Definition of Bachelor Thesis Project

for	Ruben Bär
	Stefan Heinemann
Division	Computer Science
Advisor	Dr. Olivier Biberstein

Object-Oriented Language with Subtyping and Subclassing

Many modern and widely spread object-oriented programming languages have a strict focus on their classes. Subtyping and subclassing are strongly coupled together and restrict the expressiveness of the languages. Often such languages do not support full covariance of the return type and contravariance of the parameter types. Further parametric polymorphism, also known as generic programming, is a new feature in well known languages (Java since 2004 and .NET since 2006).

However, research has shown different approaches and extensions for languages with a greater expressiveness such as F-bounded subtyping or a generalization of subtyping called matching. In this thesis, a prototypical object-oriented language will be designed with special focus on its type system.

This work will include:
- A formal definition of the O-O language
- Its parser and type checker
- A translation of source code into a high-level language like Java.

The type system of the language will supports the following characteristics:
- Matching
- Decoupling of subtyping and subclassing.

Other interesting characteristics such as:
- Matching as F-bounded subtyping
- Higher-order functions aka closures

are optional objectives of this prototypical programming language.

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Adivsor: Head of Division: