

# Homework, Week 3, part D

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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.

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.

Listing 1: My function

```
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.

I have added this function to the previous file. The new file is named **test-questions-answers.lisp**. Load it and run it. Here is my output.

Listing 2: My output

```
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