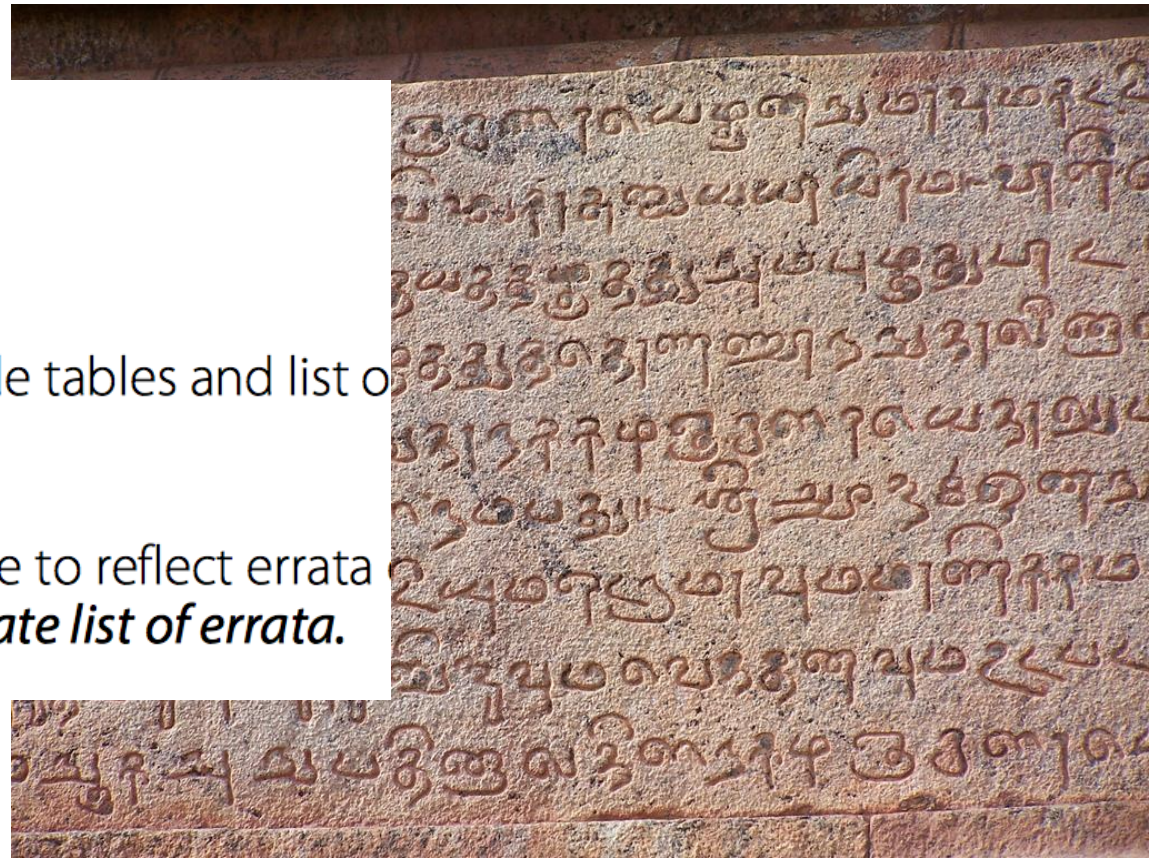
Tamil

Range: 0B80–0BFF

This file contains an excerpt from the character code tables and list o
The Unicode Standard, Version 9.0

This file may be changed at any time without notice to reflect errata
See http://www.unicode.org/errata/ for an up-to-date list of errata.

