

CS-5340/6340, Written Assignment #1  
DUE: Tuesday, September 7, 2021 by 11:59pm  
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Submit your assignment on CANVAS in pdf format.

1. (30 pts) For each sentence below, label each word with its correct part-of-speech (POS) tag based upon the word's use in the sentence. Do not assign POS tags to punctuation marks.

Choose from the following list of part-of-speech tags: **adjective** (ADJ), **adverb** (ADV), **article** (ART), **conjunction** (CONJ), **gerund** (GER), **infinitive “to”** (INF), **modal verb** (MOD), **noun** (NOUN), **particle** (PART), **preposition** (PREP), **pronoun** (PRO), **verb** (VERB) [not modal].

For infinitive verb phrase constructions, label “to” as INF and the verb itself as VERB.

Please show your part-of-speech tag assignments by appending a slash and POS tag after each word. For example: “Natural/ADJ language/NOUN is/VERB fun/ADJ.”

- (a) An engineer blew up a huge tower with dynamite.  
An/ART engineer/NOUN blew/VERB up/PART a/ART huge/ADV tower/NOUN with/PREP dynamite/NOUN.
- (b) Snowbird will be hosting skiing events tomorrow.  
Snowbird/NOUN will/MOD be/VERB hosting/GER skiing/GER events/NOUN tomorrow/NOUN.
- (c) Susan reluctantly asked to borrow money.  
Susan/NOUN reluctantly/ADV asked/VERB to/INF borrow/VERB money/NOUN.
- (d) Swimming with sharks is incredibly dangerous.  
Swimming/GER with/PREP sharks/NOUN is/VERB incredibly/ADV dangerous/ADJ.
- (e) George would not talk to people at the bowling alley.  
George/NOUN would/MOD not/ADV talk/VERB to/PART people/NOUN at/PREP the/ART bowling/NOUN alley/NOUN.
- (f) She agreed to buy it but must pay cash.  
She/PRO agreed/VERB to/INF buy/VERB it/PRO but/CONJ must/MOD pay/VERB cash/NOUN.
- (g) Jane called off the creative writing project.  
Jane/NOUN called/VERB off/PART the/ART creative/ADJ writing/GER project/NOUN.
- (h) Tom dressed up in a tuxedo.  
Tom/NOUN dressed/VERB up/PART in/PREP a/ART tuxedo/NOUN.

2. (20 pts) For each sentence below, indicate whether the verb phrase is in an **active voice** or **passive voice** construction.

- (a) The dog has been chasing a squirrel around the yard for hours. **active voice**
- (b) The lawn has not been mowed in a year. **active voice**
- (c) The man discovered a grizzly bear by the lake. **active voice**
- (d) The vegetables were cooked on the outdoor grill. **passive voice**
- (e) The war was fought over 50 years ago. **passive voice**
- (f) He had forgotten about the concert. **active voice**
- (g) She felt great pride in her son's award-winning artwork. **active voice**
- (h) Kathy plans to be an architect. **active voice**
- (i) Jim's electricity bill will be paid in full by his mom. **passive voice**
- (j) The missing artwork might have been stolen. **passive voice**

3. (30 pts) For each sentence below:

- (1) Identify the noun phrases (NPs) that correspond to the syntactic roles of **Subject (SUBJ)**, **Direct Object (DOBJ)**, and **Indirect Object (IOBJ)** with respect to the verb phrase. Put brackets [] around each relevant NP followed by a slash (/) and the syntactic role. For example: *[Natural Language]/SUBJ is fun.* Note that each sentence will have at least one of the syntactic roles, but not necessarily all of them!
- (2) Indicate whether the main verb appears in an **intransitive** construction, a **transitive** construction, or a **ditransitive** construction. Only give the answer **transitive** if the usage is not **ditransitive**.

- (a) George wrote his wife a poem.

[George]/SUBJ wrote [his wife]/IOBJ [a poem]/DOBJ.

**ditransitive**

- (b) The boy tossed a red ball to his dog.

