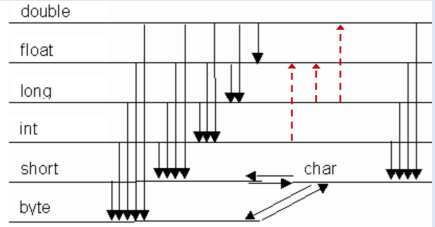
OO_Java Cheat Sheet

by tarinya via cheatography.com/25055/cs/6436/

Typ Konversion



schwarze Pfeile: expliziet
rote Pfeile: impliziet, evt Genauigkeitsverlust
alles andere impliziet

Switch-Statement

```
switch (Ausdruck) {
case Wert1:
   Anweisungen;
   break;
case Wert2:
   Anweisungen;
   break;
default:
   Anweisungen;
}
```

Wenn Ausdruck Wert1 entspricht, wird Anweisung 1 ausgeführt...

Typ Polymorphismus

```
car extends vehicle
@Override
drive(){}
Vehicle v = new Car();
//calls drive of Car not Vehicle
v.drive();
```

Klasse hat eigenen Typ plus alle Typen der Superklassen.
verschiedene "Brillen"
Dynamic Dispatch = dynamischer Typ zur Laufzeit entscheidet über aufgerufene Methoden.

Rekursion

```
public boolean groupSum(int start,
int[] nums, int target) {
  if (start >= nums.length) return
(target == 0);
  if (groupSum(start + 1, nums,
target - nums[start])) return
true;
  if (groupSum(start + 1, nums,
target)) return true;
  return false;}
Collection<String>
validParentheses(int nofPairs){
  Collection<String> list = new
ArrayList<>();
  if (nofPairs == 0)
{list.add("");} else {
    for (int k = 0; k < nofPairs;
k++) {
      Collection<String> infixes =
validParentheses(k);
      Collection<String> suffixes =
validParentheses(nofPairs - k -
1);
      for (String infix : infixes)
{
        for (String suffix :
suffixes) {
          list.add("(" + infix +
")" + suffix);}}}}
  return list;}
```

Generics

allg. Form

class Pair<T,U>

TypeBound (Bedingungen für Type)

class Node<T extends Comparable<T>>
Node<Person>//ok Node<Student>//Error

Multiple TypeBounds (mit & anhängen)

class Node<T extends Person &
Comparable<Person>>

generische Methode

Generics (cont)

public <T extends Person> T set (T element) {...}
<T>: Bedingungen für Input
T : Rückgabetyp

Wildcard-Typ (Nutzen: Typ**argument** nicht relevant)

Node<?> undef --> kein Lesen & schreiben ausser: Object o = undef.getValue();

Lambdas

```
(p1, p2) -> p1.getAge() -
p2.getAge()
```

```
p -> p.getAge() >= 18
```

```
people.sort((p1, p2) ->
p1.getName().compareTo(p2.getName()
));
```

```
people.sort(Comparator.comparing(P
erson::getLastName).thenComparing(P
erson::getFirstName));
```

```
Utils.removeAll(people, person ->
person.getAge() < 18);
```

```
people.sort(Comparator.comparing(p1
-> p1.getLastName().length()));
```

Syntax: (Parameter) -> {Body}

StreamAPI

```
people
.stream()
.filter(p -> p.getAge() >= 18)
.map(p -> p.getLastName())
.sorted()
.forEach(System.out::println);
people.stream().mapToInt(p ->
p.getAge())
.average().ifPresent(System.out::pr
intln);
Map<String, Integer>
totalAgeByCity =
```

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StreamAPI (cont)

```
  people.stream()
  .collect(
     Collectors.groupingBy(Person::getCity,
     Collectors.summingInt(Person::getAge)));
```

endliche Quelle: `IntStream.range(1, 100)`

unendl. Quelle: `Random random = new Random();`
`Stream.generate(random::nextInt).limit(100)`

FileReader/Writer

```
private static void reverteText() throws FileNotFoundException, IOException{
  try (FileReader reader = new FileReader("input.txt");
      FileWriter writer = new FileWriter("outpur.txt")){
       int value = reader.read();
       String text = "";
       while (value >=0){
          text = (char)value + text;
          value = reader.read();}
       writer.write(text);}}
```

Sichtbarkeit

public	alle Klassen
protected	Package und Sub-Klassen
private	nur innerhalb Klasse
(keines)	innerhalb Package

Datentypen

byte	8 bit (2^7 bis 2^7-1)
short	16 bit
int	32 bit
long	64 bit (1L)
float	32 bit (0.1f)
double	64 bit

Operator-Prio

+,-,++,--,! (unär)

*, /, %

+, - (binär)

<, <=, >, >=

==, !=

&&

||

Rundungsfehler

0.1+0.1+0.1 != 0.3

Problem: double/float	`x == y`
Lösung	`Math.abs(x - y) < 1e-6`

Integer Literal

binär	0b10 = 2
oktal	010 = 8
hex	0x10 = 16
opt.	1000 = 1_000

Arithmetik

```
1 / 0 --> ArithmeticException: / by zero
1 / 0.0 --> Infinity
-1.0 / 0 --> -Infinity
0 / 0.0 --> NaN
```

Arithmetik Overloading

```
int operate(int x, int y) { ... }
double operate(int x, double y) { ... }
double operate(double x, double y) { ... }
```

operate(1, 2); --> meth 1
operate(1.0, 2); --> meth 3
operate(1, 2.0); --> meth 2