- Syntax, Content
- + encoding



https://en.wikipedia.org/wiki/Linguistics#/media/File:Ancient_Tamil_Script.jpg

Code Charts

Home | Site Map | Search

Unicode 9.0 Character Code Charts

http://www.unicode.org/charts/PDF/U0B80.pdf

SCRIPTS | SYMBOLS | NOTES

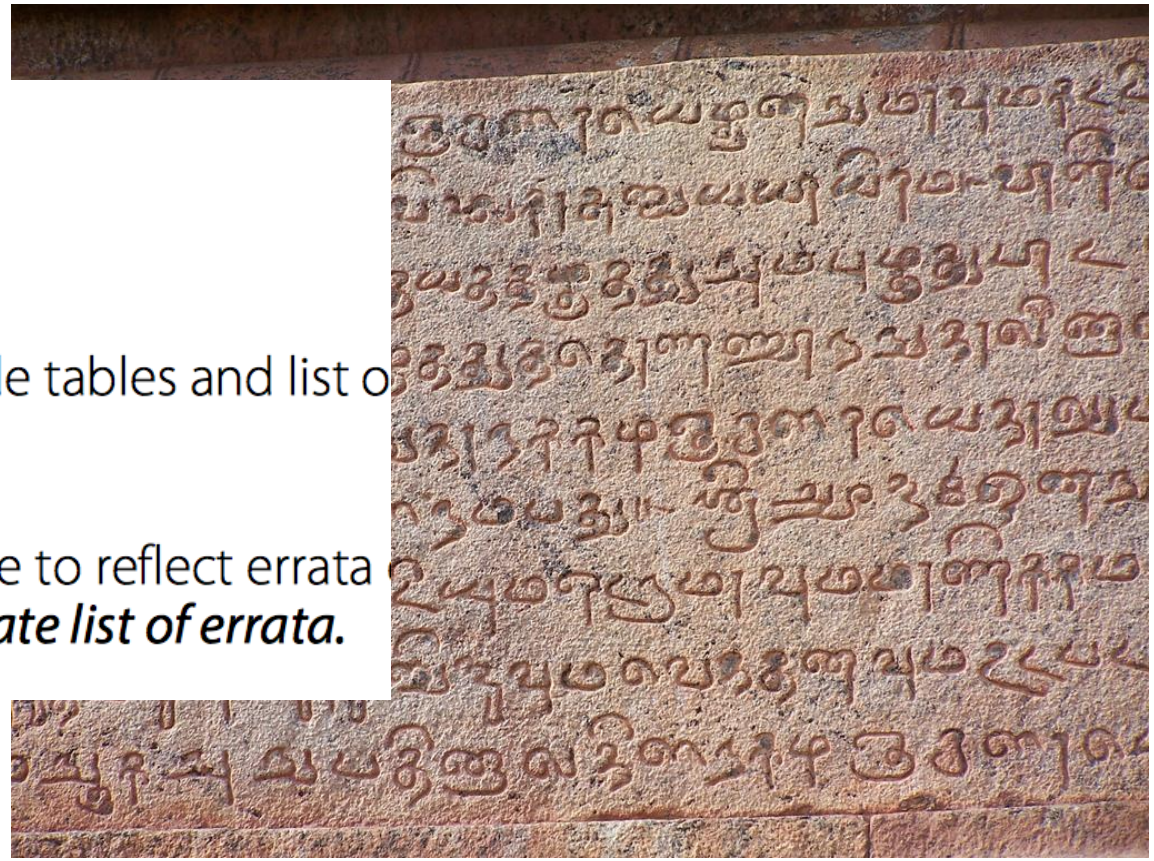
Tamil ← not ancient

Range: 0B80–0BFF

This file contains an excerpt from the character code tables and list o
The Unicode Standard, Version 9.0

This file may be changed at any time without notice to reflect errata
See http://www.unicode.org/errata/ for an up-to-date list of errata.

