Sunoikisis Digital Classics 2025

Preparing Texts & Data Cleaning

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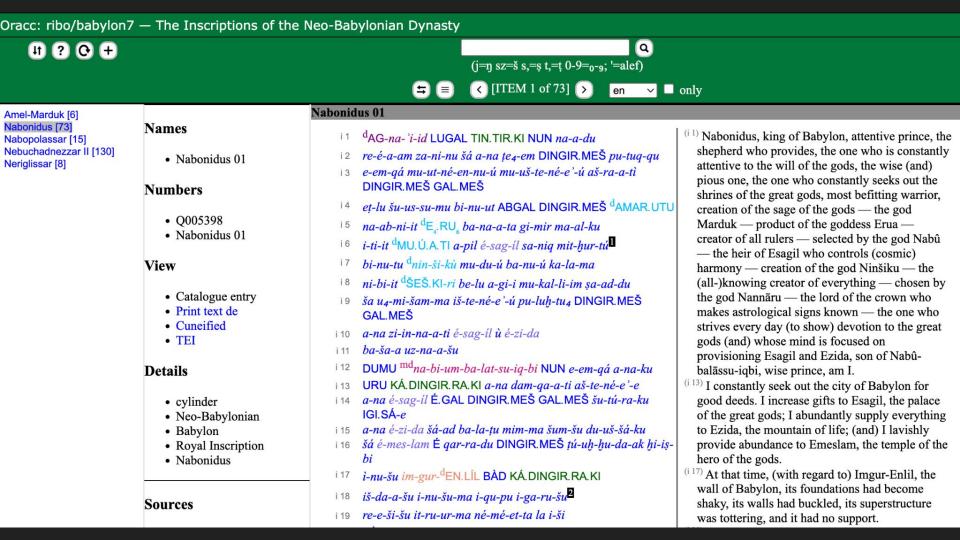
Outline

- Why do we need to clean texts?
- What are Regular expressions?
- Regex syntax
- Regex demos
- Python demo
- When not to use regex

Why do we need to clean texts?

Text cleaning

- Removing "noise" from a text for analysis
 - Correcting errors, e.g. typographical errors, OCR artefacts
 - o Removing metadata, e.g. line numbers or page numbers
- Significant part of any project working on digitising/digitised texts.
- Clean data is task-specific



dAG-na-'i-id LUGAL TIN.TIR.KI NUN na-a-du re-é-a-am za-ni-nu šá a-na țe₄-em DINGIR.MEŠ pu-tuq-qu e-em-qá mu-ut-né-en-nu-ú mu-uš-te-né-e'-ú aš-ra-a-tì DINGIR.MEŠ GAL.MEŠ et-lu šu-us-su-mu bi-nu-ut ABGAL DINGIR.ME\$ dA na-ab-ni-it ^dE₄.RU₆ ba-na-a-ta gi-mir ma-al-ku i-ti-it dMU.Ú.A.TI a-pil é-sag-íl sa-niq mit-hur-tú bi-nu-tu ^dnin-ši-kù mu-du-ú ba-nu-ú ka-la-ma ni-bi-ii dŠEŠ.Kl-ri be-lu a-gi-i mu-kal-li-im șa-ad-du ša u4-mi-šam-ma iš-te-né-e'-ú pu-luh-tu4 DINGIR.MEŠ GAL.MEŠ a-na zi-in-na-a-ti é-sag-íl ù é-zi-da ba-ša-a uz-na-a-šu DUMU mdna-bi-um-ba-lat-su-ig-bi NUN e-em-qá a-na-ku URU KÁ.DINGIR.RA.KI a-na dam-qa-a-ti aš-te-né-e '-e a-na é-sag-il É.GAL DINGIR.MEŠ GAL.MEŠ šu-tú-ra-ku IGI.SÁ-e a-na é-zi-da šá-ad ba-la-ţu mim-ma šum-šu du-uš-šá-ku šá é-mes-lam É gar-ra-du DINGIR.MEŠ tú-uh-hu-da-ak hi-işi-nu-šu im-gur-dEN.LÍL BÀD KÁ.DINGIR.RA.KI iš-da-a-šu i-nu-šu-ma i-qu-pu i-ga-ru-šu2 re-e-ši-šu it-ru-ur-ma né-mé-et-ta la i-ši

```
(i 1) Nabonidus, king of Babylon, attentive prince, the shepherd who provides, the one who is constantly att
i 2
re-é-a-am za-ni-nu šá a-na te₄-em DINGIR.MEŠ pu-tug-gu
i 3
e-em-qá mu-ut-né-en-nu-ú mu-uš-te-né-e'-ú aš-ra-a-tì DINGIR.MEŠ GAL.MEŠ
i 4
et-lu šu-us-su-mu bi-nu-ut ABGAL DINGIR.MEŠ dAMAR.UTU
i 5
na-ab-ni-it dE₄.RU6 ba-na-a-ta gi-mir ma-al-ku
i 6
i-ti-it dMU.Ú.A.TI a-pil é-sag-íl sa-nig mit-hur-tú1
i 7
bi-nu-tu dnin-ši-kù mu-du-ú ba-nu-ú ka-la-ma
i 8
ni-bi-it dŠEŠ.KI-ri be-lu a-gi-i mu-kal-li-im şa-ad-du
i 9
ša u₄-mi-šam-ma iš-te-né-e'-ú pu-luḫ-tu₄ DINGIR.MEŠ GAL.MEŠ
i 10
a-na zi-in-na-a-ti é-sag-íl ù é-zi-da
i 11
ba-ša-a uz-na-a-šu
i 12
DUMU mdna-bi-um-ba-lat-su-ig-bi NUN e-em-gá a-na-ku
i 13
URU KÁ.DINGIR.RA.KI a-na dam-qa-a-ti aš-te-né-e'-e
(i 13) I constantly seek out the city of Babylon for good deeds. I increase gifts to Esagil, the palace of t
```

