EU TYPES WG 3: Types in Programming

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Working Group 3: Types for programming

Type-based programming increases the security, reliability, resilience and reusability of software as evidenced by the increasingly popularity of strongly typed languages and the widespread use of types in applied programming language research.

The notion of type-based programming includes

1. programming languages that provide strong type systems that are either checked statically (Java, Haskell, Agda, ML) or dynamically (Scheme)

2. and to a limited extend also untyped languages (JavaScript, Tcl, PHP) that can only be analysed by third party tools,

3. as well as software engineering practises that use type theory.

Tasks

1. The design, study and deployment in a concrete programming environment of type theories that capture other properties **beyond functional correctness**, for example, resource usage, matching communications, secure multi-party computation, and modularity. (Related to WG1)

2. Design and deployment of **new strongly typed programming languages**, update of existing languages with refined type systems based on the findings of this work group.

3. Automated reasoning tools and proof assistants, including **type inference** (possibly also for untyped code), **program synthesis**, and **matching** (for example to retrieve a piece of code from a library that should satisfy a given specification).

Activities, Milestones, and Major Deliverables

Activities:

1. In year 1: set up the Working Group; have a joint meeting; define its research agenda.
2. In years 2, 3, 4: joint meeting of the WG; report on the progress in light of the research agenda; discuss and adapt the research agenda if needed.

Milestones and Major Deliverables:

1. Minutes of the WG meeting
2. List of output of the past year
3. Research agenda

What we want to do:

- Gather ongoing research efforts: topics, groups, papers
- Stimulate research and collaboration through
  1. WG 3 meetings (we can invite speakers)
  2. STSMs
- Document state-of-the-art and research agenda for EU

Joining the WG 3

- Express your interest to me by email (Subject: COST WG 3)
- Register on e-COST and with National Cost Coordinator
- to join WG 3
- I will make a mailing-list
- WG 3 meetings will be open
- Refunding from COST only upon invitation (limited funds)

Possible topics for research agenda

- Dependently typed programming
- Linear and dependent types
- Session types (Betty COST Action 6-7 October, Lisbon)
- Variance/monotonicity typing (directed type theory)
- Parametricity
- Amortized complexity analysis using types
- Security/privacy type systems
- ...

Activities

- Dissemination: EUTYPES wiki
- Industrial contacts
- Next meeting WG 3 in Paris, Jan 2017 (POPL)
- ...