- Syntax, Content
- + encoding ←



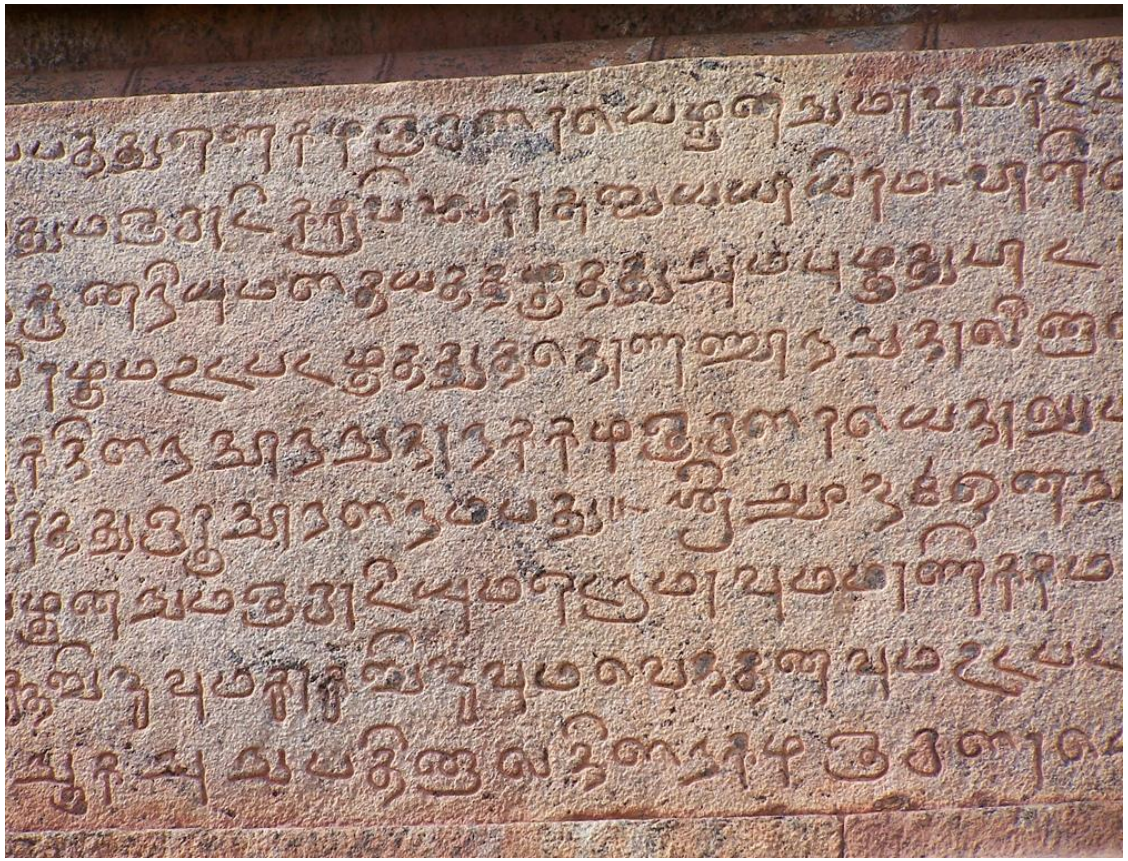
https://en.wikipedia.org/wiki/Linguistics#/media/File:Ancient_Tamil_Script.jpg

Code Charts

Home | Site Map | Search

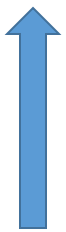
	0B8	0B9	0BA	0BB	0BC	0BD	0BE	0BF
0		ஐ 0B90		ர 0BB0	◌ 0BC0	ௐ 0BD0		ய 0BF0
1				ற 0BB1	◌ி 0BC1			ர 0BF1
2	◌ 0B82	ஒ 0B92		ல 0BB2	◌ீ 0BC2			ற 0BF2
3	◌ஂ 0B83	ஓ 0B93	ண 0BA3	ள 0BB3				ல 0BF3
4		ஔ 0B94	த 0BA4	ழ 0BB4				ள 0BF4
5	அ 0B85	க 0B95		வ 0BB5				வ 0BF5

