

Additional exercise on typing

Exercise 1

We consider the following program (in the While language extended with a command 'write' as we already saw once before):

```
begin  var x := 2;
      var y := 1;
      proc p is x := x + y;
      begin var y := true;
            call p;
            write x;
      end;
end;
```

1. According to the static semantics for variables and procedures, what does this program write ?
2. Is this program well-typed in the static semantics type system ?
3. According to the dynamic semantics for variables and procedures, what happens with this program ?
4. Is this program well-typed in the dynamic semantics type system ? We deduce from this that the fact that the program is well-typed in the static type system does not matter when we want to execute it with a dynamic semantics!
5. Propose a modification of this program which is well-typed in the dynamic semantics type system, and which displays a boolean.

Remark : if you master the static-dynamic semantics, you can try to exhibit a program which is well-typed in the dynamic type system but not in the static-dynamic type system. You can use a second procedure q.