Deklarierte Namen in MicroJava

Programm	`Program()`	
Konstanten	`ConstDecl()`	
Globale Variablen	`VarDecl()`	`level = 0`
Klassen	`ClassDecl()`	
Felder	`VarDecl()`	`level = 1`
Methoden	`MethodDecl()`	
Formale Parameter	`FormPars()`	
Lokale Variablen	`VarDecl()`	`level = 1`

Wird ein Name deklariert, wird er in die Symbolliste eingefügt

Objektknoten


```
class Obj {
  enum Kind {
    Con, Var, Type, Meth, Prog
  }

  Kind   kind;
  String name;
  Struct type;
  int    val;      // Con: value
  int    adr;      // Var, Meth: address
  int    level;    // Var: 0 = global, 1 = local
  int    nPars;    // Meth: number of parameters
  // Meth: parameters and local objects
  // Prog: global variables, constants,
  //       classes and methods
  Map<String, Obj> locals;
}
```

Strukturknoten und Scope-Knoten


```
class Struct {
  enum Kind {
    None, Int, Char, Arr, Class
  }
  Kind   kind;
  Struct elemType;  // Arr: element type
  Map<String, Obj> fields; // Class: list of fields

  int nrFields() { return fields.size(); } // Class
}

class Scope {
  Scope outer;   // next outer scope
  Map<String, Obj> locals; // list of objects in this scope
  int   nVars;   // number of variables in this scope
}
```

Symboltabelle


```
class Tab {
  public static final Struct
                    noType, intType, charType, nullType;
  public Obj noObj, chrObj, ordObj, lenObj;

  public Parser parser;  // target for errors
  public Scope curScope; // current scope
  private int curLevel;  // nesting level of current scope

  public Tab(Parser parser);
  public void openScope();
  public void closeScope();
  public Obj insert(Obj.Kind kind, String name, Struct type);
  public Obj find(String name);
  public Obj findField(String name, Struct type);
}
```

Füllen der Symbolliste


```
/** VarDecl = Type ident { "," ident } ";" . */
private void VarDecl() {
  Type();
  check(ident);

  while (sym == comma) {
    scan();
    check(ident);

  }
  check(semicolon);
}
```

Füllen der Symbolliste


```
/** VarDecl = Type ident { "," ident } ";" . */
private void VarDecl() {
  Struct type = Type();
  check(ident);
  tab.insert(Obj.Kind.Var, t.str, type);
  while (sym == comma) {
    scan();
    check(ident);
    tab.insert(Obj.Kind.Var, t.str, type);
  }
  check(semicolon);
}
```

Symbolliste verwenden


```
/** Type = ident [ "[" "]" ] . */
private void Type() {
  check(ident);




  if (sym == lbrack) {
    scan();
    check(rbrack);

  }

}
```

Symbolliste verwenden


```
/** Type = ident [ "[" "]" ] . */
private Struct Type() {
  check(ident);
  Obj o = tab.find(t.str);
  if (o.kind != Obj.Kind.Type) {
    error(NO_TYPE);
  }
  Struct type = o.type;
  if (sym == lbrack) {
    scan();
    check(rbrack);
    type = new Struct(type);
  }
  return type;
}
```

Klassen

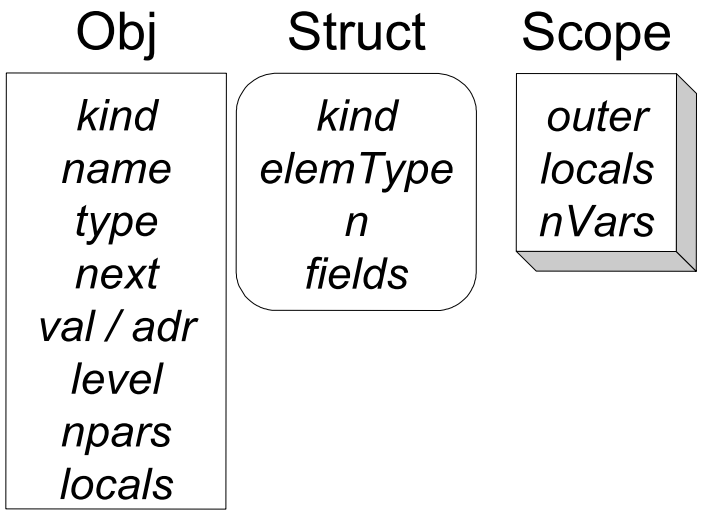

```
/** ClassDecl = "class" ident "{" {VarDecl} "}" . */
private void ClassDecl() {
  check(class_);
  check(ident);


  check(lbrace);

  while (sym == ident) {
    VarDecl();
  }
  check(rbrace);


}
```

