

# PLATZWART BÄLLE

## UML

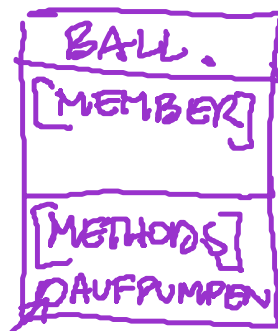
### BALL

SPORTART  
DURCHMESSER  
WEICHHEIT

EIGENSCHAFTEN

AUFPUMPEN  
SAUBERMACHEN  
INS REAL LEBEN  
ORDNEN

HANDLUNGEN



CLASS  
+ PUBLIC  
- PRIVATE  
# PROTECTED

### ARTEN VON BÄLLEN

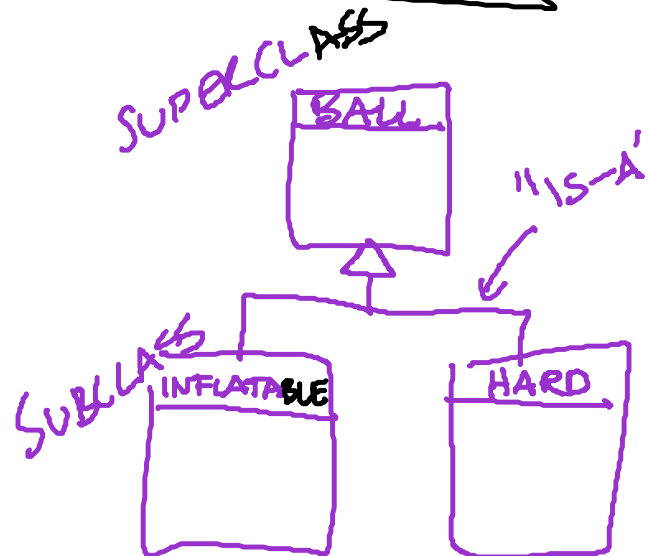
Ⓐ HART  
WEICHE

Ⓑ DRINNEN  
DRAUSSEN

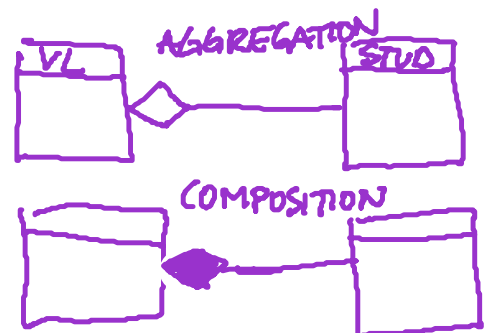
Ⓒ AUFBLASBAR  
HART

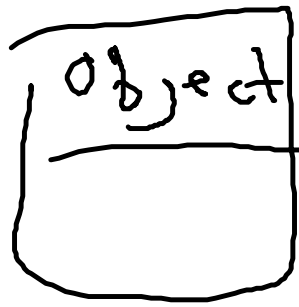
→ LUFTDRUCK SETZEN

→ OBERFLÄCHE REINIGEN

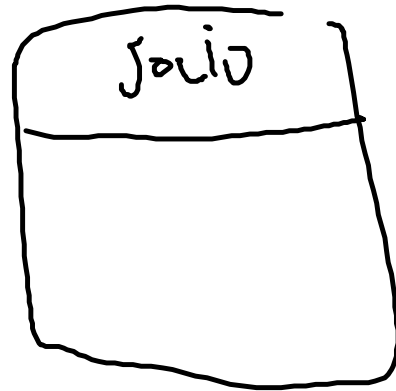
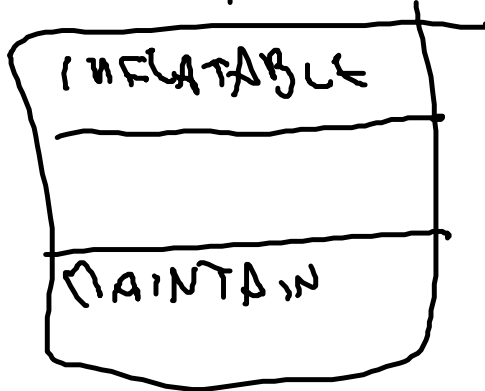
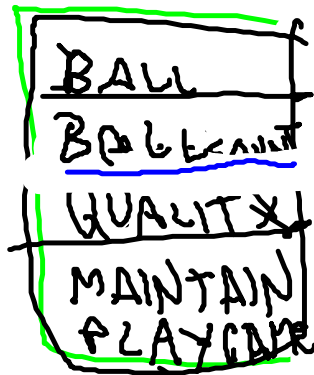


"HAS-A"





Super  
Static  
Substitution  
Typecast



Object  
equals  
Clone  
try  
catch  
throw

implements interface

throw

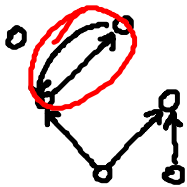
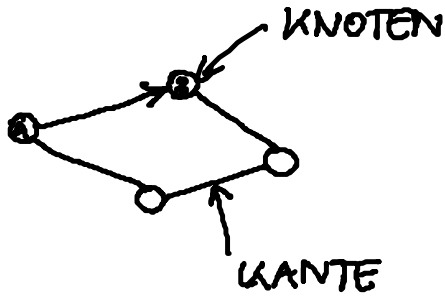
Exceptions try  
:

