

# Homework, Week 3, part D

October 31, 2013

Look at the following output. I have a variable, a list of lists, named **items**. I also have a function named **give-test** that takes as an argument the list of lists in items. Your assignment is to write the function that gives the test. The function is obviously incomplete, since it does not accept answers or keep score. We will do that next week.

```
1  ;;my output
2  [187]> items
3  (("Who was the first president of the United States?" ("George
   Washington" "John Adams" "Thomas Jefferson" "Barack Obama
   "))
4  ("Who was the first black president of the United States?" ("
   Barack Obama" "George Washington" "John Adams" "Thomas
   Jefferson"))
5  ("Who was the president during the Civil War?" ("Abraham
   Lincoln" "George Washington" "Theodore Roosevelt" "Barack
   Obama"))
6  ("Who was the president that purchased Louisiana?" ("Thomas
   Jefferson" "Abraham Lincoln" "George Washington" "
   Theodore Roosevelt"))
7  ("Who was the president that said 'Tear down this wall!'" ("
   Ronald Reagan" "Richard Nixon" "John Kennedy" "Harry
   Truman"))
8  ("Who was the president that was a famous general?" ("Dwight
   Eisenhower" "Ronald Reagan" "Richard Nixon" "John Kennedy
   "))
9  ("Who was called 'the Father of the Constitution'?" ("James
   Madison" "Thomas Jefferson" "George Washington" "Andrew
   Jackson"))
10 ("Which president was NOT from the South?" ("Barack Obama" "
   George W. Bush" "Bill Clinton" "Jimmy Carter"))
11 ("Which president wrote the Declaration of Independence?" ("
   Thomas Jefferson" "George Washington" "James Madison" "
   James Monroe"))
12 ("Who was NOT a president from the following list?" ("
   Alexander Hamilton" "Millard Filmore" "James Polk" "
   Benjamin Harrison"))
```

13 ("Who was a president from the following list?" ("John Tyler"  
 "Benjamin Franklin" "Alexander Hamilton" "Aaron Burr"))  
 14 [188]> (give-test items)  
 15  
 16 Who was the **first** president of the United States?  
 17 Barack Obama  
 18 George Washington  
 19 Thomas Jefferson  
 20 John Adams  
 21  
 22 Who was a president from the following **list**?  
 23 Aaron Burr  
 24 Benjamin Franklin  
 25 Alexander Hamilton  
 26 John Tyler  
 27  
 28 Who was the president that purchased Louisiana?  
 29 Thomas Jefferson  
 30 George Washington  
 31 Abraham Lincoln  
 32 Theodore Roosevelt  
 33  
 34 Who was the president that was a famous general?  
 35 John Kennedy  
 36 Dwight Eisenhower  
 37 Richard Nixon  
 38 Ronald Reagan  
 39  
 40 Who was called 'the Father of the Constitution'?  
 41 George Washington  
 42 James Madison  
 43 Andrew Jackson  
 44 Thomas Jefferson  
 45  
 46 Which president was NOT from the South?  
 47 Bill Clinton  
 48 George W. Bush  
 49 Jimmy Carter  
 50 Barack Obama  
 51  
 52 Which president wrote the Declaration of Independence?  
 53 George Washington  
 54 Thomas Jefferson  
 55 James Monroe  
 56 James Madison  
 57  
 58 Who was the president during the Civil War?  
 59 Abraham Lincoln  
 60 Barack Obama  
 61 Theodore Roosevelt

```

62      George Washington
63
64  Who was NOT a president from the following list?
65      James Polk
66      Millard Filmore
67      Alexander Hamilton
68      Benjamin Harrison
69
70  Who was the president that said 'Tear down this wall!'?
71      Harry Truman
72      Richard Nixon
73      Ronald Reagan
74      John Kennedy
75
76  Who was the first black president of the United States?
77      Barack Obama
78      John Adams
79      George Washington
80      Thomas Jefferson
81  NIL

```

There are many ways to do this. My answer is below. I do not expect you to write this by yourself, because you have not had all you need. I do expect you to think about it, and write what you can in plain English as if a computer could understand it. Write down all the steps. This is very important. If you can't think through all the steps and write them in English, you cannot think through all the steps and write them in Lisp, or in any other language. I will tell you in detail what each line of this function does. Think hard about it and try to understand how it works.

```

1  ;;my function
2  (defun give-test (items)
3    (cond
4      ((null items) nil)
5      (t
6       (let* ((len (length items))
7              (num (random len)))
8         (ask-question (nth num items))
9         (give-test (remove (nth num items) items))))))

```

**Line 2.** 'defun' defines the function, 'give-test' names it, and 'items' gives the name of the input data.

**Line 3.** 'cond' means 'conditional' and means that we are about to make a choice

**Line 4.** States that if items is empty ('null items'), the function returns nil

**Line 5.** States that in all other cases the followings actions will take place ('t' means TRUE).

**Line 6.** Creates a variable named 'len' that consists of an integer equal to the length of the list.

**Line 7.** Creates a variable named ‘num’ which is a random number less than the length of the list.

**Line 8.** Calls (**ask-question**), passing a random item. Do you see why?

**Line 9.** Calls (**give-test**) again, with the item just printed removed from the list.

This function goes through the list of items, prints one item at a time, and calls itself again after removing the item it just printed (so it will not print the same item twice). When all items have been printed and removed, the list of items is empty, and the function terminates. Try your best to visualize in your mind’s eye how this works. You will see this pattern many times in the coming weeks.