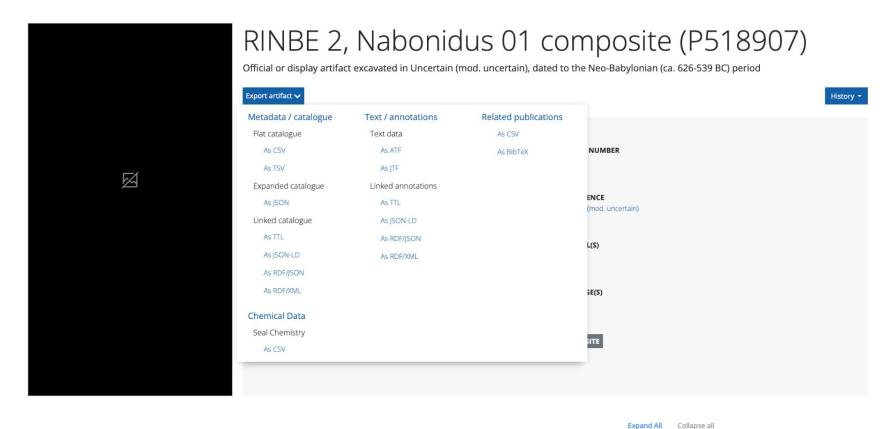
i 1

dAG-na-'i-id LUGAL TIN.TIR.KI NUN na-a-du

~



Text



```
&P518907 = RINBE 2, Nabonidus 01 composite
#atf: lang akk
@object composite text
@surface a

    {d}na3-na-'i-id lugal babilax(|TIN.TIR|){ki} nun na-a-du

#tr.en: Nabonidus, king of Babylon, attentive prince,
2. re-e2-a-am za-ni-nu sza2 a-na t,e4-em dingir-mesz pu-tug-qu
#tr.en: the shepherd who provides, the one who is constantly attentive to the will of the gods,
3. e-em-qa2 mu-ut-ne2-en-nu-u2 mu-usz-te-ne2-e'-u2 asz-ra-a-ti3 _dingir-mesz qal-mesz_
#tr.en: the wise (and) pious one, the one who constantly seeks out the shrines of the great gods,
4. et,-lu szu-us-su-mu bi-nu-ut _abgal dingir-mesz_ {d}marduk
#tr.en: most befitting warrior, creation of the sage of the gods-the god Marduk-
5. na-ab-ni-it {d}e4-ru6 ba-na-a-ta gi-mir ma-al-ku
#tr.en: product of the goddess Erua—creator of all rulers—
  i-ti-it (d)mu-u2-a-ti a-pil e2-sag-il2 sa-miq mit-hum-tu2
#tr.en: selected by the god Nabû-the heir of Esagil who controls (cosmic) harmony-
7. bi-nu-tu {d}nin-szi-ku3 mu-du-u2 ba-nu-u2 ka-la-ma
```

#tr.en: creation of the god Ninšiku—the (all—)knowing creator of everything—

9. sza u4-mi-szam-ma isz-te-ne2-e'-u2 pu-luh-tu4 _dingir-mesz gal-mesz_ #tr.en: the one who strives every day (to show) devotion to the great gods

#tr.en: chosen by the god Nannāru-the lord of the crown who makes astrological signs known-

