

Bonus HW2: Implement an interpreter for RFAE with Recursion in Racket (5 points)

*** This bonus task must be done by yourself. No discussion with your classmates is allowed! If you have any issues, discuss only with JC.**

RFAE is a language based on the following BNF to support BNF.

```
<RFAE> ::= <num>
         | {+ <RFAE> <RFAE>}
         | {- <RFAE> <RFAE>}
         | {* <RFAE> <RFAE>}
         | <id>
         | {fun {<id> <RFAE>}
           | {<RFAE> <RFAE>}
           | {if0 <RFAE> <RFAE> <RFAE>}}
```

In this language, the following example does not process 'fac' as a free identifier. But the RFAE language processes it as a recursive function.

```
{with {fac {fun {n}
            {if0 n
              1 {* n {fac {- n 1}}}}}}
  {fac 10}}
```

Example1:

```
{with {count {fun {n} {if0 n 0 {+ 1 {count {- n 1}}}}}}
  {count 8}}
>> 8
```

Example2:

```
{with {fac {fun {n}
            {if0 n
              1
              {* n {fac {- n 1}}}}}}
  {fac 10}}
>> 3628800
```

Example3: (Note that the 'count' identifier in the outer 'with' is called in the function body. This example is not a recursion.)

```
{with {count {fun {n} 0}}
  {with {count {fun {n} {if0 n 0 {+ 1 {count {- n 1}}}}}}
    {count 8}}}
>> 1
```

1. Due date

- Code: 10PM December 27 (Mon) 2021. (You must send me an email after you upload your code in your google drive with its link and your preferred time for the oral interview.)
 - JC's calendar: <https://lifove.github.io/calendar.html>
- Oral interview: Make an appointment (Zoom meeting) when you submit the code. Oral interview must be done before/on Dec 29.
 - If you finish early, you can also have a Zoom meeting early.

2. What to submit

- In your google drive, create a **Bonus HW** folder and upload a README google doc and a zip file which contains all your code.
 - Name your file: BonusHW2-[Student_id]_[name].rkt
- Then, send me an email. (You must send me an email after you upload your code in your google drive with its link and your preferred time for the oral interview.)
 - JC's calendar: <https://lifove.github.io/calendar.html>
- No late submission