[The boy]/SUBJ tossed [a red ball]/IOBJ to [his dog]/DOBJ.

**ditransitive**

- (c) John received several urgent emails from his boss.

[John]/SUBJ received [several urgent emails]/IOBJ from [his boss]/DOBJ his boss.

**ditransitive**

- (d) Sarah ordered a pizza with pepperoni.

[Sarah]/SUBJ ordered [a pizza with pepperoni]/DOBJ.

**transitive**

- (e) The man sneezed into his handkerchief.

[The man]/SUBJ sneezed into [his handkerchief]/DOBJ his handkerchief.

**transitive**

- (f) Dark smoke was seen over the wilderness area.

[Dark smoke]/SUBJ was seen over [the wilderness area]/DOBJ.

**transitive**

- (g) Fran told the kids a bedtime story.

[Fran]/SUBJ told [the kids]/IOBJ [a bedtime story]/DOBJ.

**ditransitive**

- (h) She transferred money to her sister.

She transferred [money]/IOBJ to [her sister]/DOBJ.

**ditransitive**

- (i) Pedro sat quietly at his desk.

[Pedro]/SUBJ sat quietly at [his desk]/DOBJ.

**transitive**

- (j) The company president guaranteed Mary a job.

[The company president]/SUBJ guaranteed [Mary]/IOBJ [a job]/DOBJ.

**ditransitive**

4. (20 pts) Consider the document collection below, which consists of 5 (short!) documents:

D1: *squirrels eat nuts*

D2: *the dog chased a squirrel up a tree*

D3: *the squirrel ate a nut*

D4: *a raccoon was chasing the squirrel*

D5: *the dog often chases raccoons up trees*

Create an inverted file structure for this document collection using the true morphological root (lemma) of each word as the indexed term. Include all words in the sentences except you do not need to index the words “a” and “the”. You do not need to include location (proximity) information.

- (a) squirrel: (D1, D2, D3, D4)
- (b) eat: (D1)
- (c) nut: (D1, D3)
- (d) dog: (D2, D5)
- (e) chas: (D2, D4, D5 )
- (f) up: (D2, D5)
- (g) tre: (D2, D5)
- (h) at: (D3)
- (i) raccoon (D4, D5)
- (j) wa (D4)
- (k) often (D5)

**Question #5 is for CS-6340 students ONLY!**

5. (12 pts) Fill in the table below with morphology rules to derive all of the words below from the specified root form *in a linguistically sensible way*. Some derivations may require the application of multiple rules. In this case, put each rule in a separate row of the table. Also, some words may have multiple derivations. Be sure to include all derivations that make sense. For illustration, the table is already filled in with the derivation of “*unfairly*” from the root “*fair*”.

- (a) speculative (root = “speculate”)
- (b) indigestible (root = “digest”)
- (c) understandability (root = “understand”)
- (d) hyperemotional (root = “emotion”)
- (e) counterclockwise (root = “clock”)
- (f) intensification (root = “intense”)

Derived Word	Origin	Prefix	Suffix	Replace Chars	POS of Origin	POS of Derived
unfairly unfair	unfair fair	- un	ly -	- -	ADJ ADJ	ADV ADJ
speculative	speculate	-	ive	e	ADJ	VERB
indigestible	digestible	in	-	-	ADJ	ADJ
digestible	digest	-	ible	-	ADJ	VERB
indigestible	indigest	-	ible	-	ADJ	VERB
indigest	digest	in	-	-	VERB	VERB
understandability	understand	-	ability	-	NOUN	VERB
hyperemotional	emotional	hyper	-	-	ADJ	ADJ
emotional	emotion	-	al	-	ADJ	NOUN
hyperemotional	hyperemotion	-	al	-	ADJ	NOUN
hyperemotion	emotion	hyper	-	-	NOUN	NOUN
counterclockwise	clockwise	counter	-	-	ADV	ADV
clockwise	clock	-	wise	-	ADV	ADV
intensification	intense	-	ification	e	NOUN	ADJ