8. ni-bi-it {d}nanna-ri be-lu a-gi-i mu-kal-li-im s,a-ad-du

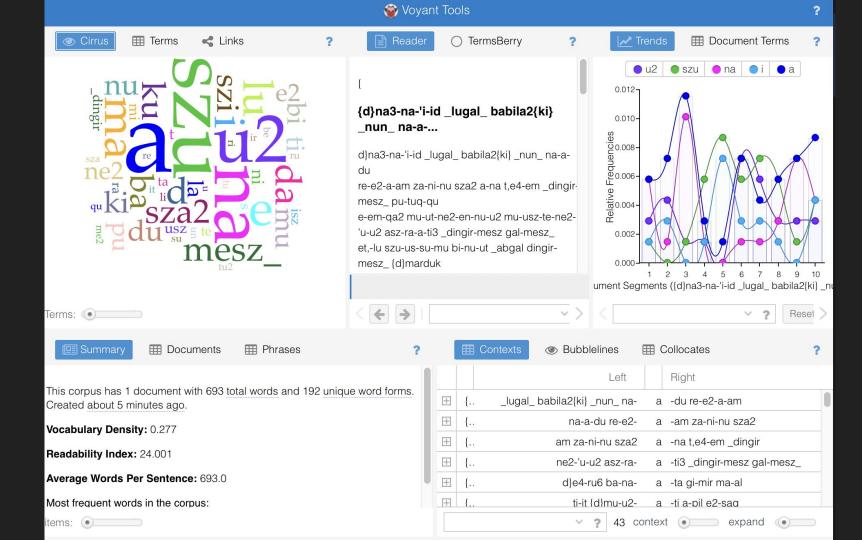
10. a-na zi-in-na-a-ti e2-sag-il2 u3 e2-zi-da
#tr.en: (and) on provisioning Esagil and Ezida,

```
&P269975 = RINBE 2, Nabonidus 01, ex. 01
#atf: lang akk
@object barrel
@surface a
@column 1
1. {d}na3-na-'i-id _lugal_ babilax(|TIN.TIR|){ki} _nun_ na-a-du
2. re-e2-a-am za-ni-nu sza2 a-na t,e4-em _dingir-mesz_ pu-tuq-qu
e-em-qa2 mu-ut-ne2-en-nu-u2 mu-usz-te-ne2-'u-u2 asz-ra-a-ti3 _dingir-mesz gal-mesz_
4. et,-lu szu-us-su-mu bi-nu-ut _abgal dingir-mesz_ {d}marduk
5. na-ab-ni-it {d}e4-ru6 ba-na-a-ta gi-mir ma-al-ku
6. i-ti-it {d}mu-u2-a-ti a-pil e2-sag-il2 sa-nig mit-hur-tu2
7. bi-nu-tu {d}nin-szi-ku3 mu-du-u2 ba-nu-u2 ka-la-ma
8. ni-bi-it {d}nanna-ri!(NIR) be-lu a-qi-i mu-kal-li-im s,a-ad-du
9. sza u4-mi-szam-ma isz-te-ne2-e'-u2 pu-luh-tu4 dingir-mesz gal-mesz
10. a-na zi-in-na-a-ti e2-sag-il2 u3 e2-zi-da
11. ba-sza-a uz-na-a-szu
12. _dumu_ {disz}{d}na-bi-um-ba-lat-su-iq-bi _nun_ e-em-qa2 a-na-ku
13. _iri_ babila2{ki} a-na dam-qa-a-ti asz-te-ne2-e'-e
14. a-na e2-sag-il2 _e2-gal dingir-mesz gal-mesz_ szu-tu2-ra-ku _igi-sa2_-e
15. a-na e2-zi-da sza2-ad ba-la-t,u mim-ma szum-szu du-usz-sza2-ku
16. sza2 e2-mes-lam _e2_ gar-ra-du _dingir-mesz_ t,u2-uh-hu-da-ak hi-is,-bi
17. i3-nu-szu im-qur-{d}en-lil2 _{<<d}en-lil2>> bad3_ babila2{ki}
18. isz-da-a-szu i-nu-szu-ma i-qu-pu i-qa-ru-szu
19. re-e-szi-szu it-ru-ur-ma ne2-me2-et-ta la i-szi
20. bad3 szu-a-ti <ana> du-un-nu-nim-ma ne2-me2-et-ta szu-ur2-szi-i
```

```
@column 2
```

