Q 1

Write a function that computes the median of a list of numbers. You may use SORT and LENGTH.

Q 2

Implement treesort. You need to add the tree traversal (=traveling around the binary search tree and collecting the items in ascending or descending order) component to your previous solution.

Q 3

Write LAMBDA expressions[1] that

(a) returns the greatest of two integers.

(b) given two integers, returns T if one or the other divides the other without remainder.

(c) given a list of integers, returns the mean.

(d) given a list of integers, returns the sum of their factorials – use your factorial solution.

Q 4

Write a function REPLACE-IF, which takes three arguments: a list LST, an item ITEM and a function TEST, and replaces every element of LST that passes the TEST with ITEM. You may find using keyword arguments useful (see the lecture notes). Make use of MAPCAR, LAMBDA and FUNCALL in your solution.

Q 5

MAPCAR can work on any number of lists; you only need to be careful to provide a function with the correct number of arguments. For instance

```
(mapcar #'(lambda (x y) (+ x y)) '(1 2 3) '(4 5 6))
```

gives (5 7 9). Don't worry if lists are not of equal length, MAPCAR goes as far as the shortest list.

Define functions that use mapcar and LAMBDA and

(a) zip two lists together – (zip '(a b) '(1 2)) should give ((A 1) (B 2)).

(b) take three lists: first two will be lists of integers, and the third is a list of functions. Apply the corresponding function to corresponding arguments.

---

[1]If needed, consult Graham on how LAMBDA works.