

## Lab 1: Chapter 1 report

For this lab I decided to compare Polish (my native language) and English. I downloaded the required Parallel UD treebanks and attempted to explore them using the gf-ud tool. It proved to be impossible to download and install it on my computer, and the eduserv installation kept throwing me errors even when the treebanks were downloaded directly onto it. Other students who I have asked did not run into those issues on the server, but nobody succeeded with a local installation. Instead I decided to write my own Python script to get the necessary information using the [CoNLL-U Parser module](#). I have included the files for it in my course repository: the [readme/setup instructions](#), [the first-time setup script](#) (which installs the necessary module/library), and [the python script itself](#).

I proceeded to get the UPOS, XPOS, and DEPREL tag counts for each of the treebanks. Not all of these had enough variants to retrieve top 20 (there were fewer than 20 tags altogether). I retrieved the following counts:

- XPOS for the en\_pud-ud-test.conllu file: 1. NN: 3000, 2. IN: 2716, 3. DT: 2121, 4. NNP: 1612, 5. JJ: 1435, 6. NNS: 1103, 7. .: 1002, 8. .: 1000, 9. VBD: 875, 10. RB: 773, 11. VBN: 591, 12. CC: 576, 13. VB: 507, 14. PRP: 490, 15. CD: 460, 16. VBZ: 439, 17. VBG: 332, 18. TO: 267, 19. VBP: 259, 20. PRP\$: 255
- UPOS for the en\_pud-ud-test.conllu file: 1. NOUN: 4036, 2. ADP: 2493, 3. PUNCT: 2451, 4. VERB: 2156, 5. DET: 2086, 6. PROPN: 1741, 7. ADJ: 1530, 8. PRON: 1021, 9. AUX: 1014, 10. ADV: 849, 11. CCONJ: 576, 12. NUM: 455, 13. PART: 426, 14. SCONJ: 290, 15. SYM: 42, 16. X: 16, 17. INTJ: 1
- DEPREL for the en\_pud-ud-test.conllu file: 1. case: 2499, 2. punct: 2451, 3. det: 2047, 4. nsubj: 1393, 5. amod: 1336, 6. obl: 1237, 7. nmod: 1076, 8. root: 1000, 9. obj: 876, 10. advmod: 852, 11. compound: 810, 12. conj: 634, 13. cc: 574, 14. mark: 555, 15. aux: 410, 16. nmod:poss: 365, 17. cop: 316, 18. advcl: 293, 19. aux:pass: 274, 20. xcomp: 271
- XPOS for the pl\_pud-ud-test.conllu file: 1. interp: 2678, 2. part: 665, 3. prep:loc:nwok: 622, 4. conj: 575, 5. subst:sg:gen:f: 507, 6. subst:sg:gen:m3: 421, 7. fin:sg:ter:imperf: 391, 8. subst:sg:nom:f: 369, 9. subst:sg:nom:m1: 339, 10. prep:gen: 337, 11. comp: 335, 12. subst:sg:nom:m3: 334, 13. adv:pos: 297, 14. subst:sg:loc:m3: 286, 15. subst:sg:acc:f: 283, 16. prep:loc: 237, 17. prep:acc:

230, 18. prep:gen:nwok: 223, 19. subst:sg:acc:m3: 220, 20. subst:sg:gen:n:ncol: 214

- UPOS for the pl\_pud-ud-test.conllu file: 1. NOUN: 4504, 2. PUNCT: 2658, 3. ADJ: 2358, 4. ADP: 2050, 5. VERB: 1633, 6. PROPN: 1326, 7. PRON: 639, 8. CCONJ: 575, 9. ADV: 535, 10. DET: 499, 11. AUX: 455, 12. PART: 379, 13. SCONJ: 335, 14. X: 230, 15. NUM: 193, 16. \_: 49, 17. SYM: 20
- DEPREL: for the pl\_pud-ud-test.conllu file: 1. punct: 2658, 2. case: 1993, 3. amod: 1431, 4. nsubj: 1076, 5. root: 1000, 6. obl: 975, 7. nmod: 942, 8. obj: 818, 9. conj: 714, 10. nmod:arg: 703, 11. cc: 558, 12. advmod: 509, 13. obl:arg: 429, 14. mark: 341, 15. flat: 315, 16. iobj: 290, 17. amod:flat: 273, 18. expl:pv: 271, 19. acl: 248, 20. advmod:emph: 225

