Jan 28th Report

By Xiang Chen (Echo)

Jan 28, 2020

Contents

1 Array **2**

2 Pair **2**

3 Quantification: Forall **2**

4 Array **3**

4.1 Array Declaration and Verification Format 3

4.2 Array Index 3

1 Array

I do some research on Z3, and find that Z3 supports using real number as array indexes, but I finish modifying my TypeChecker class, and make sure that in my program, the type of array index should always be INTEGER type, or my TypeChecker class will generate the error message to indicate that the index is not of INTEGER type.

- a : ARRAY[BOOLEAN]
  - **a[2.14]** - syntax error: in grammar
  - **a[expr]** - type check the expression first to make sure it is INTEGER type.

Z3 also supports array of boolean elements, I also add it the boolean array to my program.

---

2 Pair

- Syntax
  - Unnamed Declaration syntax: **p : PAIR[REAL; INTEGER]**
  - Named Declaration syntax: **p : PAIR[x : BOOLEAN; y : REAL]**
  - Access emelents: **p.first - p.second** or **p.x - p.y**

3 Dafny

I explore Dafny from Microsoft, I find that it is a great tool for program verification. However, it problem is that it cannot provide step-by-step proof for program verification (e.g., the five steps for loops).