II.1. Grundelemente der Programmierung

- 1. Erste Schritte
- 2. Einfache Datentypen
- 3. Anweisungen und Kontrollstrukturen
- 4. Verifikation
- **5. Arrays**

5. Arrays

folge:

14	1	0	8

```
folge [0] == 14, ..., folge [3] == 8
```

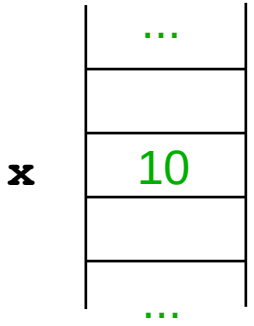
bestand:

Artikel \ Ort	0	1	2	3	...
0	5	0	10	7	
1	1	3	2	0	
2	2	17	1	1	
3	14	1	0	8	
...					

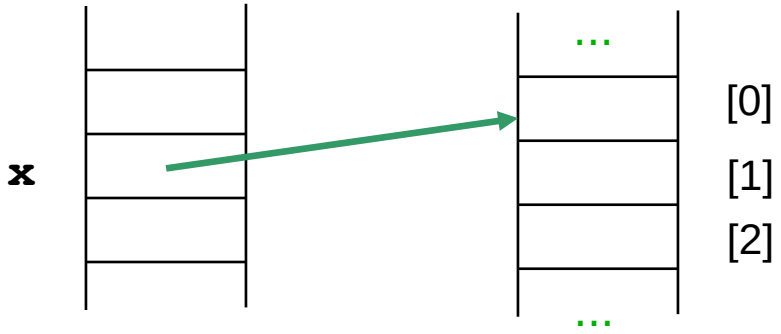
```
bestand [0] [0] == 5, bestand [0] [1] == 0,
bestand [0] [2] == 10, ...
```

Wert- und Referenzvariablen

```
int x;
x = 10;
```




```
int [] x;
x = new int [3];
x [0] = 14;
x [1] = 2;
x [2] = 5;
```



Primitive Datentypen: Variablen speichern Werte

Andere Datentypen (Arrays, Strings, ...): Variablen speichern Verweise

Wert- und Referenzvariablen

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int x;
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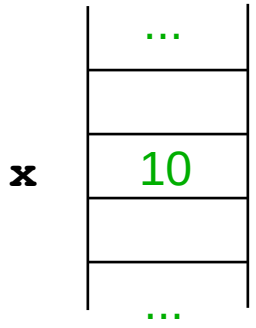


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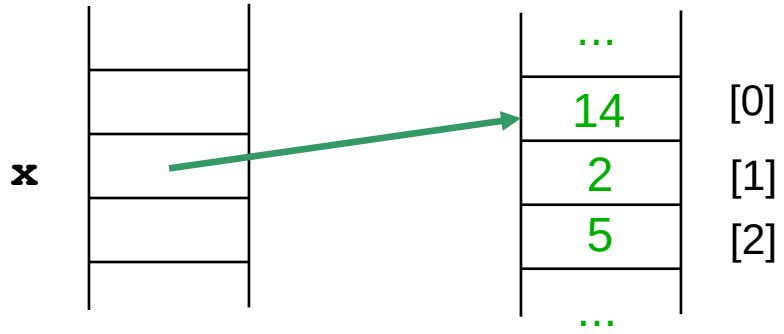


Primitive Datentypen: Variablen speichern Werte

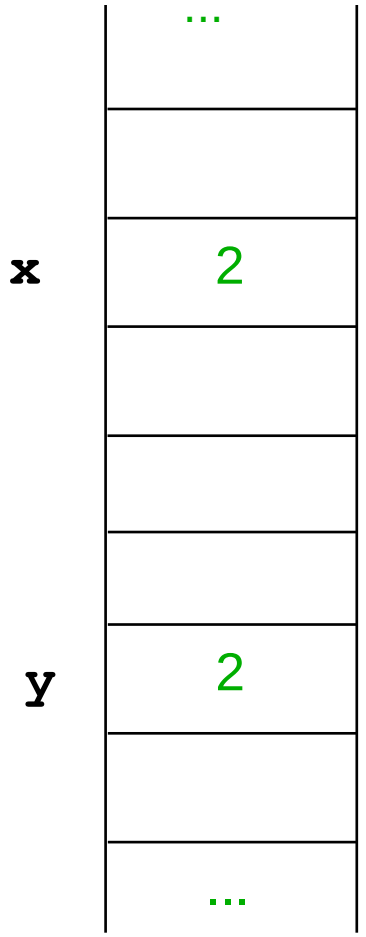
Andere Datentypen (Arrays, Strings, ...): Variablen speichern Verweise

Zuweisung bei Wertvariablen

```
int x = 2;

int y = x;

y = 8;
```



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int x = 2;

int y = x;

y = 8;
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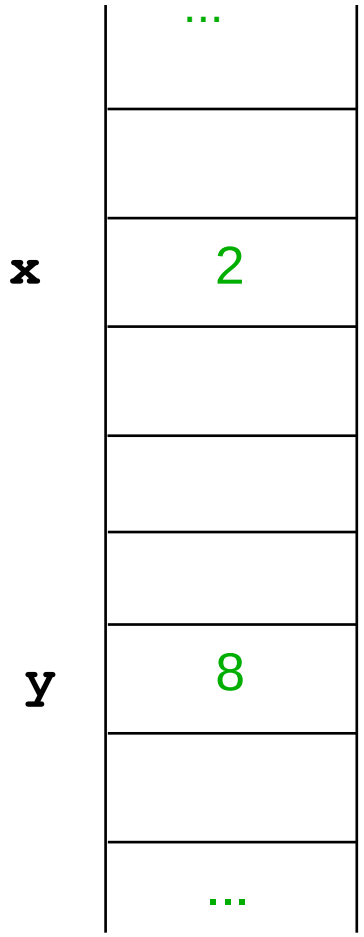


Zum Schluss: `x == 2`

Zuweisung bei Referenzvariablen

```
int [] x = new int [3];

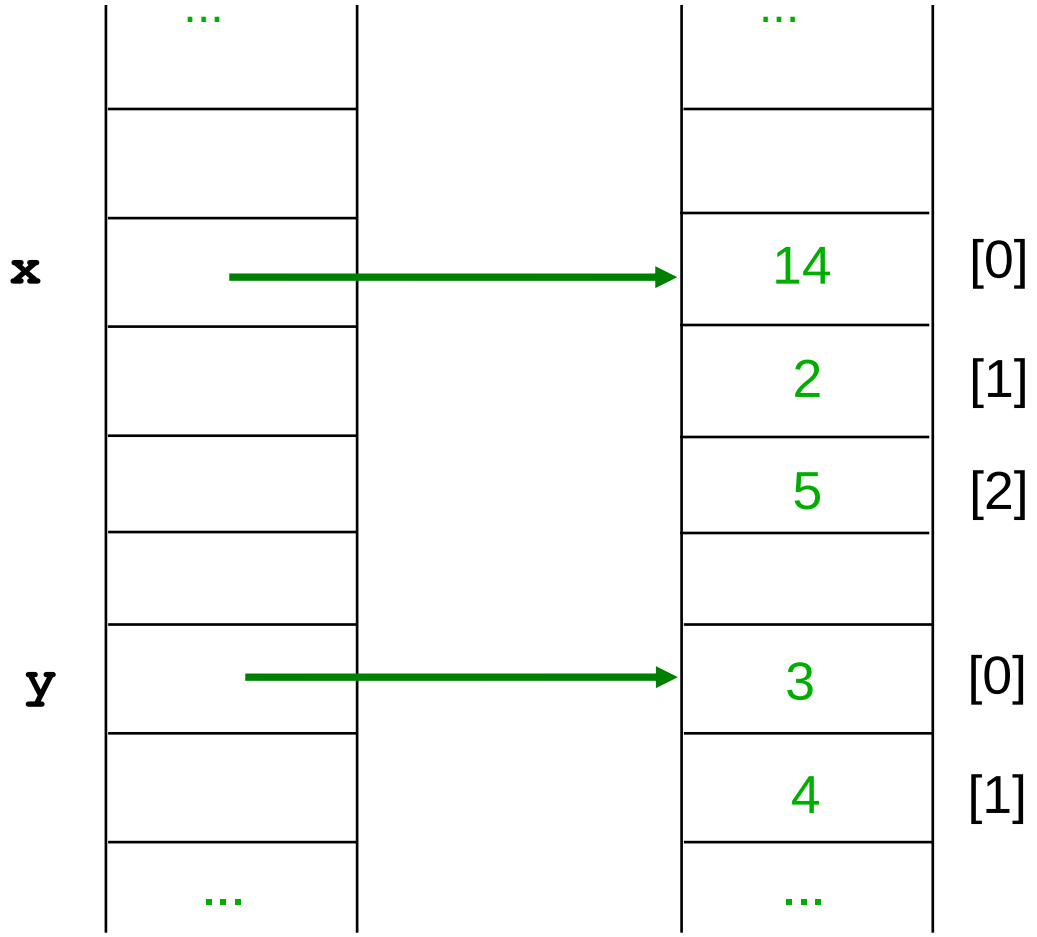
x [0] = 14;
x [1] = 2;
x [2] = 5;

int [] y = new int [2];

y [0] = 3;
y [1] = 4;

y = x;

y [1] = 8;
```



