Westfälische
Hochschule
Gelsenkirchen Bocholt Recklinghausen

Grundlagen der Informatik und Programmierung 2

Vererbung

Einführung

Prof. Dr. Tom Vierjahn

Visual Computing (https://vc.w-hs.de)
Fachbereich Wirtschaft und Informationstechnik
Campus Bocholt

Sommersemester 2020

Objektorientierte Programmierung

Westfälische Hochschule

> *The problem is that there is no distinction between the general properties of any shape (a shape has a color, it can be drawn, etc.) and the properties of a specific shape (a circle is a shape that has a radius, is drawn by a circle-drawing function, etc.). Expressing this distinction and taking advantage of it defines object-oriented programming. A language with constructs that allows this distinction to be expressed and used supports object-oriented programming. Other languages don't.*
>
> – Bjarne Stroustrup: What is "Object-Oriented Programming"?

Vererbung? – Geht doch schon. – Oder nicht?

mit Bordmitteln von C

Westfälische Hochschule

Deklarationen:

```
typedef struct Person {
  std::string first_name;
  std::string last_name;
} Person;

typedef struct Student {
  Person person;
  unsigned int id;
} Student;
```

```
typedef struct StudentInProgram {
  Student student;
  std::string program;
  std::string regulations;
} StudentInProgram;
```

anwendender Code:

```
StudentInProgram jane{"Jane", "Appleseed", 199100001, "I.S", "2018"};
std::cout << jane.student.person.first_name << ' ';
std::cout << jane.student.person.last_name << '\n';
std::cout << jane.student.id << '\n';
std::cout << jane.program << ' ' << jane.regulations << std::endl;
```

Vererbung? – Geht doch schon. – Oder nicht?

mit Bordmitteln von C

Westfälische Hochschule

anwendender Code:

```
StudentInProgram jane{"Jane", "Appleseed", 199100001, "I.S", "2018"};
std::cout << jane.student.person.first_name << ' ';
std::cout << jane.student.person.last_name << '\n';
std::cout << jane.student.id << '\n';
std::cout << jane.program << ' ' << jane.regulations << std::endl;
```

Vererbung? – Geht doch schon. – Oder nicht?

Westfälische Hochschule

anwendender Code:

```
StudentInProgram jane{"Jane", "Appleseed", 199100001, "I.S", "2018"};
std::cout << jane.first_name << ' ';
std::cout << jane.last_name << '\n';
std::cout << jane.id << '\n';
std::cout << jane.program << ' ' << jane.regulations << std::endl;
```

Vererbung? – Geht doch schon. – Oder nicht?

jetzt mit C++

Westfälische Hochschule

```
struct Person {
  std::string first_name;
  std::string last_name;
};
struct Student : public Person {
  unsigned int id;
};
```

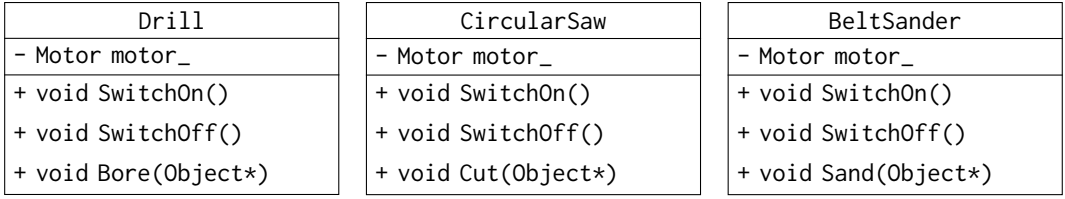
```
struct StudentInProgram
    : public Student {
  std::string program;
  std::string regulations;
};
```

anwendender Code:

```
StudentInProgram jane{"Jane", "Appleseed", 199100001, "I.S", "2018"};
std::cout << jane.first_name << ' ';
std::cout << jane.last_name << '\n';
std::cout << jane.id << '\n';
std::cout << jane.program << ' ' << jane.regulations << std::endl;
```

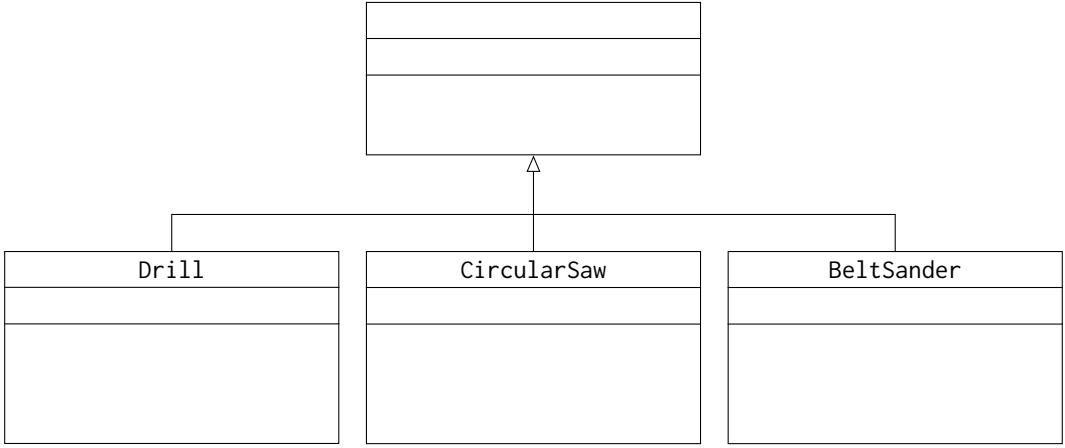
Beispiel: Elektrowerkzeuge

Gemeinsamkeiten führen zu vervielfältigtem Code



Beispiel: Elektrowerkzeuge

extrahiere Gemeinsamkeiten



Beispiel: Elektrowerkzeuge

Code

```
class PowerTool {
 public:
  void SwitchOn();
  void SwitchOff();

 private:
  Motor motor_;
};
```

```
class Drill : public PowerTool {
 public:
  void Bore(Object* obj);
};
```

```
class CircularSaw : public PowerTool {
 public:
  void Cut(Object* obj);
};
```

```
class BeltSander : public PowerTool {
 public:
  void Sand(Object* obj);
};
```

Zusammenfassung

Westfälische Hochschule

- Vererbung in C?
- Vererbung in C++
- einführendes Beispiel

Prof. Dr. Tom Vierjahn
- E-Mail: tom.vierjahn@w-hs.de

Visual Computing
- Web: `https://vc.w-hs.de`
- YouTube: Visual Computing WH
- Twitter: @VisComputingWH

Westfälische Hochschule
Fachbereich Wirtschaft und Informationstechnik
Campus Bocholt