Klassen

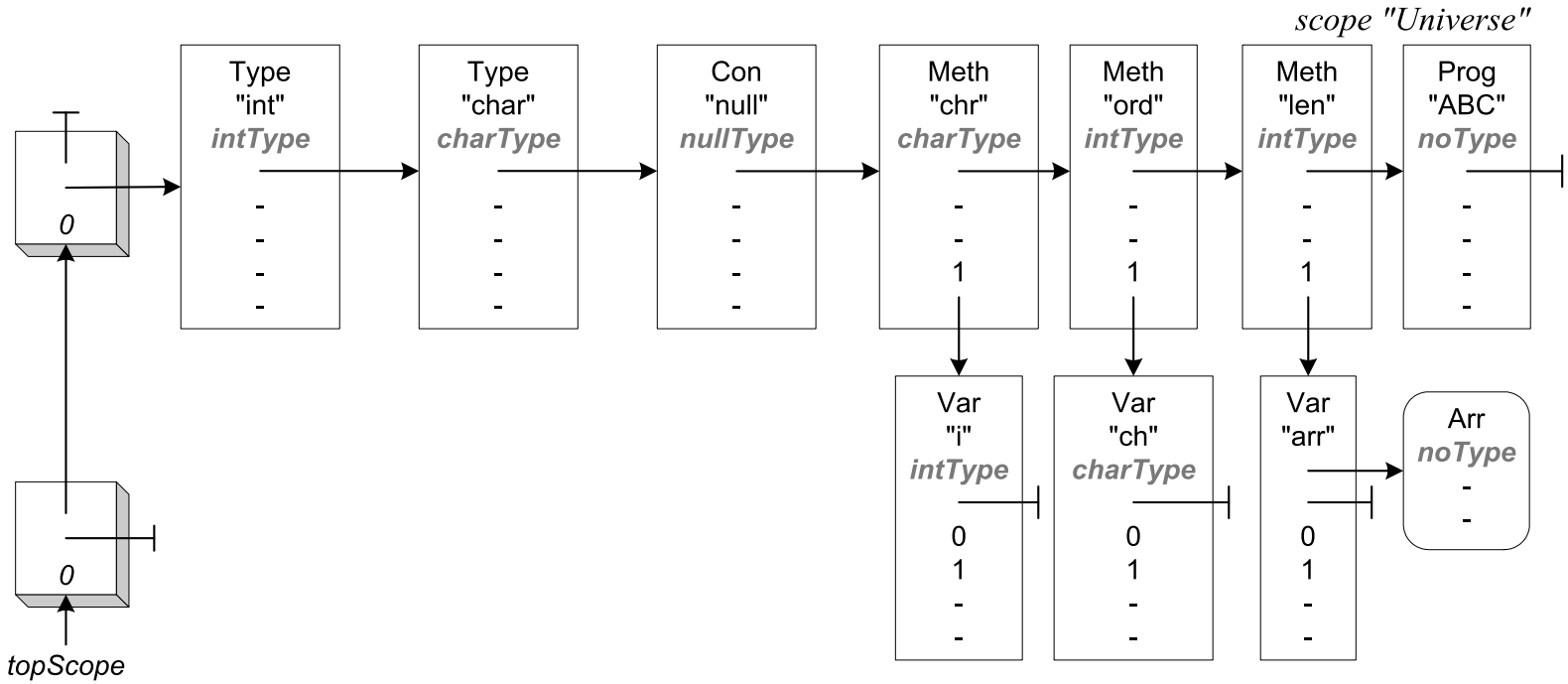

```
/** ClassDecl = "class" ident "{" {VarDecl} "}" . */
private void ClassDecl() {
  check(class_);
  check(ident);
  Obj clazz = tab.insert(Obj.Kind.Type,
      t.str, new Struct(Struct.Kind.Class));
  check(lbrace);
  tab.openScope();
  while (sym == ident) {
    VarDecl();
  }
  check(rbrace);
  clazz.type.fields = tab.curScope.locals;
  tab.closeScope();
}
```

