# CSE341 – Programming Languages (Fall 2015)

# Homework #2

**Handed out**: 11:00am Tuesday October 28, 2015.

**Due**: 11:55pm Tuesday November 11, 2015.

**Hand-in Policy**: PDF versions should be submitted online on Moodle by the submission deadline. No late submissions will be accepted.
**Collaboration Policy**: No collaboration is permitted. Any cheating (copying someone elses work in any form) will result in a grade of -200 for the first offense and -400 for the subsequent attempts.
**Grading**: Each homework will be graded on the scale 200. Unless otherwise noted, the questions/parts will be weighed equal.
**Notes:**

- This homework involves 26! possible solutions, therefore you should not develop a brute-force approach, otherwise you will encounter stack overflows. If a stack overflow occurs on testing, your code will be graded over 100 points.

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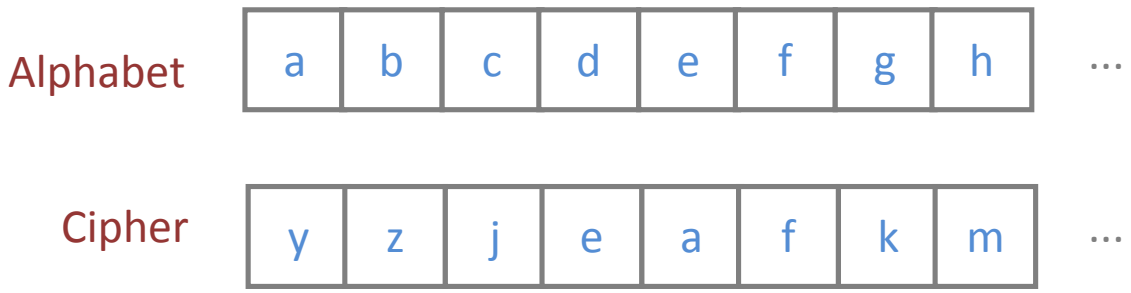
You will implement a function, which finds the cipher of a provided encrypted paragraph using a dictionary. Dictionary file is provided as "dictionary.lisp". Cipher is a one-to-one, randomly shuffled alphabet as seen below:




In this homework, words are represented as atom lists and paragraphs are represented as list of lists (word lists). Alphabet is defined as atom list.

Suppose that we have a randomly generated paragraph as follows:

```
Original Paragraph:

((V I C D A N I) (K A P L A N) (V A N D A L) (K A R G A B U K E N) (S A R K
I) (T E R A V I H) (A B A N D O N E) (R O K O K O) (C E D I T) (B E S B E L
L I) (M E S U M) (L I M I T) (M I K R O B I K) (C A L K A N) (P A R T I Z A
N))


Encrypted Paragraph:

((J Q X C N V Q) (Z N T R N V) (J N V C N R) (Z N K F N E O Z P V)
(Y N K Z Q) (I P K N J Q U) (N E N V C A V P) (K A Z A Z A) (X P C Q
I) (E P Y E P R R Q) (B P Y O B) (R Q B Q I) (B Q Z K A E Q Z) (X N
R Z N V) (T N K I Q D N V)))
```

Encrypted paragraph will be the argument of your function and you know the dictionary and alphabet. You will find the cipher for the encrypted paragraph.

```
Alphabet: (A B C D E F G H I J K L M N O P Q R S T U V W X Y Z)
Cipher  : (N E X C P W F U Q G Z R B V A T H K Y I O J S M L D)
```

## Rules:

- Cipher is a one to one correspondence of alphabet.
- Cipher is generated randomly; there will be no relation between plain alphabet and cipher.
- You should provide comments. Otherwise 40% of your grade will be taken away.
- You should not change the function name or parameter number for the given function.
- You should rename the file `hw2.lisp` to `STUDENT_NUMBER_HW2.lisp`.

## Function Prototype

```
(find-cipher paragraph)
```

## Sample Inputs and Outputs

```
(find-cipher '((J Q X C N V Q) (Z N T R N V) (J N V C N R) (Z N K F N E O Z
P V) (Y N K Z Q) (I P K N J Q U) (N E N V C A V P) (K A Z A Z A) (X P C Q
I) (E P Y E P R R Q) (B P Y O B) (R Q B Q I) (B Q Z K A E Q Z) (X N R Z N
V) (T N K I Q D N V))))

=> (N E X C P W F U Q G Z R B V A T H K Y I O J S M L D)
```