

## Quiz 2

1. Wir betrachten die Wörter  $w_n = 1^{n^3}(01)^n \in \{0,1\}^*$  für alle  $n \in \mathbb{N}$ . Gib jeweils die beste obere Schranke für die Kolmogorov-Komplexität an, welche folgende Programme für die Wörter  $w_n$  liefern (in Abhängigkeit von  $n$ ).

(a) **begin**

```

x := n;
x := x*x*x;
for i:=1 to x do
  write(1);
for i:=1 to n do
  write(01);

```

**end;**(b) **begin**

```

x := n;
y := x*x*x;
for i:=1 to y do
  write(1);
for i:=1 to x do
  write(01);

```

**end;**(c) **begin**

```

x := n;
for i:=1 to x do
  for j:=1 to x do
    for k:=1 to x do
      write(01);
    for i:=1 to x do
      write(101);

```

**end;**(d) **begin**

```

x := n;
for i:=1 to n do
  for j:=1 to n do
    for k:=1 to n do
      write(1);
    for i:=1 to n do
      write(01);

```

**end;**

2. Sei  $M = (Q, \Sigma, \delta, q_0, F)$  mit

- $Q = \{q_0, q_1, q_2\}$
- $\Sigma = \{0, 1\}$
- $F = \{q_2\}$

- $\delta(q_0, 0) = q_0, \quad \delta(q_0, 1) = q_1$
- $\delta(q_1, 0) = q_1, \quad \delta(q_1, 1) = q_2$
- $\delta(q_2, 0) = q_2, \quad \delta(q_2, 1) = q_2$

- (a) Stelle  $M$  graphisch dar

(b) Welche Aussagen sind korrekt?

- ☐  $0100 \in L(M)$
- ☐  $\hat{\delta}(q_0, 011011) \in F$
- ☐  $L(M) = \{w \in \Sigma^* \mid \hat{\delta}(q_0, w) \in F\}$
- ☐  $\hat{\delta}(q_0, 011011) = \hat{\delta}(q_1, 00001)$
- ☐  $\hat{\delta}(q_0, 011011) = \hat{\delta}(q_0, 010000)$

(c) Bestimme  $L(M)$ .