SEVENTH QUIZ

You have 15 minutes from the start of class to complete this quiz. Read the questions with care; work with deliberate speed. Don’t give us more than we ask for. The usual instructions apply. Good luck!

Problem 1 (10 points)

Below is a grammar in which terminal symbols are indicated by this typewriter typeface.

\[ \text{Name} \rightarrow \text{fullname} \mid \text{fullname} \text{ degrees} \\
\text{fullname} \rightarrow \text{first} \mid \text{middle} \mid \text{last} \mid \text{suffix} \\
\text{first} \rightarrow \text{huey} \mid \text{dewey} \mid \text{louie} \\
\text{middle} \rightarrow \text{m.} \mid \text{q.} \mid \text{r.} \\
\text{last} \rightarrow \text{duck} \mid \text{goose} \mid \text{xiv} \\
\text{suffix} \rightarrow \text{empty} \mid \text{, jr\text{-}sr} \mid \text{generation} \\
\text{jr\text{-}sr} \rightarrow \text{jr.} \mid \text{sr.} \\
\text{generation} \rightarrow \text{i} \mid \text{ii} \mid \text{iii} \\
\text{degrees} \rightarrow \text{empty} \mid \text{, one\text{-}degree} \mid \text{degrees} \\
\text{one\text{-}degree} \rightarrow \text{md} \mid \text{ph\text{-}d.} \]

(a) (6 points) Mark each of the following six sentences “legal” or “illegal” according to this grammar:

- Huey Q. Duck, Jr.
- Dewey Goose III
- Huey M. Duck, Jr., Sr., III
- Louie R. XIV
- Dewey Q. Duck, Ph.D., M.D.
- Louie R. Duck, Jr., M.D., M.D.

(b) (4 points) Draw the derivation (parse tree) for one of the legal sentences above.
Problem 2 (10 points)
In class we discussed the “software crisis.”
(a) (2 points) In just a few words, what is the “software crisis”?
(b) (2 points) We covered three different approaches to “solving” the crisis; list two of them.
(c) Pick one of the two approaches you listed above, and write its name here:
(c.1) (3 points) In one brief English sentence, describe the approach you just listed.
(c.2) (3 points) In one brief English sentence, give a reason why this approach did not (completely) solve the software crisis (other than “It was too time-consuming and expensive”).
<table>
<thead>
<tr>
<th>Brief definition or description</th>
<th>One reason why it didn’t “solve” the software crisis (other than “It’s too expensive and time-consuming”).</th>
<th>One situation where this approach is appropriate or useful today, or one useful concept or technique that this approach produced.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured (“gotoless”) pro-</td>
<td></td>
<td></td>
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<tr>
<td>gramming</td>
<td></td>
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<td>N-version programming (“design</td>
<td></td>
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<tr>
<td>diversity”)</td>
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<td>Formal verification</td>
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<td>(program proofs)</td>
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