

# Symbolic Verification via Program Transformation

---

Henrich Lauko



Masaryk University  
Brno, Czech Republic

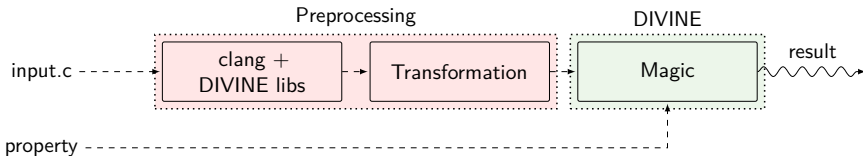
10th May 2018



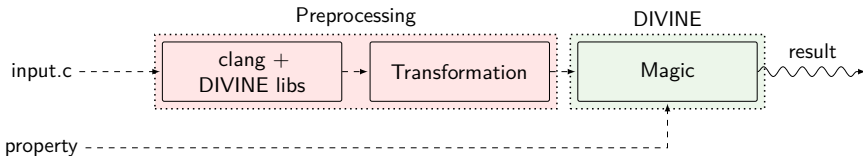
# Topic Recapitulation

- verification of programs with inputs

- verification of programs with inputs
- transform the program to manipulate symbolic representation instead of concrete inputs



- verification of programs with inputs
- transform the program to manipulate symbolic representation instead of concrete inputs



- **Diploma thesis:** prototype that can handle values on stack



- 1. new concept of transformation:**



1. **new concept of transformation:**
  - enables abstraction of data on the heap



## 1. new concept of transformation:

- enables abstraction of data on the heap
- added support of arrays with abstract values



## 1. new concept of transformation:

- enables abstraction of data on the heap
- added support of arrays with abstract values
- get rid of necessity to compute shapes of data structures
  - enables arbitrary structure with abstract data





## 1. new concept of transformation:

- enables abstraction of data on the heap
- added support of arrays with abstract values
- get rid of necessity to compute shapes of data structures
  - enables arbitrary structure with abstract data

## 2. polishing of code:

- simplification of whole process (from 6000 loc. to 2500 loc.)



## 1. new concept of transformation:

- enables abstraction of data on the heap
- added support of arrays with abstract values
- get rid of necessity to compute shapes of data structures
  - enables arbitrary structure with abstract data

## 2. polishing of code:

- simplification of whole process (from 6000 loc. to 2500 loc.)

## 3. finishing paper resubmission

- evaluation should now cover bigger portion of SV-COMP

## May:

- evaluation + paper submission



## **May:**

- evaluation + paper submission

## **June – September**

- string abstraction in cooperation with italian Ph.D. student

## **May:**

- evaluation + paper submission

## **June – September**

- string abstraction in cooperation with italian Ph.D. student
- further work on memory abstractions

## **May:**

- evaluation + paper submission

## **June – September**

- string abstraction in cooperation with italian Ph.D. student
- further work on memory abstractions
- summer school on automated reasoning (Manchester)

## **May:**

- evaluation + paper submission

## **June – September**

- string abstraction in cooperation with italian Ph.D. student
- further work on memory abstractions
- summer school on automated reasoning (Manchester)

## **October – December**

- Erasmus at Aachen

## **May:**

- evaluation + paper submission

## **June – September**

- string abstraction in cooperation with italian Ph.D. student
- further work on memory abstractions
- summer school on automated reasoning (Manchester)

## **October – December**

- Erasmus at Aachen
- work on utilization of SMT solving in verification