http://www.unicode.org/charts/PDF/U0B80.pdf



//en.wikipedia.org/wiki/Linguistics#/media/File:Ancient_Tamil_Script.jpg

Applications

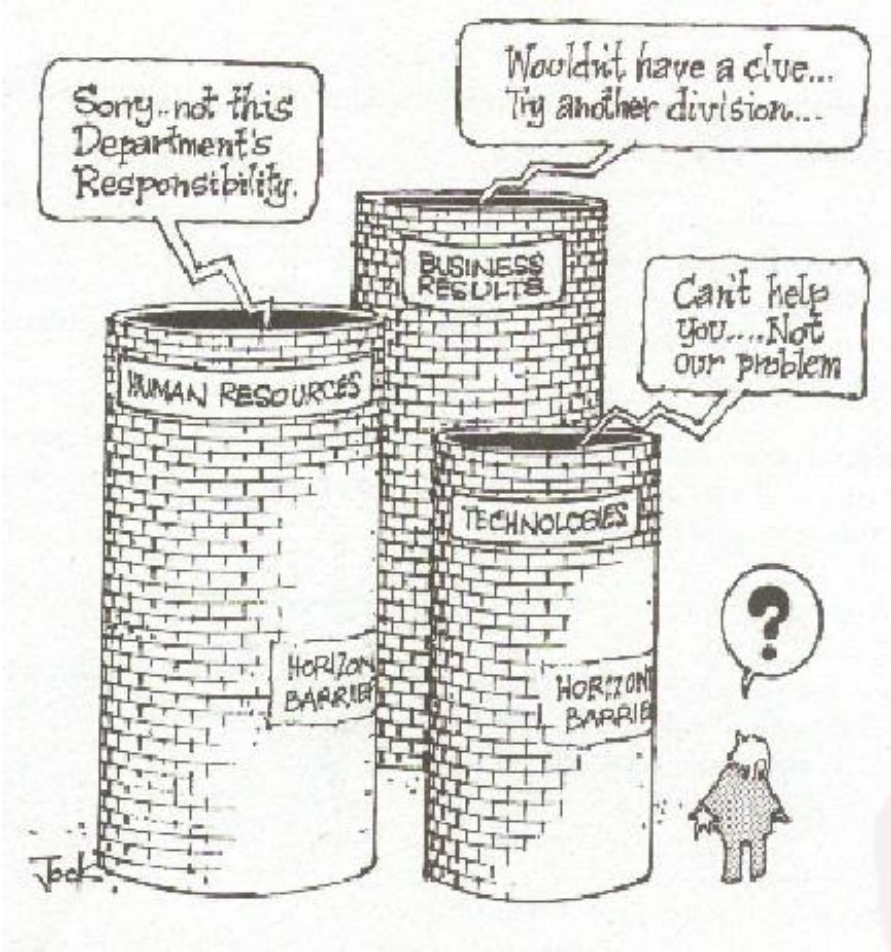


Schema
Formats
Encodings
Storage

Applications

- Word file => MS Word
- Excel file => MS Excel
- Zip file => winzip, gzip
- Database => Oracle MySQL

- Text file => ?



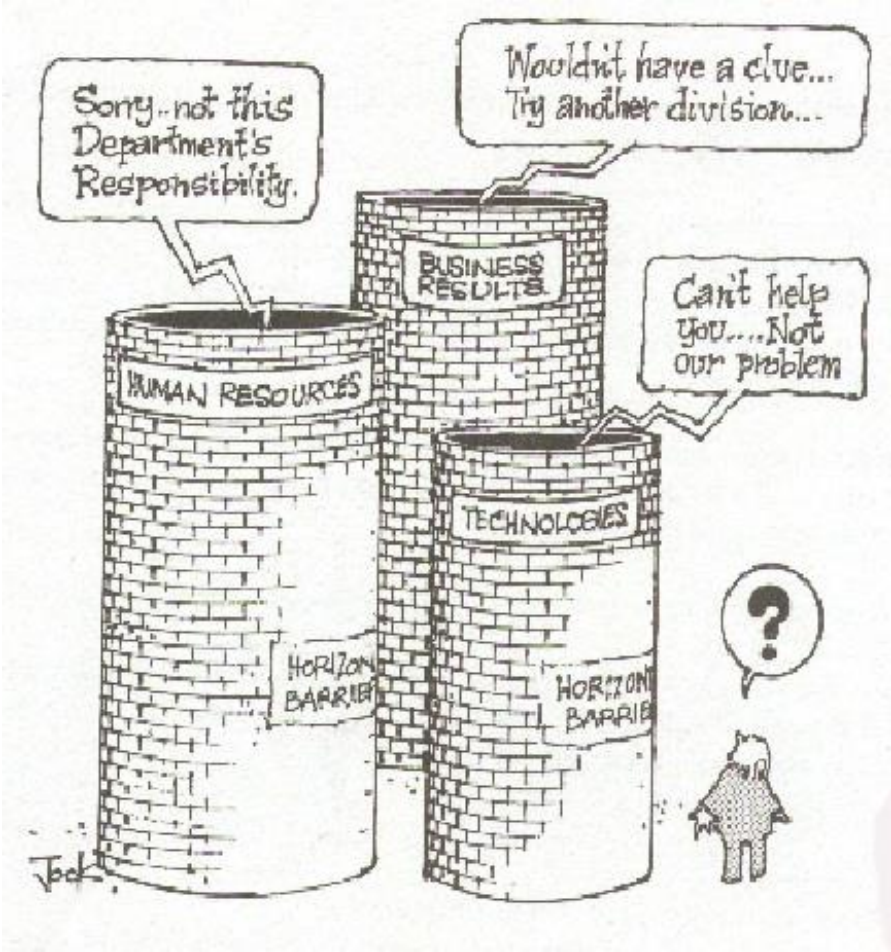
Applications

- Word file => MS Word
- Excel file => MS Excel
- Zip file => winzip, gzip
- Database => Oracle MySQL