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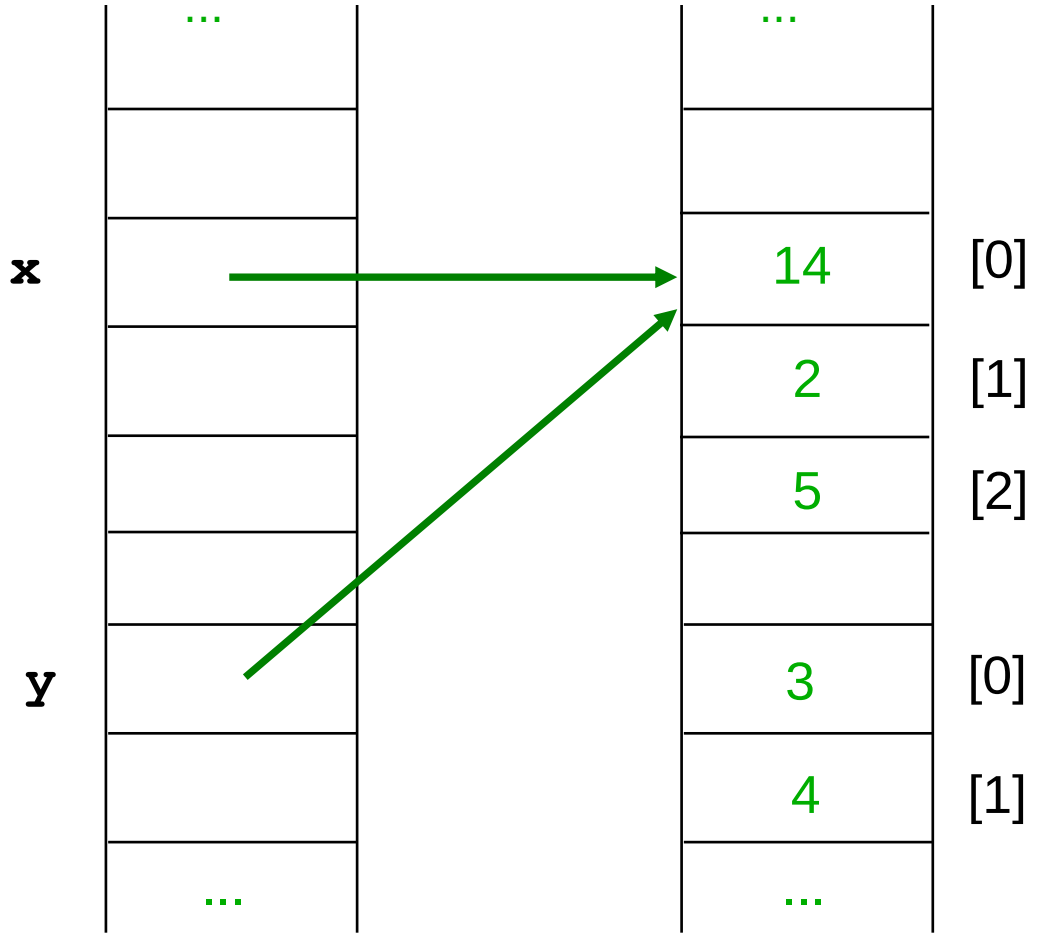

