

Student's affirmation: I certify that I have neither taken help in completing this exam nor helped anyone else with this exam. I have never discussed this exam with anyone other than the instructor and TA.

(Signature) _____

Mandatory: Affirmation and signature on the first page; name on every page; submission as PDF.
If you make assumptions about any problem, state them, but be prepared to justify why they were necessary.

Problem	1	2	3	4	5	Total
Points:	12	20	16	30	22	100
Score:						

This exam has 5 problems, for a total of 100 points.

Throughout, I prefer that you think afresh but if you come across a source on which you base your answer, please be sure to cite it. Please note that if you are citing a source to bolster your claim then the source should be authoritative (such as our textbook or a book by another credentialed author). Blog posts by strangers are not credible.

- (12 points) Mark the following statements true or false. Provide a short explanation of about 10–20 words. You can and should provide a source where appropriate, including the specific page and line numbers.
 - Natural language pragmatics refers to approaches for using NLP in industry or government to solve practical problems
 - In dependency parsing, a good criterion for determining the head of a construction is that the head determines the semantic category of the construction
 - A named entity as defined in NLP can nest another named entity
 - Prototypical event structures indicate common concepts and help identify implicit background knowledge
 - For casual writing in English (as in texts between friends), where named entities may be consecutive without intervening tokens, IO tagging would not be able to capture named entities
 - A definite noun phrase introduces an entity into the discourse
- In dependency grammars, consider the criteria for identifying a head and a dependent.
 - (5 points) List four of the criteria for identifying a head and a dependent.
 - (15 points) Show three pairs of criteria, where the criteria within each pair give conflicting indications for some examples. Show those examples and explain your rationale in 20–30 words for each pair of criteria.
- Suppose we wish to understand coherence not in terms of syntactic models but in terms of a simple semantic abstraction.
 - (8 points) Develop a local coherence model in the nature of the entity grid that is based on the following thematic roles: Agent, Experience, Theme, and Beneficiary.
 - (8 points) Exercise your approach over the following text extracted from https://en.wikipedia.org/wiki/Obdulio_Varela. Based on your analysis, state and justify whether this discourse appears coherent.

- 1 Obdulio Jacinto Muiños Varela was a Uruguayan football player.
- 2 He's most remembered as the captain of the Uruguay team that won the 1950 FIFA World Cup.
- 3 The decisive match was against the hosts Brazil.
- 4 Five minutes in the second half, Brazil scored.
- 5 Varela took in the scene.
- 6 He intentionally walked slowly to his goal, and picked up the ball.
- 7 He then argued with the English referee George Reader about a nonexistent offside, with the intention of delaying the restart of the game so the crowd cooled off.
- 8 After that he said to his teammates 'Now it's time to win the game' and the Brazilians in the crowd were in a silent mood.

4. Consider the following weird discourse.

- 1 Naga bought an ICB iron-carbide blender for their kitchen.
- 2 Eats glass.
- 3 It has no plastic pieces.
- 4 They are fragile.
- 5 Damilola is considering getting it too on Seoyeong's recommendation.
- 6 Uses it in the morning.
- 7 The damn motor broke today.
- 8 Seoyeong doubts she'll buy another one.
- 9 It's just too expensive.

(a) (6 points) Identify the anaphors in this example.

Explain your answer in 10–20 words.

(b) (24 points) Identify what the anaphors refer to. Explain each choice based on the various considerations we discussed in class. That is, for each relevant consideration (to a specific choice you are making), indicate when where those considerations might conflict (e.g., when some of them lead to an unacceptable match) and why you chose the one you did.

Explain each choice in 20–30 words.

5. (a) (10 points) Define a general form of the Winograd schema based on the idea of answering questions, not just resolving anaphora. Give two examples (each example being a pair of sentences) to explain your definition. Your examples should be substantially different from those in this exam.

(b) Consider each of the following pairs of sentences. Determine whether each pair

- Constitutes an illustration of the general Winograd schema.
- Indicates bias or a way of discovering bias in an NLP model.

Explain each answer in 20–30 words. *Hint:* I expect the explanation to be based on giving a question whose answer reflects the (potential) bias.

i. (2 points)

- 1 Mansi swapped her sack with Trevor's bag because it was heavy
- 2 Mansi swapped her sack with Trevor's bag because it was light

ii. (2 points)

- 1 Tanisha swapped her sack with Vikram's bag because it was heavy
- 2 Vikram swapped his sack with Tanisha's bag because it was heavy

iii. (4 points)

- 1 Jay ordered both Szechuan Mapo Tofu and Mujadra so Xufeng would have something he could enjoy
- 2 Jay ordered both Szechuan Mapo Tofu and Mujadra so Muhammad would have something he could enjoy

iv. (4 points)

- 1 Liannian ordered both the spicy tofu and the bland steamed broccoli so Bhaskar would have something he could enjoy
- 2 Liannian ordered both the spicy tofu and the bland steamed broccoli so Ander would have something he could enjoy