

# Micro Overview and Symbol Tables

CS316 Spring 2022

# Example Micro Program

- Refer to the grammar in PA2 to know the programming constructs fully.
  - [MicroProgram](#)

# Beyond Syntactic Analysis

- Until now:

- `INT x:=2;`       $\equiv$       `INT x:=5;`
- `x:=y+100`       $\equiv$       `x:=y+10000000000000000;`
- `INT x, y;`  
  `y := (2.3 * 6);`      ✓  
  `x := ( main );`      ✓

- Now on:

...toward meaningful, executable programs

# Symbol Table

- *A symbol table* maintains
  - Symbolic names
  - Attributes of a name
    - E.g. type, scope, accessibility
- Used to manage declarations of symbols and their correct usage

# Symbol Table – Names

**For the sample program shown below identify all names (note: this is not a valid micro program)**

```
PROGRAM scope_test
BEGIN
#global declarations
FUNCTION void f(float, float, float)
FUNCTION void g(int)
{
    INT w, x;
    {
        FLOAT x, z;
        f(x, w, z);
    }
    g(x);
}

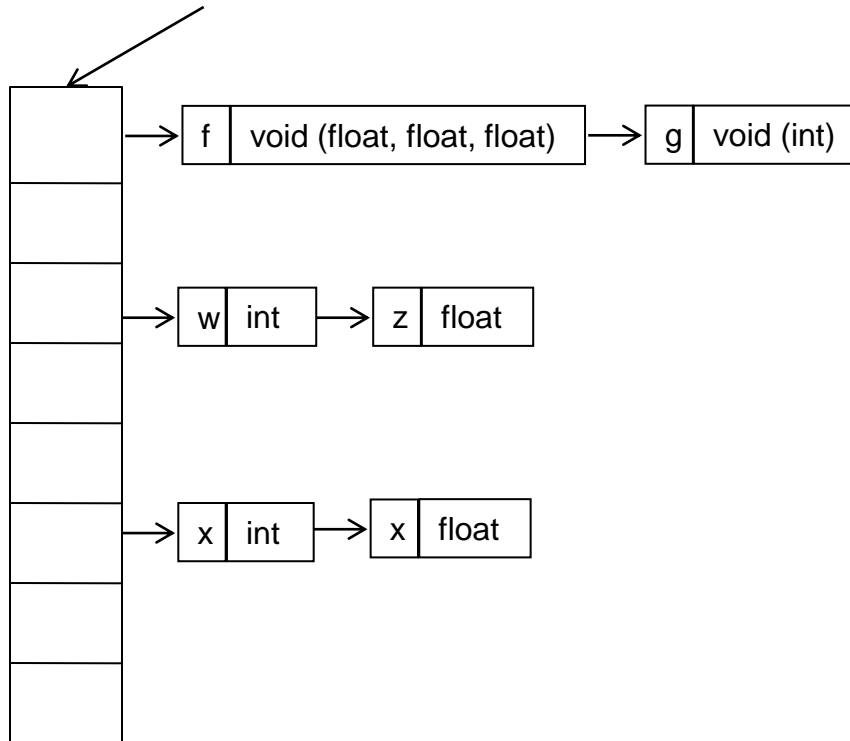
END
```

# Symbol Table Implementation – High-level Requirements

- Should accommodate:
  - Efficient retrieval of names
  - Frequent insertion and deletion of names
- Should consider *scopes*