catch

fangen

often

# ALGO DAT — GRAPHEN



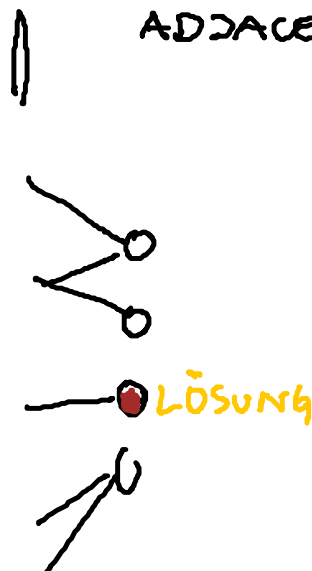
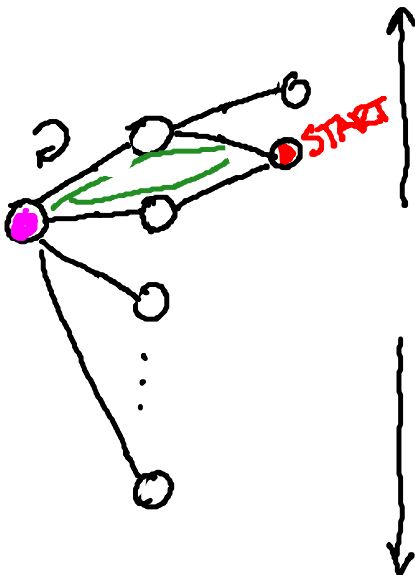
n KNOTEN

$$\frac{n \cdot (n-1)}{2}$$

$$n \cdot (n-1) = \frac{n^2 - n}{2}$$

VON \ NACH	1	2	3	4	5	...
1						
2		1				
3						
4					0	
5						
...						

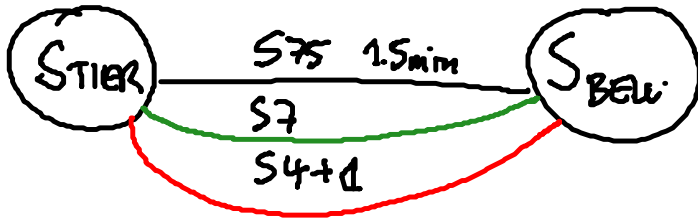
ADJAZENZMATRIX  
ADJACENCY MATRIX



BAUM = DAG  
DIRECTED  
ACYCLIC  
GRAPH

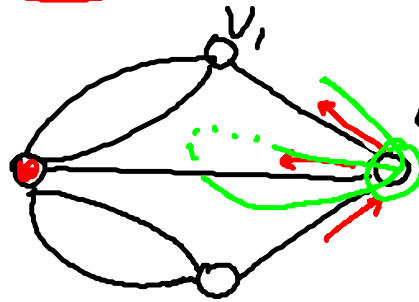
DURCHMESSER DES GRAPHEN

# MULTI GRAPH



$$G = (V, E)$$

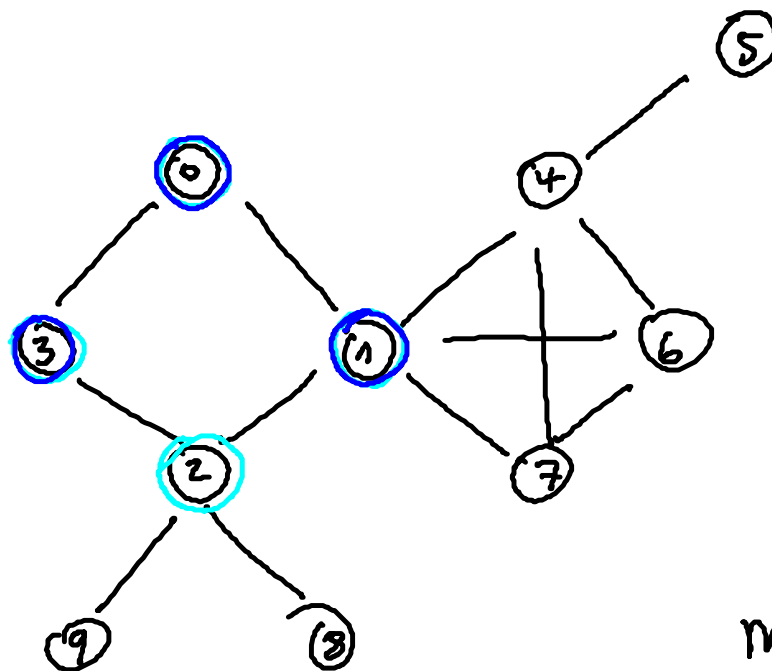
$$e_i \in E = \begin{cases} (a, b) & \text{GERICHTET} \\ \{a, b\} & \text{UNGER.} \end{cases}$$



GRAD EINER KNOTEN  
= ANZAHL KANTEN  
AM KNOTEN

$$\deg(v_1) = 3$$

VON	NACH
12	16
4	1
...	...



$$|V| = n$$

$$|E| = m$$

~~n+m~~  
n+m  
max(n, m) ?

FÜR ALLE KNOTEN  $v$

$n$

$$\sim n + 2m$$

FÜR ALLE NACHBARN VON  $v$

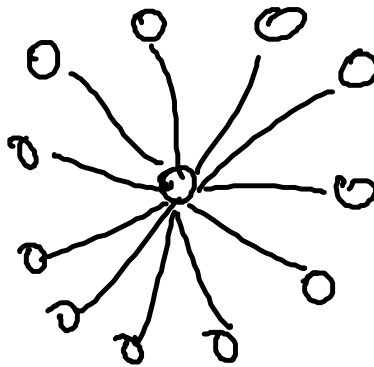
IMMER GLEICH

$$\geq n \cdot \max_{v \in V} (\deg(v))$$

FÜR ALLE SCHREITEN DURCHLAUF

$$\sum_{v \in V} \deg(v) = 2 \cdot |E| = 2m$$

$$2m \geq n^2$$



$$\max \deg = n-1$$

$$n \cdot (n-1) \approx n^2$$