AI Programming Design, Sections 1 and 2, Spring 2019
Homework 1
Due: April 16, 5:00pm (April 17, 5:00pm for -30%)

Comments and meaningful variable names are strongly recommended.

1. (20 pts) Write a function DOT-PRODUCT that takes two lists, each of three numbers, and produces the dot product of the vectors that they represent. For example,
   >(DOT-PRODUCT '(2 -3 4) '(5 6 7))
   20 (<= 2*5+(-3*6)+4*7)
   For the function, you may want to use CAR and CDR.

2. (20 pts) When converting between degrees Fahrenheit and degrees Celsius, it is useful to note that -40° Fahrenheit equals -40° Celsius. This observation makes for the following symmetric conversion formulas:
   C = (F + 40)/1.8 – 40,
   F = (C + 40)*1.8 – 40.
   Define conversion procedures, FAHRENHEIT-TO-CELSIUS and CELSIUS-TO-FAHRENHEIT, using these formulas. For each function, it takes an input parameter, temperature.

3. (20 pts) Define your own version of the predicate EVENP for checking whether an integer is divisible by 2. Call it MY-EVENP. You may want to use REM and ZEROP.

4. (20 pts) Define NAND function, which is short for NOT AND. Its truth table is as follows:

x	y	(NAND x y)
T	T	NIL
T	NIL	T
NIL	T	T
NIL	NIL	T

5. (20 pts) Define ROTATE-RIGHT, a procedure that takes a list as its argument and returns a new list in which the former last element becomes the first. The following illustrates:
   >(ROTATE-RIGHT '(a b c))
   (C A B)
   >(ROTATE-RIGHT (ROTATE-RIGHT '(a b c)))
   (B C A)
   You may want to use APPEND, LAST, REVERSE, and REST.

6. (20 pts) Define ROTATE-LEFT, a procedure that takes a list as its argument and returns a new list in which the former first element becomes the last. The following illustrates:

```
>(ROTATE-LEFT '(a b c))
(B C A)
>( ROTATE-LEFT (ROTATE-LEFT '(a b c)))
(C A B)
```

   You may want to use APPEND, LIST, FIRST, and REST.

7. (20 pts) Define an iterative function MY-RANGE that takes a list of numbers (at least one long) and returns a list of length two of the smallest and largest numbers. Function MY-RANGE should have the following behavior:

```
>(MY-RANGE '(0 7 8 2 3 –1))
(-1 8)
```

8. (20 pts) Write an iterative function POWER-OF-NUMBER that computes powers of numbers, using DO. The function takes two input arguments, i.e., a number and an exponent.

9. (20 pts) Write an iterative version, MY-MEMBER, of built-in function MEMBER using DO.

10. (20 pts) Write an iterative version, MY-REVERSE, of built-in function REVERSE using DO.

11. (40 pts) Define your own version, MY-LENGTH, of the reserved function LENGTH using DOLIST and using DO, respectively.

240 points total

Notes) File name: 김철수HW1_201812345.cl