Zuweisung bei Referenzvariablen

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int [] x = new int [3];

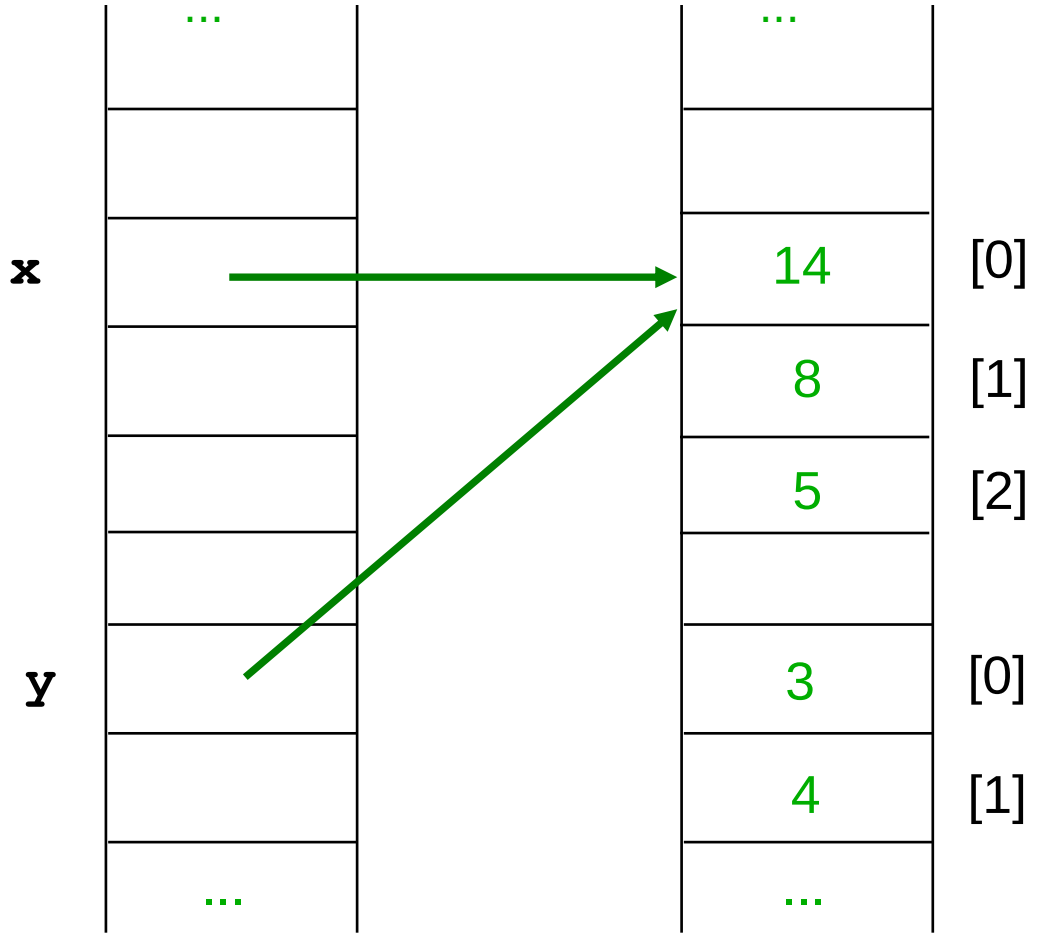
x [0] = 14;
x [1] = 2;
x [2] = 5;

int [] y = new int [2];

y [0] = 3;
y [1] = 4;

y = x;

