

**CS6320, Fall 2020**  
**Dr. Mithun Balakrishna**  
**Homework 6**

**A. Problems:**

**1. Thematic Roles (25 points)**

<b>Thematic Role</b>	<b>Definition</b> <b>Example</b>
Agent	The volitional causer of an event <i>The waiter spilled the soup.</i>
Experiencer	The experiencer of an event <i>John has a headache.</i>
Force	The non-volitional causer of the event <i>The wind blows debris from the mall into our yards.</i>
Theme	The participant most directly affected by an event <i>Only after Benjamin Franklin broke the ice...</i>
Result	The end product of an event <i>The French government has built a regular-size baseball diamond...</i>
Content	The proposition or content of a propositional event <i>Mona asked "You met Mary Ann at a super market?"</i>
Instrument	An instrument used in an event <i>He turned to poaching catfish, stunning them with a shocking device...</i>
Beneficiary	The beneficiary of an event <i>Whenever Ann Callahan makes hotel reservations for her boss...</i>
Source	The origin of the object of a transfer event <i>I flew in from Boston.</i>
Goal	The destination of an object of a transfer event <i>I drove to Portland.</i>

Using the thematic role definitions from the above table, assign the various verb arguments in the following WSJ examples to their appropriate thematic roles:

1. The intense heat buckled the highway about three feet.

**Solution 1:** [FORCE The intense heat] buckled [THEME the highway] [RESULT about three feet].

**Solution 2:** The intense [FORCE heat] buckled the [THEME highway] [RESULT about three feet].

2. He melted her reserve with a husky-voiced paean to her eyes.

**Solution 1:** [AGENT He] melted [THEME her reserve] [INSTRUMENT with a husky-voiced paeon to her eyes].

**Solution 2:** [AGENT He] melted [THEME her reserve] with a husky-voiced [INSTRUMENT paeon] to her eyes.

3. But Mingo, a major Union Pacific shipping center in the 1890s, has melted away to little more than the grain elevator now.

**Solution 1:** But [EXPERIENCER Mingo, a major Union Pacific shipping center in the 1890s,] has melted away [RESULT to little more than the grain elevator] now.

**Solution 2:** But [EXPERIENCER Mingo], a major Union Pacific shipping center in the 1890s, has melted away [RESULT to little more than the grain elevator] now.

## 2. Word Sense Disambiguation (50 points):

**function** SIMPLIFIED LESK(*word*, *sentence*) **returns** best sense of *word*

*best-sense*  $\leftarrow$  most frequent sense for *word*

*max-overlap*  $\leftarrow$  0

*context*  $\leftarrow$  set of words in *sentence*

**for each** *sense* **in** senses of *word* **do**

*signature*  $\leftarrow$  set of words in the gloss and examples of *sense*

*overlap*  $\leftarrow$  COMPUTEOVERLAP(*signature*, *context*)

**if** *overlap* > *max-overlap* **then**

*max-overlap*  $\leftarrow$  *overlap*

*best-sense*  $\leftarrow$  *sense*

**end**

**return**(*best-sense*)

Using WordNet Library API to access the WordNet dictionary, implement the SIMPLIFIED LESK algorithm to disambiguate the word *bank* in the sentence. Your output should show the word overlap for each sense of the word *bank* in WordNet and the final chosen sense.

*The bank can guarantee deposits will eventually cover future tuition costs because it invests in adjustable-rate mortgage securities.*