Grammar Basics

- A simple grammar can over generate sentences that are not grammatical.
- In many languages nouns have different cases.
- Many languages also require subject/verb agreement.
- EX: “Me has the gold”
Changes Needed to Handle Objective and Subjective Cases

Augment

- Instead of introducing new rules, augment the existing grammar.
- Both NP and Pronoun will take a parameter indicating their case.
- Subject/verb agreement as well; instead verb subcategorization.
Using Augmentations to represent Noun Cases

S -> NP(Subj) VP | ...
NP(case) -> Pronoun(case) | Noun | Article Noun | ...
VP -> VP NP(OBJ) | ...
Pronoun(Subj) -> I | you | he | she | ...
Pronoun(OBJ) -> me | you | him | her | ...

Verb Subcategorization

- We want to accept phrases like “Give me the gold.”
- We do not want “Go me the gold.”
- The grammar must state which verbs can be followed by which other categories
- Each verb has a list of compliments
- EX: “Give the gold to me.”
### Examples of Verbs With Their Subcategorization Frames

<table>
<thead>
<tr>
<th>Verb</th>
<th>Subcats</th>
<th>Example Verb Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>give</td>
<td>[NP, PP]</td>
<td>Give the gold in 3 3 to me</td>
</tr>
<tr>
<td></td>
<td>[NP, NP]</td>
<td>Give me the gold</td>
</tr>
<tr>
<td>smell</td>
<td>[NP]</td>
<td>Smell a wumpus</td>
</tr>
<tr>
<td></td>
<td>[Adjective]</td>
<td>Smell awful</td>
</tr>
<tr>
<td></td>
<td>[PP]</td>
<td>Smell like a wumpus</td>
</tr>
</tbody>
</table>

### Verbs with Their Categorization (cont.)

<table>
<thead>
<tr>
<th>Verb</th>
<th>Subcats</th>
<th>Example Verb Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>is</td>
<td>[Adjective]</td>
<td>Is smelly</td>
</tr>
<tr>
<td></td>
<td>[PP]</td>
<td>Is in 2 2</td>
</tr>
<tr>
<td></td>
<td>[NP]</td>
<td>Is a pit</td>
</tr>
<tr>
<td>died</td>
<td>[ ]</td>
<td>died</td>
</tr>
<tr>
<td>believe</td>
<td>[S]</td>
<td>believe the smelly wumpus in 2 2 is dead</td>
</tr>
</tbody>
</table>
Integrating Verb Subcategorization into the Grammar

- First, augment the category VP to take a subcategorization argument that indicates the compliments needed to form a complete VP.
- Second, change the rule for S to say that it requires a verb phrase that has all its compliments.
- In addition to compliments phrases can also adjuncts.

Generative Capacity of Augmented Grammars

- Depends on the number of values for the augmentation (if finite then equivalent to CFG)
- Consider each augmented rule as a rule schema which stands for a set of rules, one for each set of values for the augmented constitutes
- In general, augmented grammars go beyond context free grammars
Example

- Me spell chucker work grate. Need grandma chicken?

THE END