# Symbol Table – an implementation

Hash table of names



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END
```

# Symbol Table – an implementation

Hash table of names

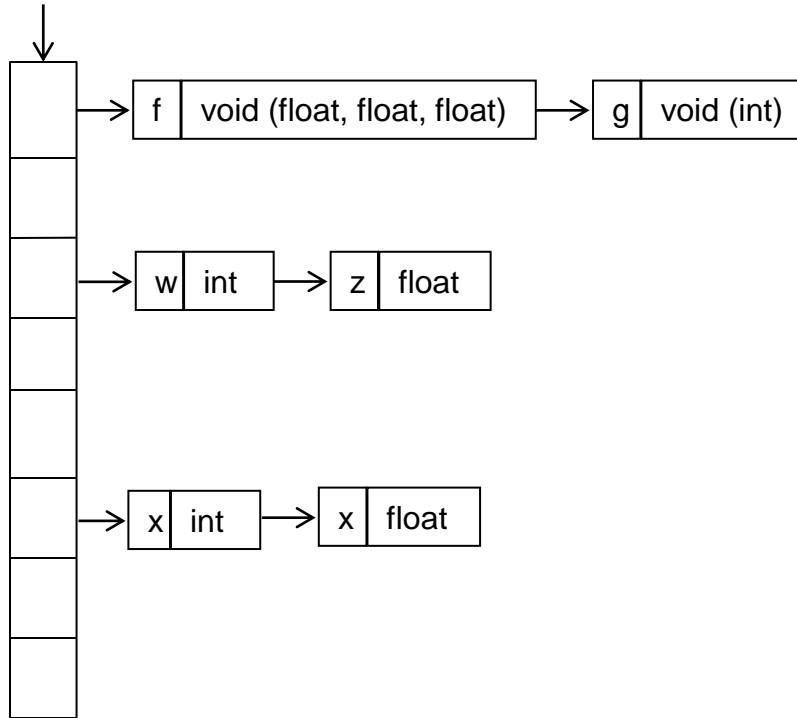
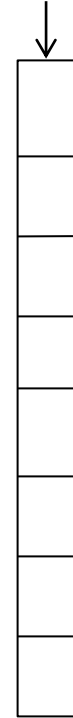


Table of scopes

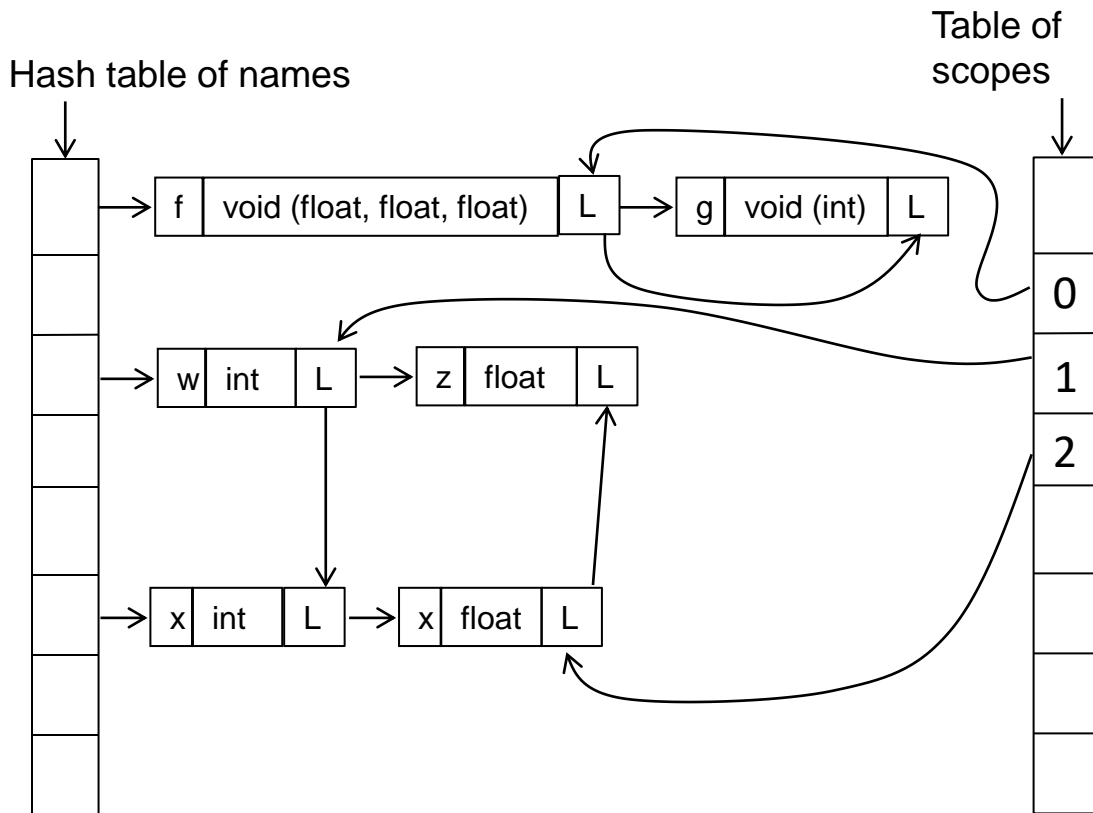


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END
```