- Text file =>

```
86 Free Software
45 Proprietary

Any format
Any schema
```



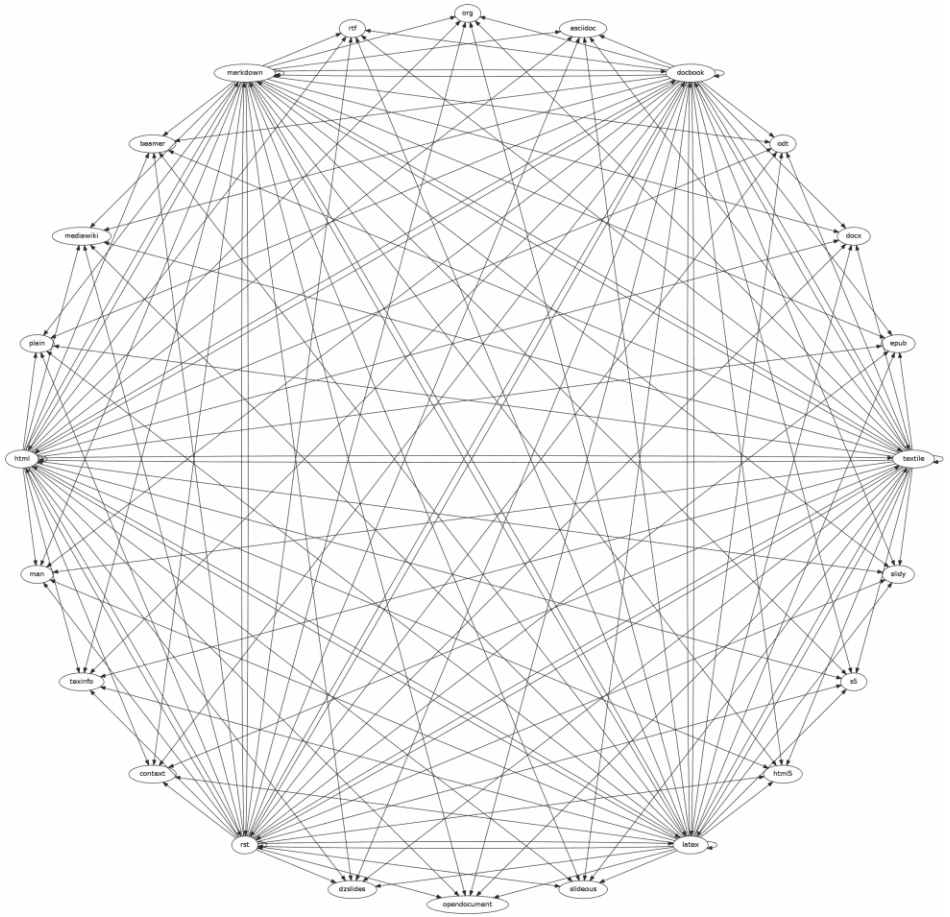
Applications

Pandoc a universal document converter

- Word file => MS Word
- Excel file => MS Excel
- Zip file => winzip, gzip
- Database => Oracle MySQL