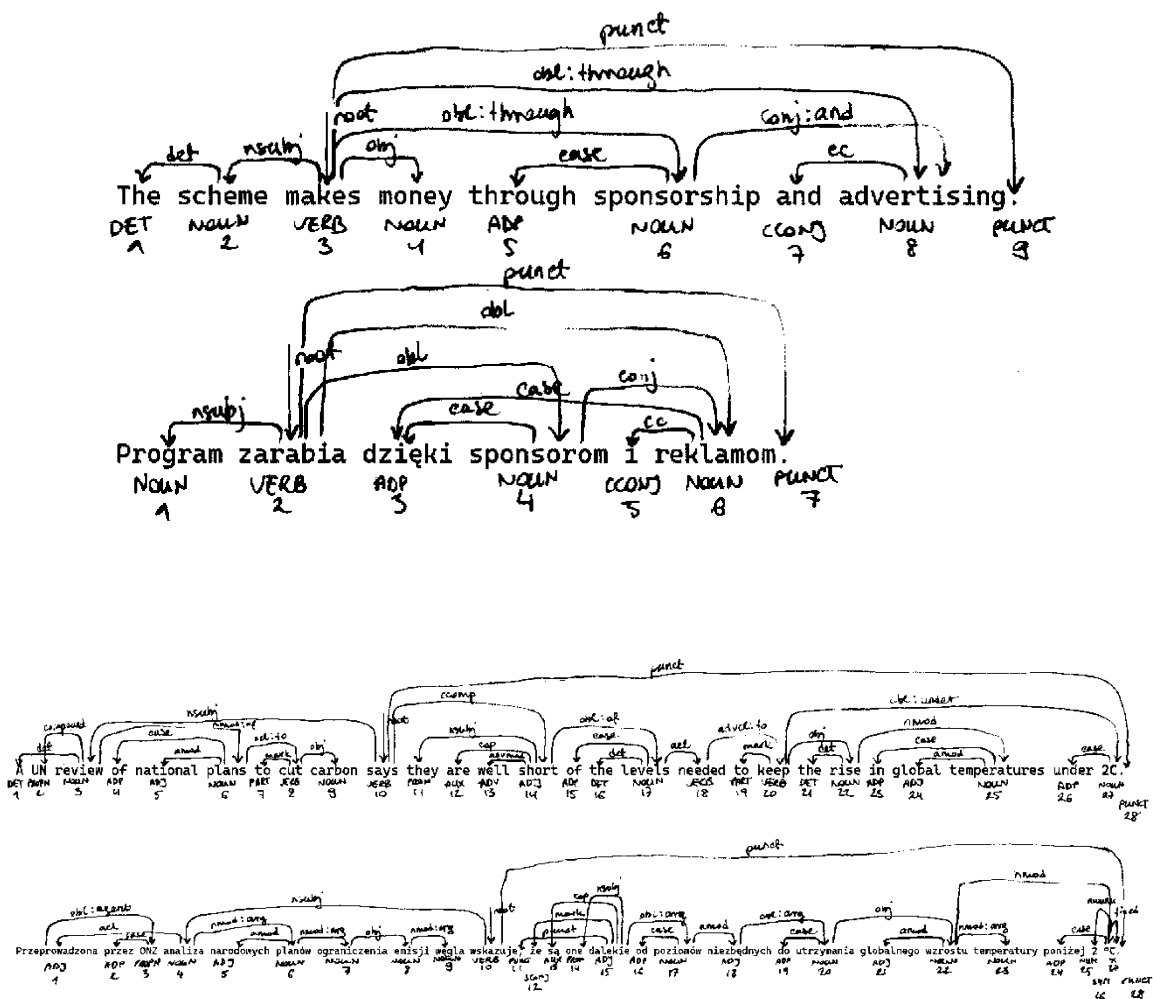
It is easy to notice that for the XPOS (language-specific) tags, different tags are used for English and Polish. The English ones seem to follow the Penn Treebank convention, while the Polish ones reflect the much broader spectrum of word forms that this language possesses. Thus, instead of just having categories for nouns (NN), proper nouns (NNP), plural nouns (NNS) etc., the Polish one has to include information such as noun, singular, genitive case, feminine (subst:sg:gen:f) or noun, singular, nominative case, masculine animate (subst:sg:nom:m1). Thus, the two are not really comparable 1:1 in terms of the distribution of the parts of speech.