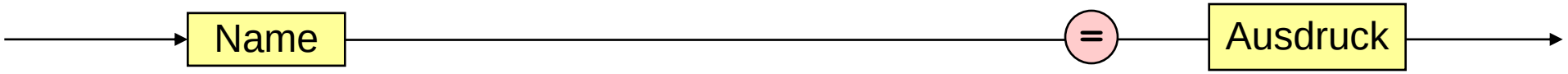
y [1] = 8;
```



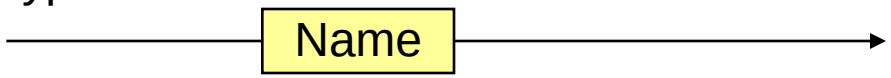
Zum Schluss: `x [1] == 8`

Zuweisung, Typ

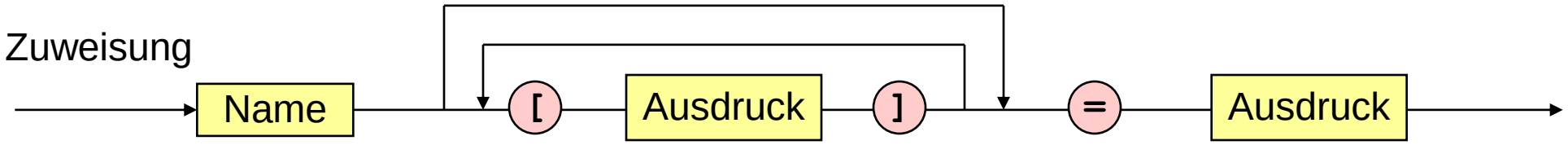
Zuweisung

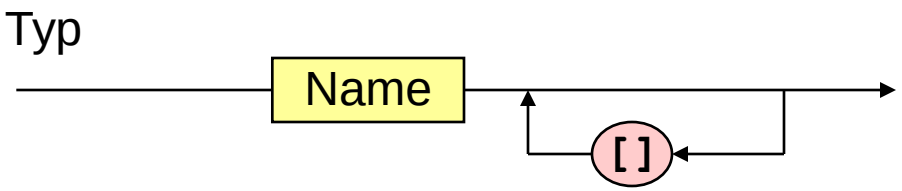


Typ



Zuweisung, Typ





