

Exercises

- (1) 1. Which function is computed by the following LOOP program $P(x, y; z)$?

```
z := x;
LOOP y DO
  v := 0;
  w := 0;
  LOOP z DO
    v := w;
    w++
  OD;
  z := v
OD;
z++
```

- (2) 2. Complete the proof on [slide 14](#) that every LOOP computable function is primitive recursive.
- (2) 3. Construct LOOP programs for the following functions:
- (a) $x \dot{-} y$
 - (b) $\lfloor \frac{x}{2} \rfloor$
- (2) 4. Prove parts (3) and (4) of the lemma on [slide 29](#).

Bonus Exercise

- (3) 5. Determine the level in the Grzegorzcyk hierarchy of the Fibonacci function.
- (1) 6. Does the inequality $2_2(x) \times 2_c(x) \leq 2_{c+3}(x)$ hold for all $x, c \geq 0$?