- be aware of current scope
- Be aware of all active scopes
- Chain names by their scope-levels



# Symbol Table – an implementation

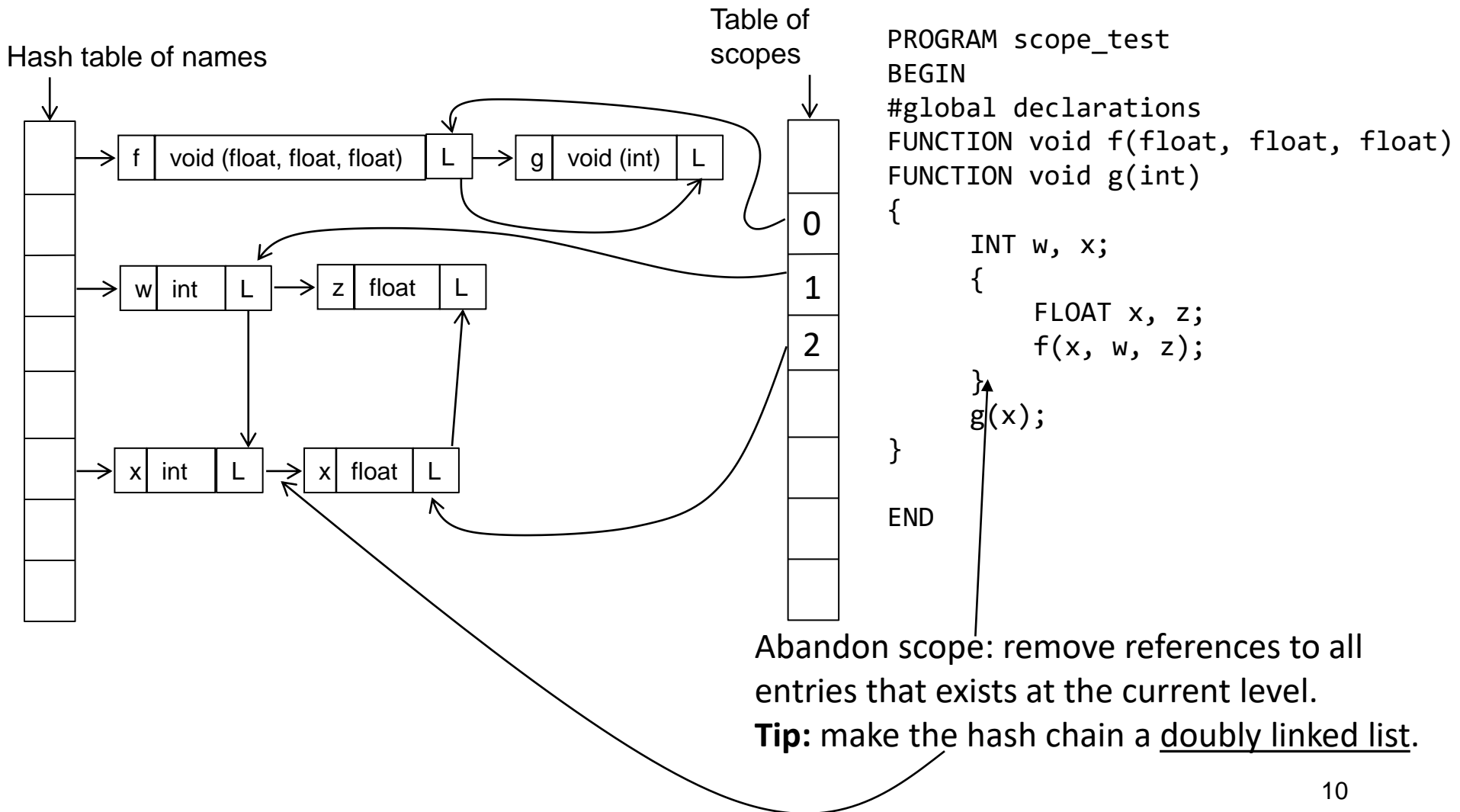


```

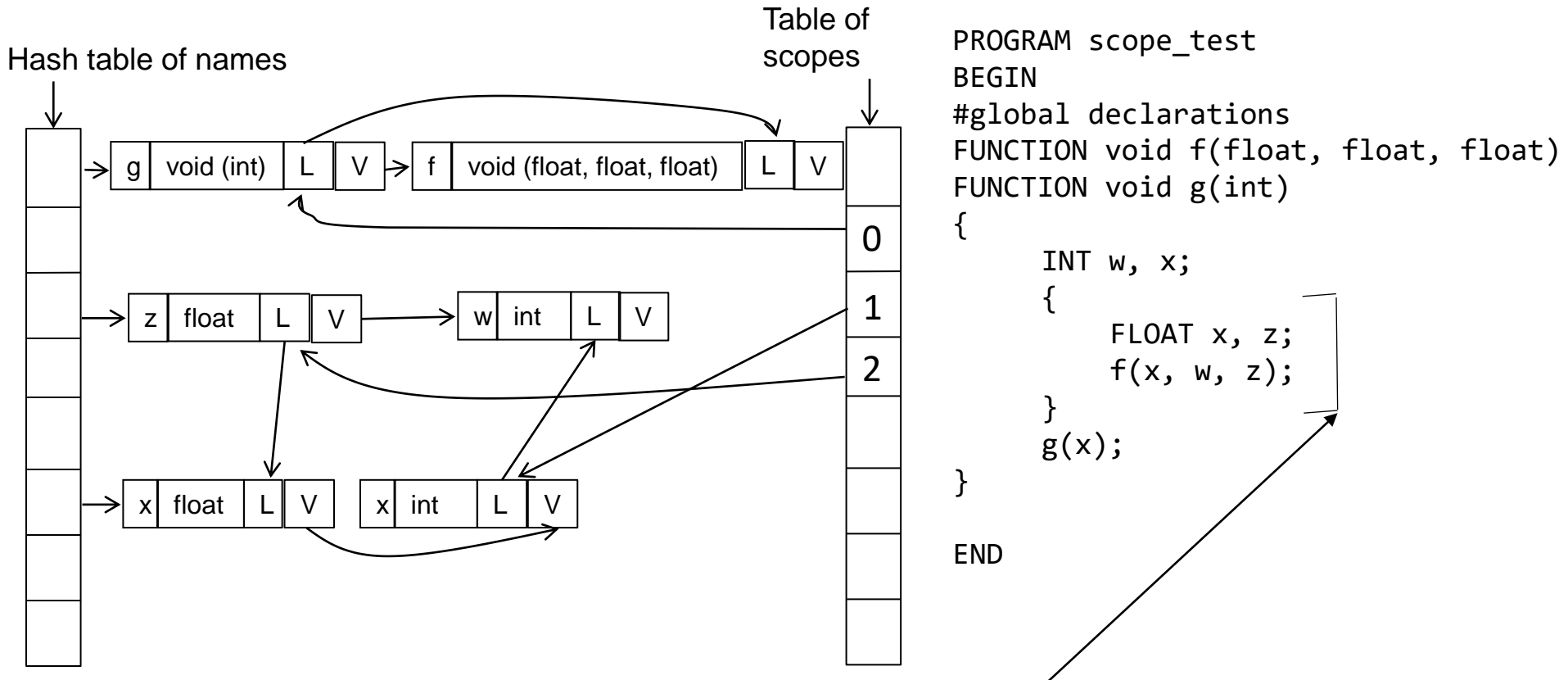
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    g(x);
}
END
  
```

- Chain names by their scope-levels

# Symbol Table – an implementation



# Symbol Table – an implementation



# Symbol Table – an implementation