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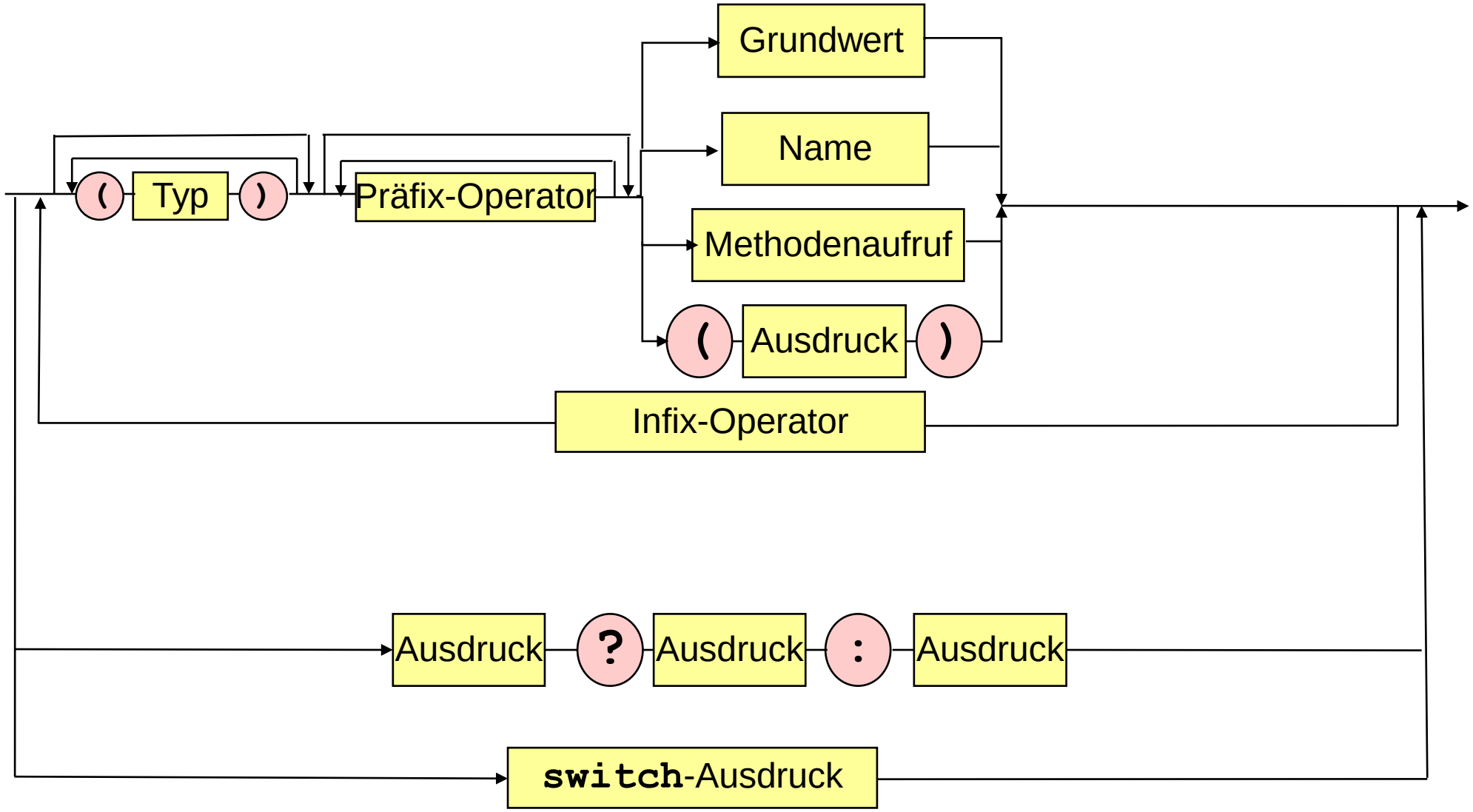
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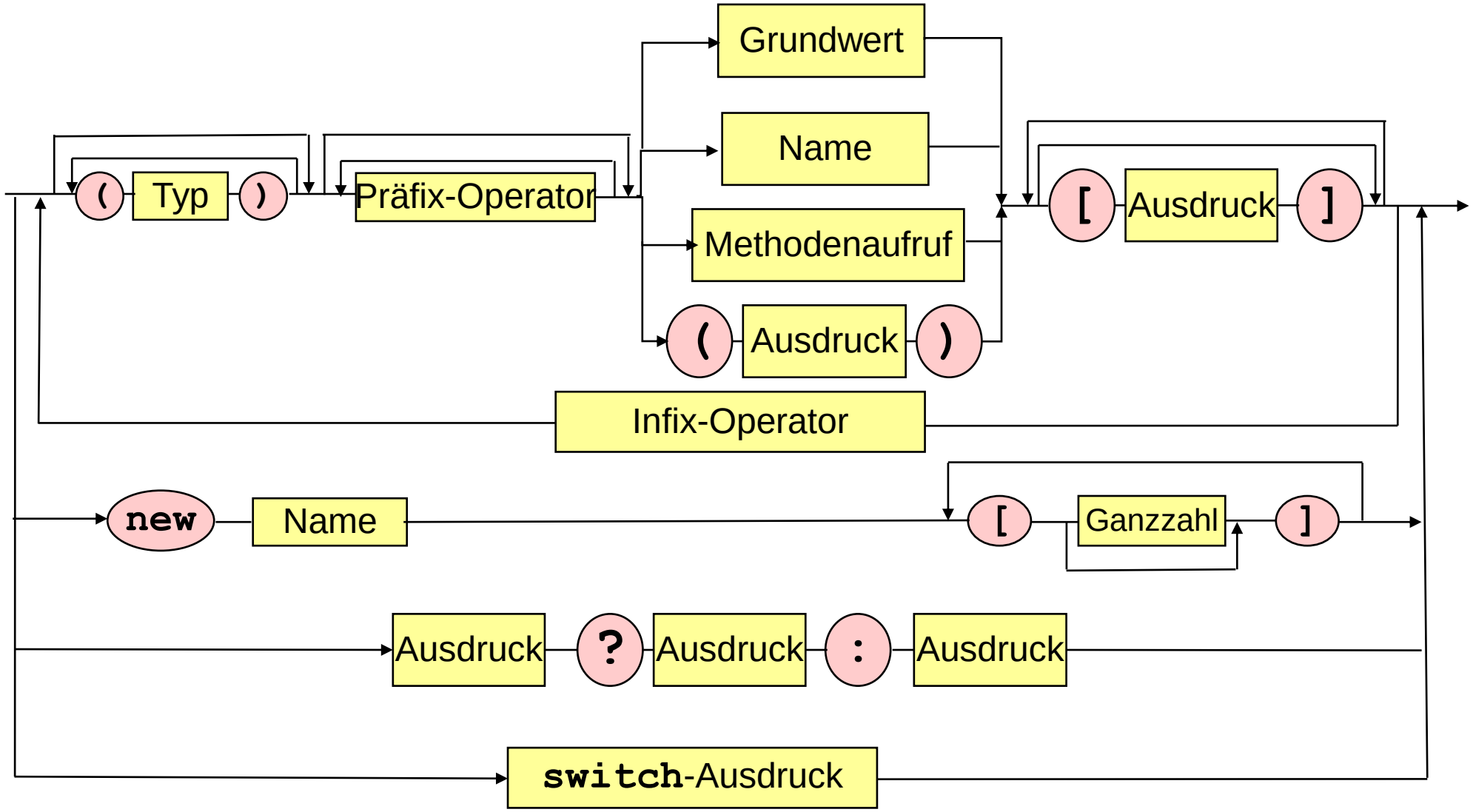
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Palindrom-Programm mit Arrays