- Text file => 86 Free Software
  45 Proprietary

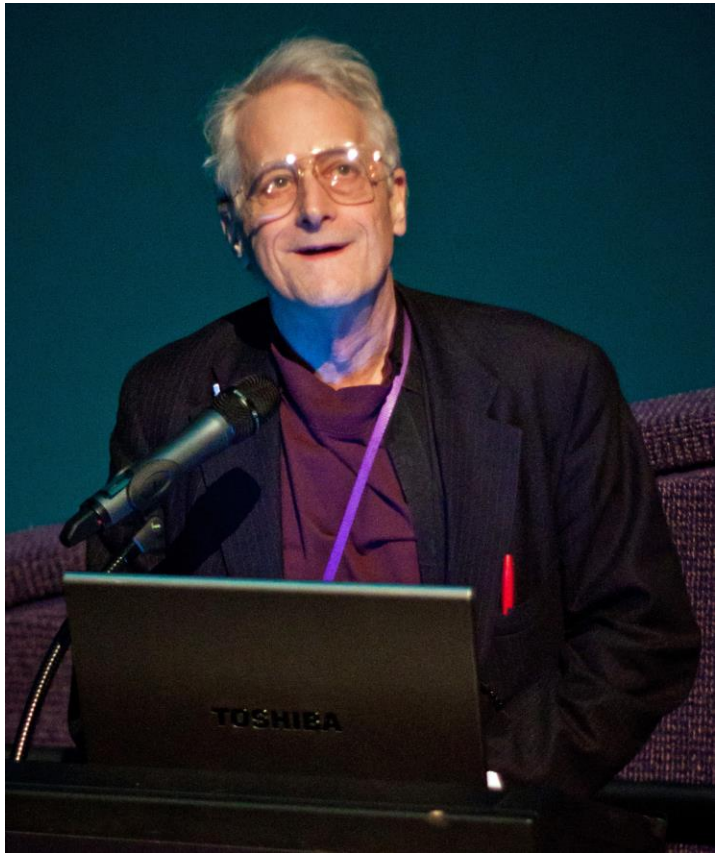
  Any format
  Any schema



Applications

- Word file
- Excel file
- Zip file
- MySQL Database

- Text file



"Obsolete power corrupts obsoletely."
- Ted Nelson

The technology associated with interpreting the representation at each of the layers can change or become less available

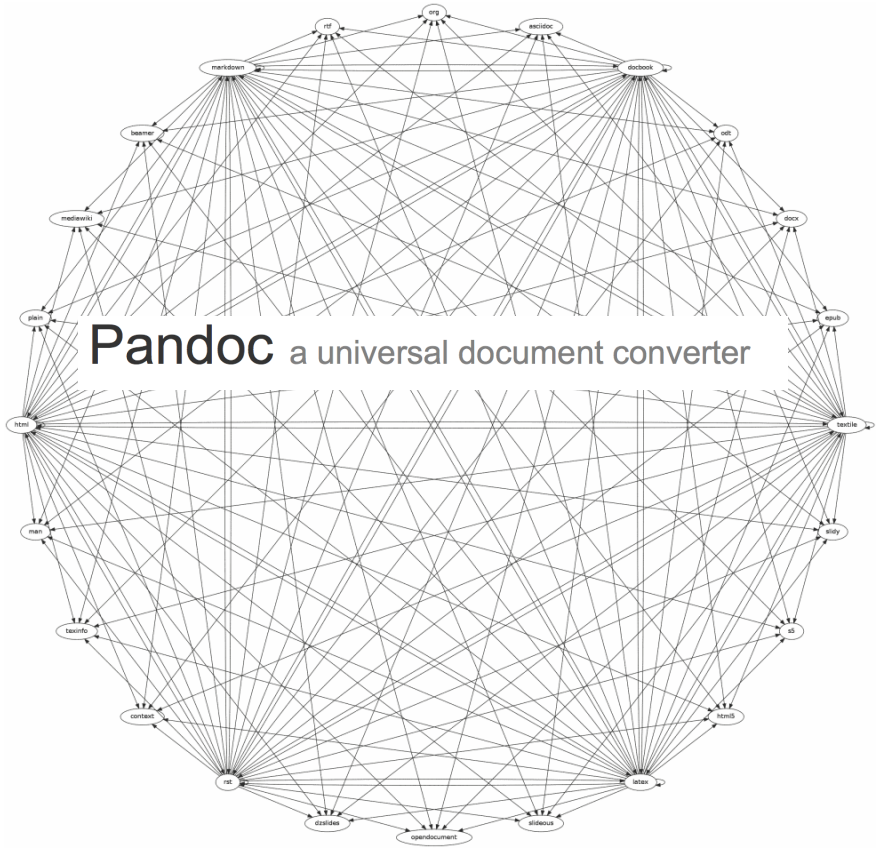
https://en.wikipedia.org/wiki/Ted_Nelson

Applications + Transformations

- Word file => MS Word
- Excel file => MS Excel
- Zip file => winzip, gzip
- Database => Oracle MySQL

- Text file => 86 Free Software
  45 Proprietary

  Any format
  Any schema



Applications + Standards

- British Museum's
  History of the world in 100 objects
  podcast
- The S'hia 'Alam'
  - A lavishly gilded ceremonial sword which represented the standards which were carried during conflict
  - Rules of engagement.

https://www.britishmuseum.org/explore/a_history_of_the_world.aspx
https://sites.google.com/site/100objectsbritishmuseum/home/shi-a-religious-parade-standard---steel-alam-from-iran

Applications + Standards

- British Museum Room 33
  - China and South Asia
    The Sir Joseph Hotung Gallery

- Museum label:
  - “This alam is covered in Islamic religious inscriptions, giving it talismanic power” (AD 680)

Applications + Standards + Transformations