Homework 9

April 6, 2022

1 Interpreter in Scala

For this homework, you will implement an interpreter for a language with arithmetic expressions, let expressions, and functions. The interpreter will be able to return error values if the input program contains errors related to arithmetics, variables, and function applications.

2 Requirements

Please use the template file, where the case classes that define the AST nodes and evaluation results are defined. You should implement the methods marked with TODO. The main method of the `Hwk9` object runs the following tests:

```
(* test 1 *)
let
  val y = 10
in
  let
    val f = x => x + y
  in
    let
      val y = 20
    in
      f 5
    end
  end
end

(* test 2 *)
let
  val y = 10
in
  let
    fn f => x + z
```

```
  in
    let
      val y = 20
    in
      f 5
    end
  end
end

(* test 3 *)
10 div 0

(* test 4 *)
10 + (10 - (fn x=>5))

(* test 5 *)
10 10

(* test 6 *)
let
  val f = 10
in
  f 20
end

(* test 7 *)
let
  val x = 10 + (fn x=>x)
in
  0 + 20
end
```

If you run the main method, you should expect the following output.

```
15
error(Variable z is not found)
error(Division by zero error in: (10  /  0))
error(Minus error: (fn x => 5) is not a number)
error(Application error: 10 is not a function)
error(Application error: 10 is not a function)
error(Plus error: (fn x => x) is not a number)
```

3 Submission

Please submit your solution as `Hwk9.scala` to canvas.