



Data Structures for Symbol Tables

Complement to Lecture 2, pages 80–88

Christoph Kessler, IDA,
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Symbol table



Set of symbol table items

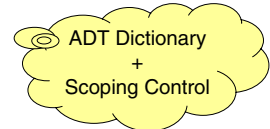
- searchable by name + scope

Data stored for each entry:

- name
- attributes
 - type (int, bool, array, ptr, function)
 - address (block, offset)
 - declared or not, used or not
 - ...

Operations

- lookup (name)
- insert (name)
- put (name, attribute, value)
- get (name, attribute)
- enter scope ()
- exit scope ()



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2b.2

Data structures for Symbol tables



For flat symbol tables: (one block of scope)

- Linear lists
 - Hash tables
 - ...
- (see data structures for ADT Dictionary)

For nested scopes:

- Linear lists with scope control
- Trees of flat symbol tables
- Hash tables with scope control (see following slides)

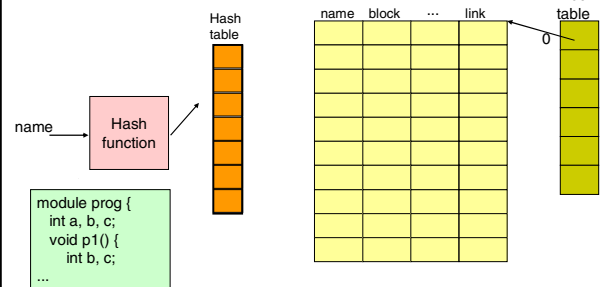
TDDb29/44, C. Kessler, IDA, Linköpings universitet, 2006.

2b.3

Hash tables with chaining



Current scope block: 0



insert p1 and enter a new scope block (2)

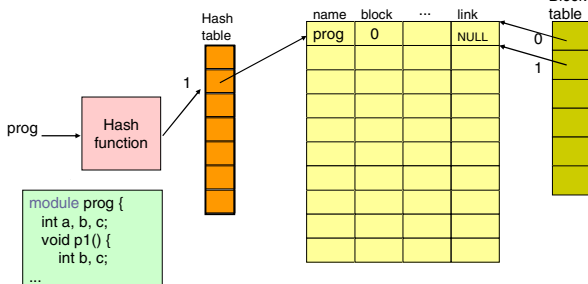
TDDb29/44, C. Kessler, IDA, Linköpings universitet, 2006.

2b.4

Hash tables with chaining



Current scope block: 1



insert prog and enter a new scope block (1)

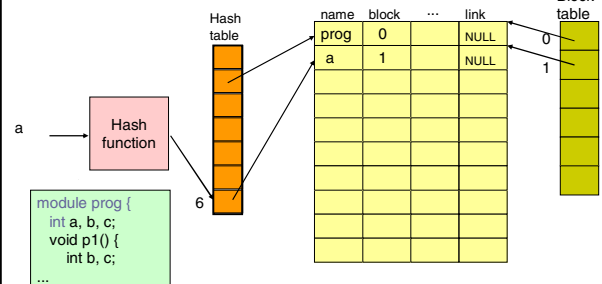
TDDb29/44, C. Kessler, IDA, Linköpings universitet, 2006.

2b.5

Hash tables with chaining



Current scope block: 1

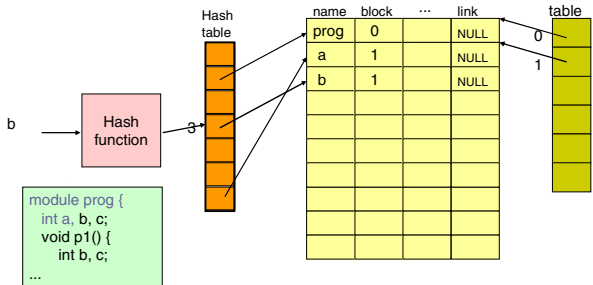


TDDb29/44, C. Kessler, IDA, Linköpings universitet, 2006.

2b.6

Hash tables with chaining

Current scope block: 1

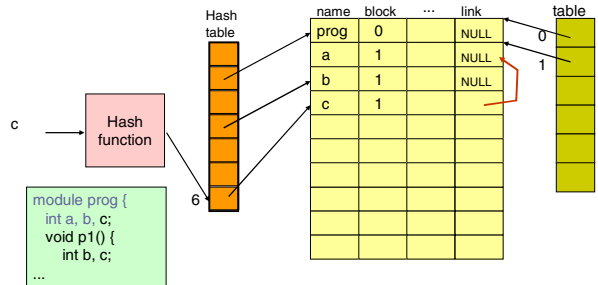


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2b.7

Hash tables with chaining

Current scope block: 1



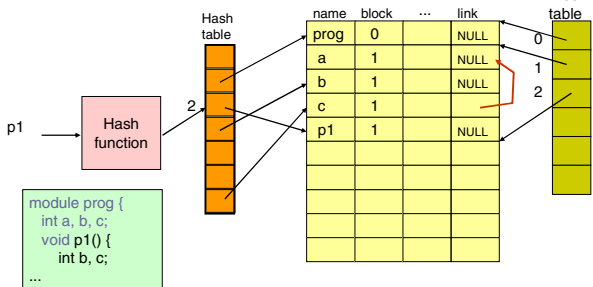
a and c hash to the same hash value (6) – use chaining

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2b.8

Hash tables with chaining

Current scope block: 1->2



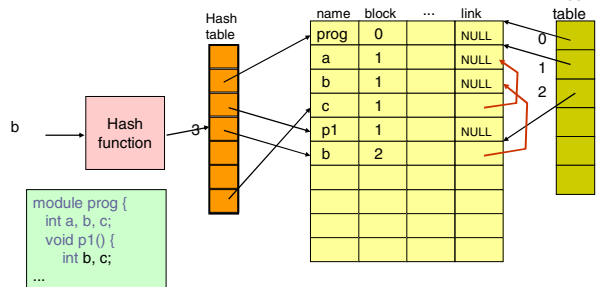
insert p1 and enter a new scope block (2)

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2b.9

Hash tables with chaining

Current scope block: 2



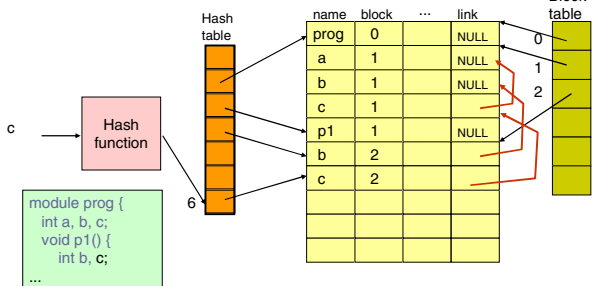
make hash table point to (statically) closest b – will later find this one first in chain

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2b.10

Hash tables with chaining

Current scope block: 2

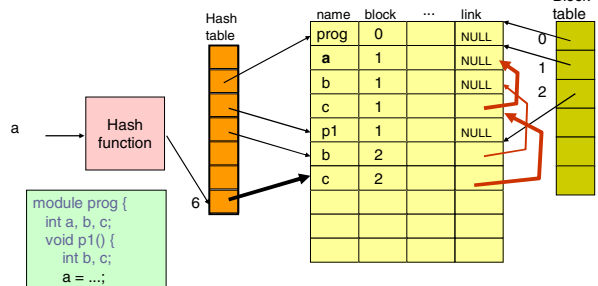


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2b.11

Hash tables with chaining

Current scope block: 2



lookup(a): follow chain links ...

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2b.12