```
public class Palindrom {

 public static void main (String [] args) {

 char [] wort = args[0].toCharArray();
 boolean palindrom = true;


 for (int i = 0;
      i <= (wort.length - 2) / 2 && palindrom;
      i++)

     palindrom = wort [i] == wort [wort.length - 1 - i];

 System.out.println(palindrom);
 }
}
```

Sort-Programm mit Arrays

```
public static void main (String [] args) {
   int i,j,z;
   int n = SimpleIO.getInt("Wieviele Zahlen sortieren?");
   int [] a = new int[n];

   //Lies Elemente ein
   for (i = 0; i < n; i++)
        a[i] = SimpleIO.getInt("Gib eine Zahl ein");

   //Sortiere Elemente
   for (i = 0; i < n-1; i++)

  //Vertausche a[i] mit kleinstem Nachfolger
       for (j = i+1; j < n; j++)

           if (a[i] > a[j]) { //Nachfolger kleiner als a[i]?
              //Vertausche a[i] und a[j]
              z = a[i]; a[i] = a[j]; a[j] = z;            }

  //Gib sortierte Elemente aus
  String result = "";
  for (i = 0; i < n; i++)  result = result + a[i] + " ";

  SimpleIO.output(result,"Sortierte Elemente");      }
```

foreach Schleife

Array **a** vom Typ **int []**

```
for (int i = 0; i < a.length; i++) {
     int x = a[i];

     System.out.print(x);


     }
```

```
for (int x : a) {

     System.out.print(x);


     }
```

foreach Schleife

Array **a** vom Typ **type []**

```
for (int i = 0; i < a.length; i++) {
     type x = a[i];

     …

     }
```

```
for (type x : a) {

     …

     }
```

Sort-Programm mit Arrays

```
public static void main (String [] args) {
   int i,j,z;
   int n = SimpleIO.getInt("Wieviele Zahlen sortieren?");
   int [] a = new int[n];

   //Lies Elemente ein
   for (int x : a)
     x = SimpleIO.getInt("Gib eine Zahl ein");
   //Sortiere Elemente
   for (i = 0; i < n-1; i++)

  //Vertausche a[i] mit kleinstem Nachfolger
      for (j = i+1; j < n; j++)

          if (a[i] > a[j]) { //Nachfolger kleiner als a[i]?
             //Vertausche a[i] und a[j]
             z = a[i]; a[i] = a[j]; a[j] = z;            }

  //Gib sortierte Elemente aus
  String result = "";
  for (int x : a) result = result + x + " ";

  SimpleIO.output(result,"Sortierte Elemente");      }
```