Overloading

```
class Graphic {
  void moveTo(Graphic other)
     // Method 1
  }
}

Graphic g = new Circle();
Circle c = new Circle();
```

```
class Circle extends Graphic {
  void moveTo(Graphic other) {
     // Method 2
  }

  void moveTo(Circle other) {
     // Method 3
  }
}
```

g.moveTo(c)	Compiler: nur Methode 1 → Laufzeit: Overriding durch Methode 2
c.moveTo(g)	Compiler: Overloading, nur Methode 2 passt für Argument g
c.moveTo(c)	Compiler: Overloading, Methode 3 spezifischer
g.moveTo(g)	Compiler: nur Methode 1 → Laufzeit: Overriding durch Methode 2

Bedingungsoperator

```
max = left > right ? left : right;
```

wenn left>right wird max = left, sonst max=right

Package prio

own class (inc. nested class)

single type imports -> import p2.A;

class in same package

import on demand -> import p2.*

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Enum

```
public enum Color {
   BLUE(1), RED(2);
   private final int code;
   private Color(int code) {
      this.code = code;}
   public int getColorValue() {
      return code;}}
```

Methodenreferenz

```
people.sort(this::compareByAge)
int compareByAge(Person p1, Person p2){return p1.age - p2.age;}
```

```
people.sort(Sorter::compareByAge)
static int compareByAge(Person p1, Person p2){return p1.age - p2.age;}
```

```
Sorter sorter = new Sorter();
people.sort(sorter::compareByAge);
```

Serialisieren

```
OuputStream fos = new FileOutputStream("serial.bin");
try (ObjectOutputStream stream = new ObjectOutputStream(fos)){
   stream.writeObject(person);
}
```

needs Serializable interface
serialisiert alle direkt & inderekt referenz. Obj

Input/Output

```
try (BufferedInputStream inputBuffer = new bis(new FileInputStream(pathSource));
BufferedOutputStream outputB = new bos(new FileOutputStream(pathTarget))) {
   byte[] byteBuffer = new byte[4096];
   int value = inputBuffer.read(byteBuffer);
   while (value >= 0) {
      outputB.write(byteBuffer, 0, value);
      value = inputBuffer.read(byteBuffer);}}
catch (FileNotFoundException e) {
   System.out.println("File not found: "+e);
} catch (IOException e) {
   System.out.println("reading Error:"+e);}
```

String Pooling

```
String a = "OO", b = "Prog", c = "OOProg";
//true
a == "OO"; c == "OO" + "Prog";
(a+b).equals(c);
//false
a + b == c;
```

String Literals gepoolt. True Fälle --> es werden keine neuen Objekte erstellt
Integer-Pooling -128 bis 127

Collections

Array	`int[] intArray = new int[3];`
List	`List<T> al = new ArrayList<>();`

Collections (cont)

Set	`Set<T> hs = new HashSet<>();`
Map	`Map<U,T> hm = new HashMap<>();`

```
Iterator<T> it = a.iterator();
while(it.hasNext()) {..}
```

`Collections.sort(Object o)`	needs Comparable on o

```
for (Map.Entry<Character, Double> entry: map.entrySet())
```

LIST/SET: add(), remove()
LIST: get(index)
MAP: put(key, value), remove(key),getKey()

Interface vs. Abstract Class

Methoden	implizit public, abstract	evt abstract, nie private
Variablen	KONSTANTEN (impl. public static final)	normal, Constructor mit super()
Vererbung	`implements a,b`	`extends a`

Abstract Method (in abs. cl.): `public abstract void report();` kein Rumpf{}
in interface: `void report();`
I. Methode mit Rumpf: `default void report(){...}`

```
interface I1 extends I2,I3
class C2 extends C1 implements I1, I2
```

wenn I1&I2 nun gleiche Methoden haben (signatur) --> C2 muss ine der beiden überschreiben. Zugriff möglich mit
`I1.super.methode();`
`I2.super.methode();`

Unchecked vs Checked Exceptions

Unchecked	Checked
Error	Try/catch oder Methodenkopf
RunTime-Exceptions	mögl. catch-Block: `e.printStackTrace()`

-> RunTime, NullPointer, IllegalArgument, IndexOutOfBounds

eigene exception

```
class myE extends Exception { myE()
{}
MyE(String message) {
super(message);} }
```

Junit

```
@Before
public void setUp() {...}
@Test (timeout = 500, expected =
Exception.class)
public void testGoodName(){
  assertEquals(expected, actual);
  assertTrue(condition);}
```

@After -> tearDown()
EdgeCases testen (Grenzwerte, null,...)

equals

```
@Override
public boolean equals(Object obj) {
   if(this == obj) {return true;}
   if (obj == null) {return false;}
   if (getClass() !=
obj.getClass()) {
      return false;}
   Student other = (Student)obj;
   return regNumber ==
other.regNumber;}}
```

HashCode überschreiben!
` x.equals(y) → x.hashCode() == y.hashCode()
Grund: inkonsistenz bei Hashing. obj wird nicht gefunden, obwohl in Hash-Tabelle,
x.contains(y) --> nutzt hashCode() & equals()

HashCode()

```
@Override
public int hashCode() {
  return 31* firstName.hashCode()
   + 31 * lastName.hashCode();
}
```

Funktionsschnittstelle

```
@FunctionalInterface
interface Comparator<T> {
  int compare(T first, T second);
}
```

genau eine Methode --> java.util.function

RegEx

Pattern pattern = Pattern.compile("*reg*")

vor ? optionaler Teil	([0]?[0-9]|2[0-3])
(){}*+?| als norm text	* \(\\ ...
Gruppennamen	(?<NAME>)

Matcher matcher = pattern.matcher(string);
if (matcher.matches()){String one = matcher.group("NAME")}