- 1. ma-ha-za!(A) re-esz-tu-u2 tuk-la-tu4# ba#-u2#-la-a!(ZA) tu2# i#-szi#-id#-[x]
- 2. u2-da-an-ni-in ki-ma kin-ne2-e u2-pat-tin-ma
- 3. sza-da-ni-isz u2-zag-gi2-ir me2-la-a-szu
- 4. uhu2-mi-isz u2-zaq-qiz-ir mez-ta-a-szu
 4. uhu2-mi-isz u2-szar-szi-id-su!(SZU) a-na tab-ra-a-tu2 asz-tak2-[x x]
- 5. szi-t,i-ir szu-mi sza2 _lugal_ mah-ri sza2 qe2-reb-szu ap-pal-[x]
- 6. it-ti szi-t,i-ir szu-mi-ia qer-ba-szu u2-ki-in a-na s.a#-[x x]
- 7. {d}en-lil2 _dingir-mesz_ {d}marduk sza2 qi2-bit-su ki-na-at#
- 8. be-lu ap-kal-lu4 _dingir-mesz_ szu-ur2-bu-u2 qu-[x x]
- 9. szi-ip-ri szu-a-ti ha-di-isz nap-lis-[x]
- 10. mi-im-mu-u2 e-te-ep-pu-szu li#-[x x]

```
{d}na3-na-'i-id _lugal_ babila2{ki} _nun_ na-a-du
re-e2-a-am za-ni-nu sza2 a-na t,e4-em dingir-mesz pu-tug-gu
e-em-ga2 mu-ut-ne2-en-nu-u2 mu-usz-te-ne2-'u-u2 asz-ra-a-ti3 dingir-mesz gal-mesz
et,-lu szu-us-su-mu bi-nu-ut _abgal dingir-mesz_ {d}marduk
na-ab-ni-it {d}e4-ru6 ba-na-a-ta gi-mir ma-al-ku
i-ti-it {d}mu-u2-a-ti a-pil e2-sag-il2 sa-nig mit-hur-tu2
bi-nu-tu {d}nin-szi-ku3 mu-du-u2 ba-nu-u2 ka-la-ma
ni-bi-it {d}nanna-ri be-lu a-gi-i mu-kal-li-im s,a-ad-du
sza u4-mi-szam-ma isz-te-ne2-e'-u2 pu-luh-tu4 _dingir-mesz gal-mesz_
a-na zi-in-na-a-ti e2-sag-il2 u3 e2-zi-da
ba-sza-a uz-na-a-szu
_dumu_ {disz}{d}na-bi-um-ba-lat-su-iq-bi _nun_ e-em-qa2 a-na-ku
_iri_ babila2{ki} a-na dam-qa-a-ti asz-te-ne2-e'-e
a-na e2-sag-il2 _e2-gal dingir-mesz gal-mesz_ szu-tu2-ra-ku _igi-sa2_-e
a-na e2-zi-da sza2-ad ba-la-t,u mim-ma szum-szu du-usz-sza2-ku
sza2 e2-mes-lam _e2_ qar-ra-du _dingir-mesz_ t,u2-uh-hu-da-ak hi-is,-bi
i3-nu-szu im-gur-{d}en-lil2 bad3_ babila2{ki}
isz-da-a-szu i-nu-szu-ma i-qu-pu i-ga-ru-szu
re-e-szi-szu it-ru-ur-ma ne2-me2-et-ta la i-szi
bad3 szu-a-ti <ana> du-un-nu-nim-ma ne2-me2-et-ta szu-ur2-szi-i
```



```
{ d } na3-na- ' i-id _lugal_ babila2 { ki } _nun_
na-a-du
re-e2-a-am za-ni-nu sza2 a-na t , e4-em _dingir-
mesz_ pu-tuq-qu
e-em-qa2 mu-ut-ne2-en-nu-u2 mu-usz-te-ne2- ' u-
u2 asz-ra-a-ti3 _dingir-mesz gal-mesz_
et , -lu szu-us-su-mu bi-nu-ut _abgal dingir-mesz_
{ d } marduk
na-ab-ni-it { d } e4-ru6 ba-na-a-ta gi-mir ma-al-ku
i-ti-it { d } mu-u2-a-ti a-pil e2-sag-il2 sa-niq mit-
hur-tu2
bi-nu-tu { d } nin-szi-ku3 mu-du-u2 ba-nu-u2 ka-la-
ma
ni-bi-it { d } nanna-ri be-lu a-gi-i mu-kal-li-im s , a-
ad-du
sza u4-mi-szam-ma isz-te-ne2-e ' -u2 pu-luh-tu4
_dingir-mesz gal-mesz_
a-na zi-in-na-a-ti e2-sag-il2 u3 e2-zi-da
ba-sza-a uz-na-a-szu
_dumu_ { disz } { d } na-bi-um-ba-lat-su-iq-bi
_nun_ e-em-qa2 a-na-ku
```