The UPOS (universal) tags give a much better comparison. Nouns are the most common part of speech in both languages; however, Polish seems to have more of them than English in this treebank. It also uses more punctuation, but fewer verbs. The lack of verbs in the Polish version could be attributed to the fact that the language does not make much use of auxiliary verbs; that, however, is a separate UPOS category (where, indeed, English has a higher count). The difference thus may stem from the fact that Polish prefers to use verb-derived nouns in place of some verbs. There is also a massive disparity in terms of determiners, as Polish is a language that does not have articles. This category also included only 17 tags.

To some extent, the DEPREL tags can also be compared. The case and punct tags dominate both treebanks, but with a slightly different proportion. Naturally, both have the same number of root tags. Tags like amod, nsubj, nmod, obj, avmod are also high up on both lists. The differences in terms of the other tags also reveal a bit about the grammar of the two languages: for example, the 15<sup>th</sup> most popular DEPREL tag in English was aux, which does not appear in the top 20 of Polish, due to the reasons mentioned above; same holds true for the 3<sup>rd</sup> most popular tag in English, det.

For the last two parts of the assignment, I selected the following sentences:

- English short: The scheme makes money through sponsorship and advertising.
- Polish short: Program zarabia dzięki sponsorom i reklamom. (sentence 39)
- English long: A UN review of national plans to cut carbon says they are well short of the levels needed to keep the rise in global temperatures under 2C.
- Polish long: Przeprowadzona przez ONZ analiza narodowych planów ograniczenia emisji węgla wskazuje, że są one dalekie od poziomów niezbędnych do utrzymania globalnego wzrostu temperatury poniżej 2 °C. (sentence 48)



the		program
scheme		zarabia
makes		dzięki
money		sponsorom
through		i
sponsorship		reklamom
and		
advertising		

a		przeprowadzona
UN		przez
review		ONZ
of		analiza
national		narodowych
plans		planów
to		ograniczenia
cut		emisji
carbon		węgla
says		wskazuje
they		,
are		że
well		są
short		one
of		dalekie
the		od
levels		poziomów
needed		niezbędnych
to		do
keep		utrzymania
the		globalnego
rise		wzrostu
in		temperatury
global		poniżej
temperatures		2
under		°
2C		C

The trees and alignment charts were done partly on computer, partly by hand mostly due to the fact that I needed to make one of the sentences very small and that it is easier to

read the words in the table when presented in this way. I hope it is still okay, and all the connections were drawn by hand on printed copies and subsequently scanned.

From the two alignment charts we can draw a couple of conclusions about syntactic differences between Polish and English. First of all, in most cases determiners are not present (I still drew the line to the noun that they are connected with though). Word order in Polish in general is similar to that of English, but in some cases it can be much more free (as with the global temperatures and “they are”). Polish does not need as many ADP as English as the relations between the parts of the sentence are encoded in case endings (thus the lines from “to” or “of” go to the nouns that have those case endings). Finally, Polish verbs can contain more information than their English counterparts (“make money” = “zarabiać”). Sometimes more than one word is needed to represent a concept from English, or vice versa. The noun and adjective order seems to usually follow the same pattern (adjective first).