Beispiel: Symbollistenaufbau

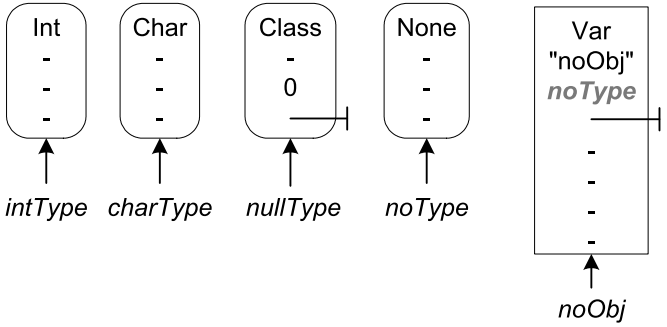

```
program Abc /* 1 */
   char[] c;
   int max;
   char npp;
{
   int put /* 2 */ (int x)
   { /* 3 */
      x++;
      print(x, 5);
      npp = 'C';
      return x;
   } /* 4 */
} /* 5 */
```



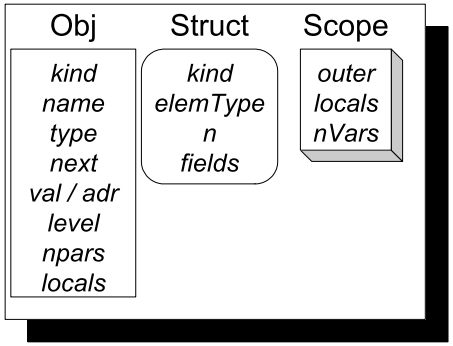
Beispiel: Bei Punkt ①



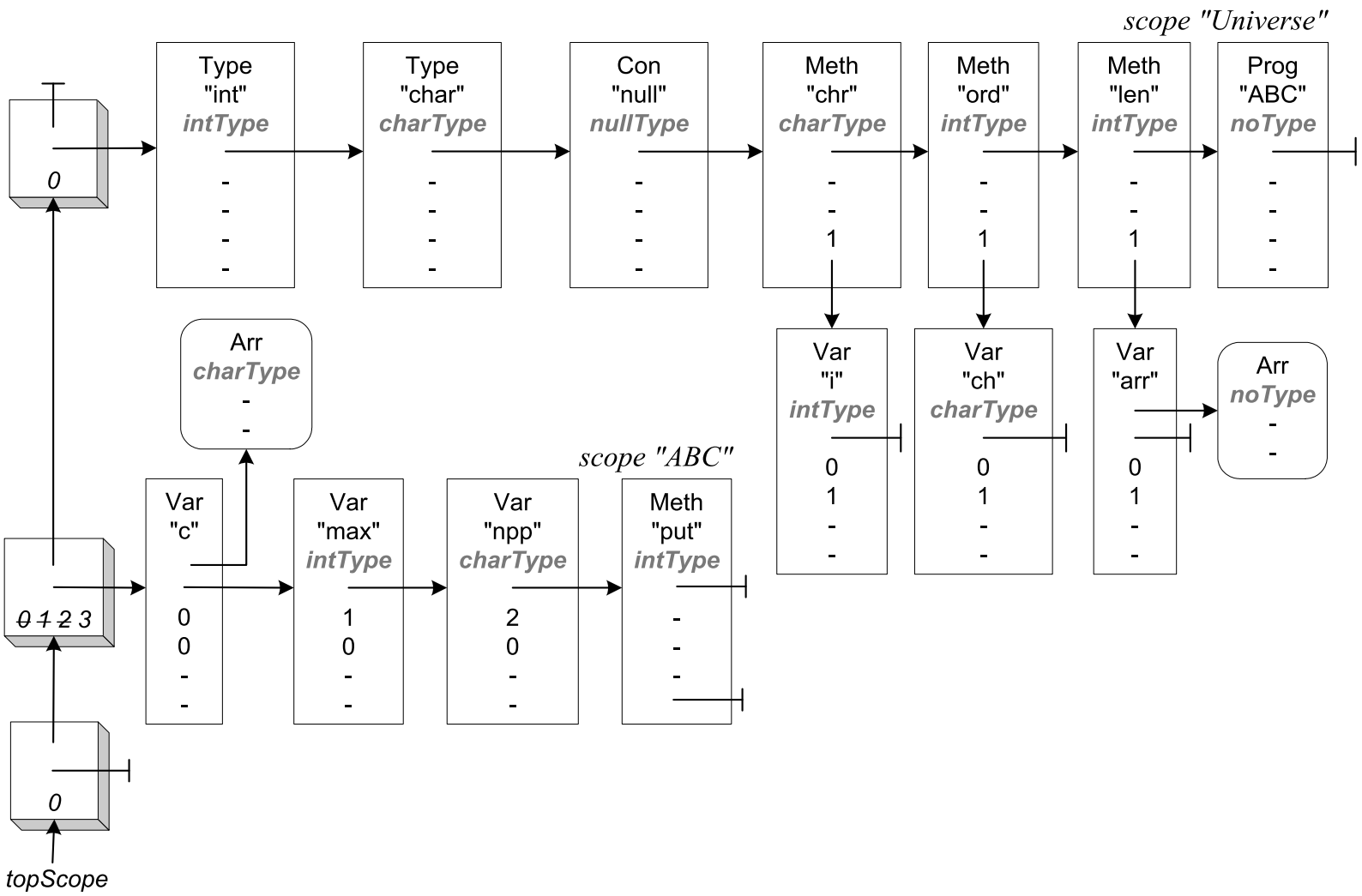
Vordefinierte Typen und Objekte:



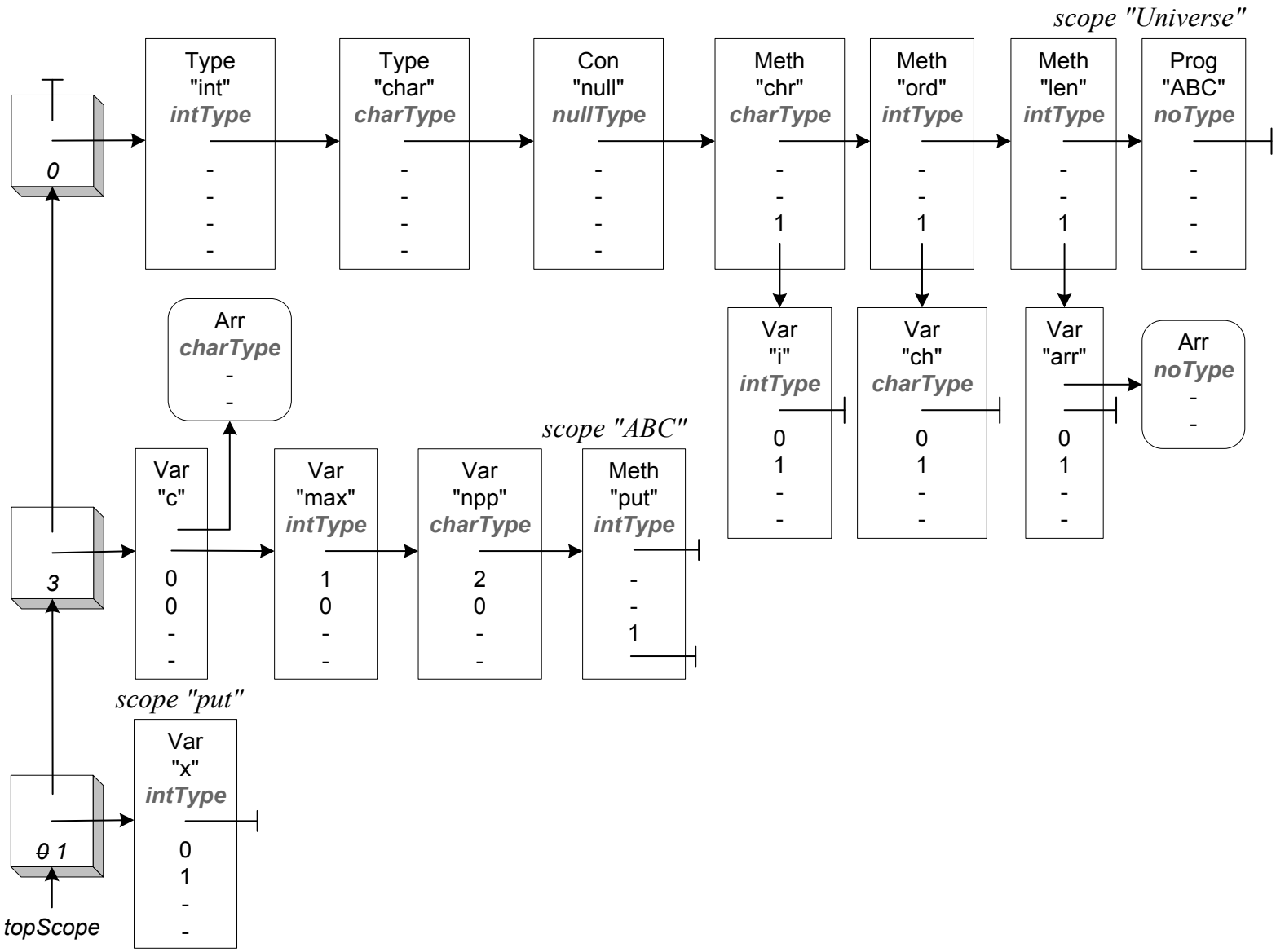
Struktur der 3 Knotenarten:



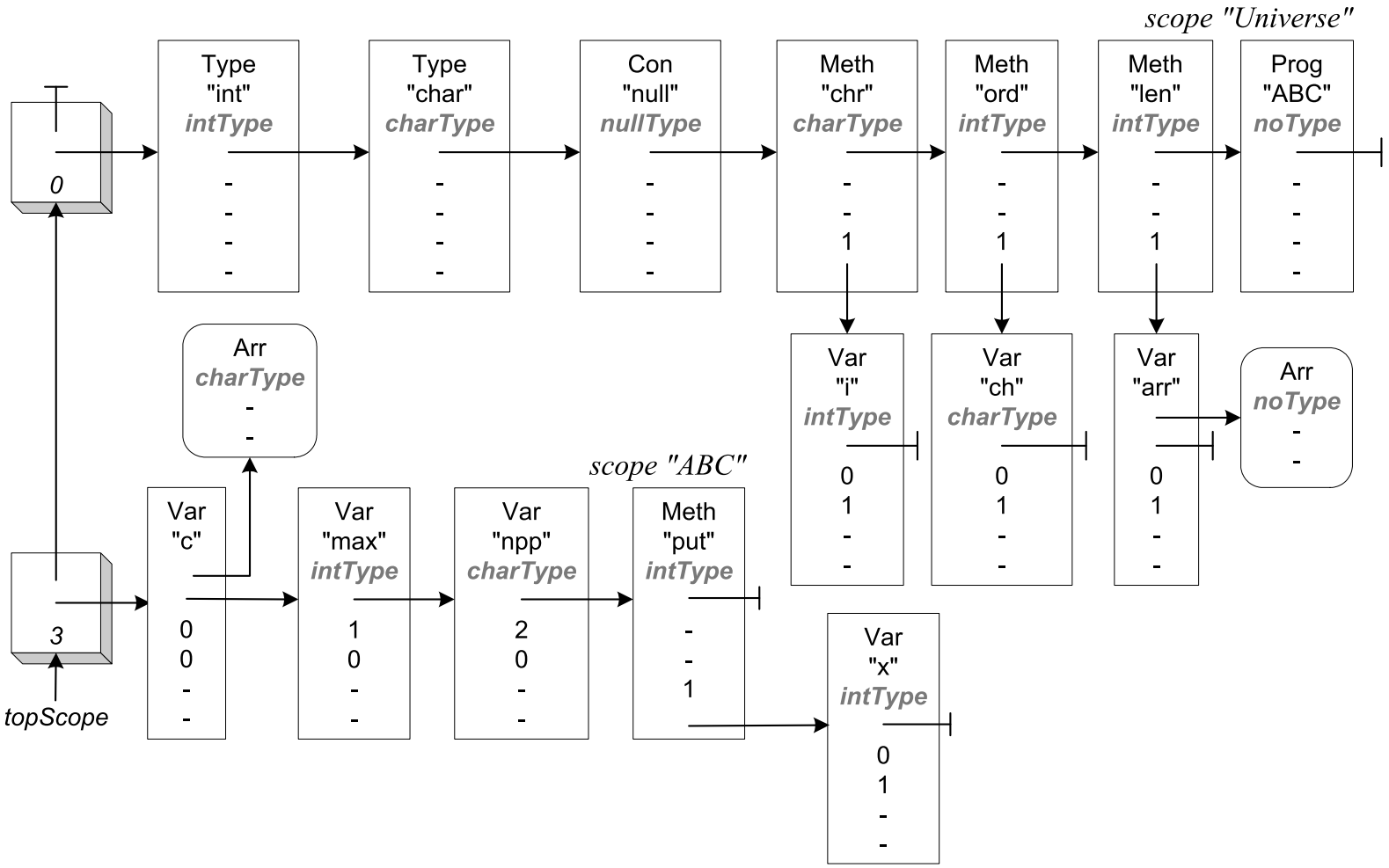
Beispiel: Bei Punkt ②



Beispiel: Bei Punkt ③



Beispiel: Bei Punkt ④



Beispiel: Bei Punkt ⑤