Nabonidus, king of Babylon, attentive prince, the shepherd who provides, the one who is constantly attentive to the will of the gods, the wise (and) pious one , the one who constantly seeks out the shrines of the great gods, most befitting warrior, creation of the sage of the gods the god Marduk — product of the goddess Erua — creator of all rulers — selected by the god Nabû — the heir of Esagil who controls (cosmic) harmony — creation of the god Ninšiku — the (all-) knowing creator of everything chosen by the god Nannāru — the lord of the crown who makes astrological signs known — the one who strives every day (to show) devotion to the great gods (and) whose mind is focused on provisioning Esagil and Ezida, son of Nabûbalāssu-iqbi, wise prince, am I.

Text cleaning

- Removing "noise" from a text for analysis
 - Correcting errors, e.g. typographical errors, OCR artefacts
 - o Removing metadata, e.g. line numbers or page numbers
- Significant part of any project working on digitising/digitised texts.
- Clean data is task-specific

Text cleaning solutions

- By hand
- Online tools
- Al
- Regular expressions

What are Regular expressions?

What are regular expressions?

- Find-and-replace based on patterns not literal characters
- Eg validate an email address in an online form
- The 'find' part is useful for counting things
- The 'replace' part is useful for cleaning and preparing
- They don't do anything else!

Why learn regular expressions?

- They are (almost) ubiquitous in text editing software
- Any standard programming language has them
- They vary very little between implementations
- They are very modular: you can do a lot with a few chars
- The basic syntax is very minimal: not much to learn
- (But you will need to practise)

Regex syntax

Regular Expressions Cheat Sheet by DaveChild

A quick reference guide for regular expressions (regex), including symbols, ranges, grouping, assertions and some sample patterns to get you started.

Anchors

- Start of string, or start of line in multi-line pattern
 Start of string
- \$ End of string, or end of line in multi-line pattern
- Z End of string
- \b Word boundary
- \B Not word boundary
- \< Start of word
- \> End of word

Character Classes

\c Control character

Quantifiers

W	0 or more	{3}	Exactly 3
+	1 or more	{3,}	3 or more
?	0 or 1	{3,5}	3, 4 or 5
	d a ? to a qua greedy.	antifier t	to make it

Escape Sequences

- \ Escape following character
 \Q Begin literal sequence
 \E End literal sequence

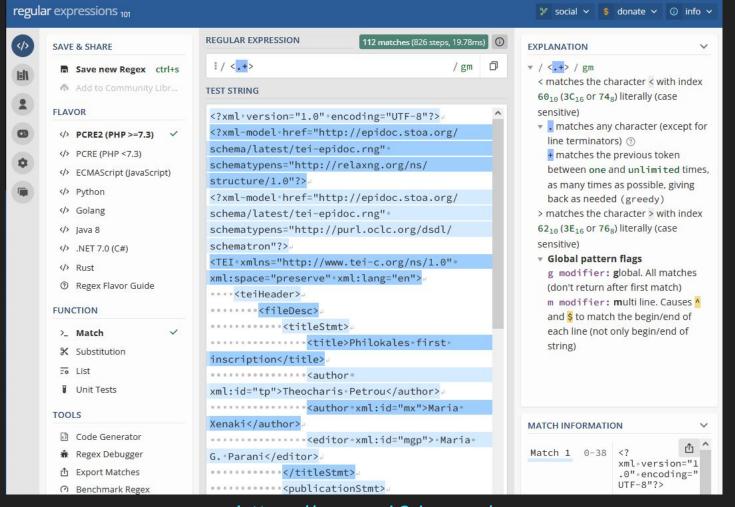
 "Escaping" is a way of treating
- "Escaping" is a way of treating characters which have a special meaning in regular expressions

Groups and Ranges

- . Any character except new line (\n)

 (a|b) a or b
- (...) Group
- (?:...) Passive (non-capturing) group
- [abc] Range (a or b or c)
- [^abc] Not (a or b or c)
- [a-q] Lower case letter from a to
- [A-Q] Upper case letter from A to Q
- [0-7] Digit from 0 to 7

https://cheatography.com/davechild/cheat-sheets/regular-expressions/



https://regex101.com/

Regex demos (live)

Python demo (live)

When not to use regex

Exercise





Understanding Regular Expressions

Doug Knox

In this lesson, we will use advanced find-and-replace capabilities in a word processing application in order to make use of structure in a brief historical document that is essentially a table in the form of prose.

Peer-reviewed

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