



Lecture 17

Semantics Analysis

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Take aways from the last class

- Bottom-up parsing of translation scheme

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- Inherited Attributes on the parser stack

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- Simulating the evaluation of inherited attributes

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- General Algorithm

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 - ▶ May be restrictive in some situations
 - ▶ Rapid prototyping may be difficult

Rapid prototyping is an iterative approach to user interface design that can help you test and validate ideas early in the design process.

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 - ▶ Constructed Type: array, record, pointers, functions

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 - ▶ void: no type value

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function $f(char\ a, char\ b) : *integer$; is denoted by $char \times char \rightarrow pointer(integer)$

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- $\text{record}((\text{addr} \times \text{integer}) \times (\text{lexeme} \times \text{array}(1 \dots 15, \text{char})))$

type expression for record.

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- $E \rightarrow E_1[E_2]$ $E.\text{type} = \text{if } E_2.\text{type} == \text{integer and } E_1.\text{type} == \text{array}(s, t) \text{ then } t \text{ else type_error}$

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- $E \rightarrow *E_1$ $E.type = \text{if } E_1.type == \text{pointer}(t)$
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E2 will denote the index of array.

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 then void
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- $S \rightarrow \text{if}(E)\text{then } S_1 \quad S.Type = \text{if } E.type == \text{boolean}$
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 then $S_1.type$
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- $S \rightarrow \text{while}(E)\text{do } S_1$ $S.Type = \text{if } E.type == \text{boolean}$
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- $S \rightarrow \text{while}(E)\text{do } S_1 \quad S.Type = \text{if } E.type == \text{boolean} \text{ then } S_1.type \text{ else type_error}$
- $S \rightarrow S_1; S_2 \quad S.Type = \text{if } S_1.type == \text{void} \text{ and } S_2.type == \text{void} \text{ then void else type_error}$