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Software Engineering Design & Construction

Dr. Michael Eichberg
Fachgebiet Softwaretechnik
Technische Universität Darmstadt

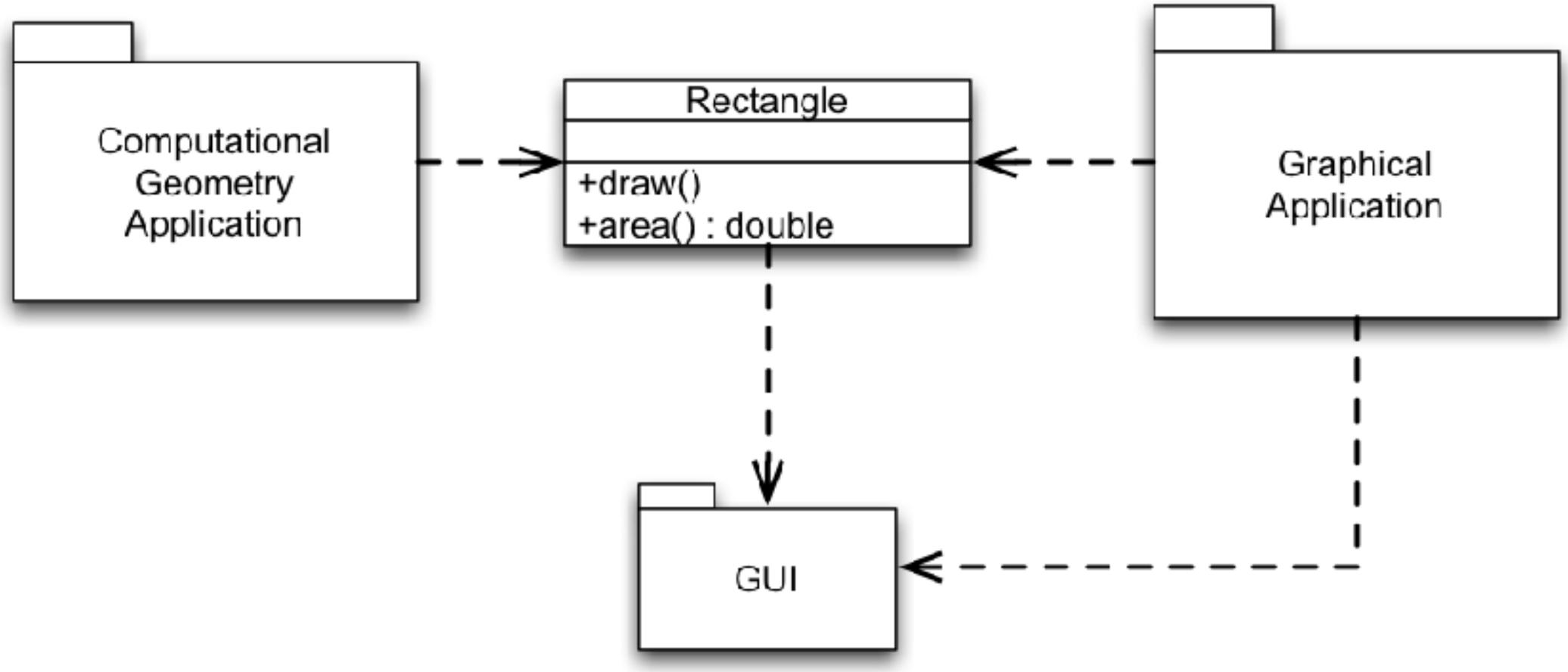
Single Responsibility Principle

S*ingle* ***R****esponsibility* ***P****rinciple*

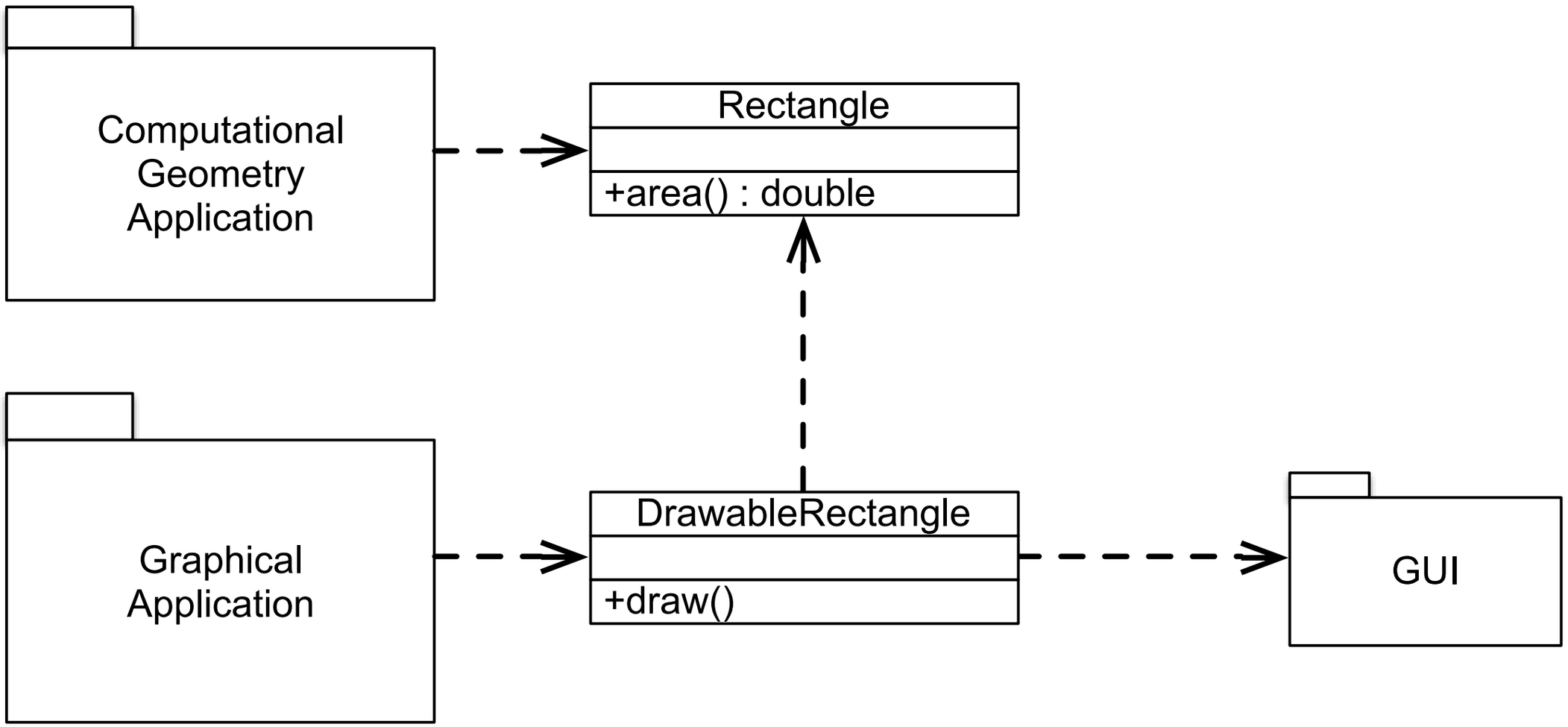
A class should have only one reason to change.

–Agile Software Development; Robert C. Martin; Prentice Hall, 2003

What do you think of the following design?



A Single-Responsibility Compliant Design



Responsibility

- In general, a class is assigned ***either*** the responsibility to know ***or*** do something (one thing).

- Examples:
  - Class `PersonData` is responsible for knowing the data of a person.
  - Class `CarFactory` is responsible for creating `Car` objects.

- A responsibility is an axis of change.

- A class with only one responsibility has only one reason to change!

Cohesion

(conceptual view)

- Cohesion measures the degree of togetherness among the elements of a class.

- In a class with high cohesion **every element is part of the implementation of exactly one concept**. The elements of the class work together to achieve one common functionality.

- A class with high cohesion often implements only one responsibility.

SRP and Cohesion

- Applying the single-responsibility principle maximizes the cohesion of classes.
- Classes with high cohesion ...
  - can be reused easily,
  - are easily understood,
  - protect clients from changes, that should not affect them.

java.util.Date

Do we have a SRP Violation?

- The class `Date` represents a specific instant in time, with millisecond precision.

int	getSeconds()
long	getTime()
int	getTimezoneOffset()
int	getYear()
int	hashCode()
static long	parse(String s)
void	setDate(int date)
void	setHours(int hours)
void	setMinutes(int minutes)
…	…

java.util.Date

Do we have a SRP Violation?

- The class `Date` represents a specific instant in time, with millisecond precision.

- …

`public static long parse(String s)`

Attempts to interpret the string s as a representation of a date and time. If the attempt is successful, the time indicated is returned represented as the distance, measured in milliseconds, of that time from the epoch (00:00:00 GMT on January 1, 1970). If the attempt fails, an IllegalArgumentException is thrown.

…

Do perform the strategic application of principles!

Only apply a principle, if there is a symptom!