# Objectives

- Installation of Dafny step by step

- Run some examples

Dafny (https://dafny.org/) is an object-oriented programming language developed by *Microsoft Research* designed for reasoning. It includes constructs for both imperative and functional programming, as well as for writing specifications, defining pieces of mathematics, stating lemmas, and writing proofs.
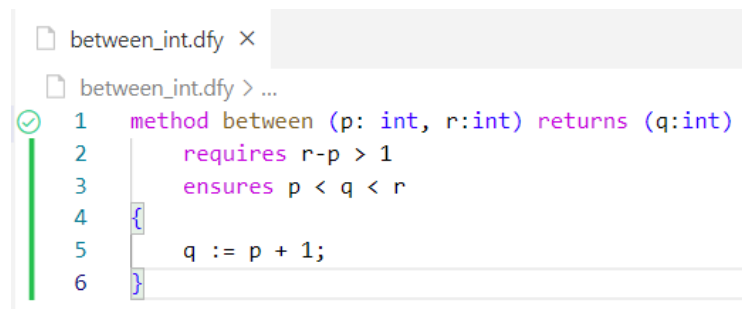
# 1  Installation

1. Install VS Code onto your machine. If you don't have it, you can download it from here.

2. Click the *Extensions* button, search for the Dafny extension from *dafny-lang*, and click to install it.

   **Remark 1** *After you install the Dafny extension, you can look for more shortcuts that make Dafny work (e.g. compile, run, show counterexamples).*

3. You should also have installed *.NET 6.0* or *7.0* depending on what platform you're using (Windows, Linux or Mac).

4. To get more specific informations about installation of Dafny, you can visit https://github.com/dafny-lang/dafny/wiki/INSTALL.

# 2  Example

After installation, we will try to compile and run some simple code. Create a `.dfy` file in VS Code and write the following code. It should look like this:

```
between_int.dfy
between_int.dfy > ...
1    method between (p: int, r:int) returns (q:int)
2        requires r-p > 1
3        ensures p < q < r
4    {
5        q := p + 1;
6    }
```

1. What does the program do? What is the precondition? What is the postcondition?

2. What happens if you change the body of the method with `q := p + 2`? Give a counterexample.

3. What happens if you change the precondition with `r-p>=1`? Give a counterexample.