Problem Set 7
COMP301 Fall 2021
Week 9: 29.11.2021 - 03.12.2021

Instructions:

- Submit your answers to the Blackboard PS7 assignment until December 4th Saturday, at 23.59.
- Please use the code boilerplate, which includes several tests for you to see if your code is correct.
- Submit your code and PDF file to BlackBoard as a single zip file *yourIDno_ username.zip*. (Example: *123456_ ddeveci18.zip*)

Problem 1:

a). Draw the contour diagram of the following program.

```
let x = 23
    in proc(y)
        let z = -(y,x)
            let t = -(x,y)
                in -(y, t)
```

b). Consider the expression

```
let z=5 in
    letrec f(x) = if zero?(x) then 1
                            else (f -(x, 1))
                in (f 5)
```

Draw the environment that is passed to `value-of` when the expression «f» in «(f -(x, 1))» is evaluated for x=3.

Problem 2[1]: Extend the `letrec` language to allow the declaration of any number of mututally recursive unary procedures, for example:

```
letrec
    even(x) = if zero?(x) then 1 else (odd -(x,1))
    odd(x) = if zero?(x) then 0 else (even -(x,1))
in (odd 13)
```

evaluates to 1 because 13 is an odd number.

Note 1: Methods that need to be modified are highlighted inside the LETREC language source code with some hints. See the following files: `data-structures.rkt`, `environment.rkt`, `interp.rkt` and `lang.rkt`

Note 2: You need to update the following files: `environment.rkt`, `interp.rkt` and `lang.rkt`.

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[1]EOPL p.84-85 Exercise 3.32