Problem Set 8
Comp 301
Fall 2022
Week 10: 12.12.2022 - 16.12.2022

Instructions:

- Submit your answers to the Blackboard PS8 assignment until December 17th Saturday, at 23.59.
- Please use the code boilerplate, which includes several tests for you to see if your code is correct.
- Save your code and pdf file, zip it as `ID_username.zip` with your ID and username (Example: `1234567_yhizir19.zip`), and submit this ZIP file.
- Read the questions carefully. Good luck!

Problem 1:
Part A. Translate this expression into a nameless expression and include your answer in the pdf file.

```
let x = 3 in
  let y = 2 in
     let z = -(x,y) in
        let x = -(z, y) in
           let func = (proc(x) proc(y) proc(z) -(x,-(y,z))) in
(((func x) y) z)
```

Part B. Translate this nameless expression into a PROC expression and include your answer in the pdf file.

```
%let %nameless-var 32 in
  %let %nameless-var 3 in
     %let %nameless-var 5 in
        %let %nameless-var %lexproc -(#2,#0) in
           %let %nameless-var 10 in
              %lexproc -(#0,-(#4, #3))
```

Problem 2: In class you already seen that below program gives -1 as result:

```
let g = let counter = newref(0)
   in proc (dummy)
    begin
      setref(counter, -(deref(counter), -1));
      deref(counter)
    end
in let a = (g 11)
   in let b = (g 11)
      in -(a,b)
```

But below code gives a different result. Explain why these two programs give different results and indicate the result of the program.

```
let g = proc (dummy)
      let counter = newref(0)
      in begin
      setref(counter, -(deref(counter), -1));
      deref(counter)
      end
      in let a = (g 11)
       in let b = (g 11)
          in -(a,b)
```

Problem 3: Modify the interp.scm so that a setref-exp returns the old contents of the location.

Problem 4: [1]: Implement the store in constant time by representing it as a Scheme vector. You can look at the documentation of Scheme vectors.

[1] EOPL Exercise 4.9