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Assignment: Homework 1 - Design Document for “fgroups”

I. Data Structures and Usage:

i. Hanson Tables

- a) Fingerprint Groups Table
Keys: Fingerprints (represented as Atom strings)
Values: Hanson Sets (see part I.ii.b)

ii. Hanson Sets

- a) Previously Processed Names Set
Members: Names (represented as Atom strings) that have already been checked for valid input and inserted into the Fingerprint Groups Table (see above)
- b) Names Belonging to a Fingerprint Set
Members: Names (represented as Atom strings) that match a fingerprint key in the Fingerprint Groups Table from part I.i.a

iii. Atom Strings

- a) Fingerprints
- b) Names

II. Input Reading Invariant Description

i. All prior lines were valid and processed

- a) Given an input line (when we are partway through reading input), it will hold true that all previously inputted lines have been valid and processed into our data structures.
- b) Primarily, this means that all previous lines were validly formatted as per the specifications, to allow for separation of the fingerprint and name on the given line.
- c) It also means that we stored them into our data structure without errors, and no name has been duplicated.

III. Computation/Output of Fingerprint Groups

i. Organized Storage, Hanson Mapping

- a) Our data structures allow us to group the fingerprints to their corresponding names as they are processed in.
- b) As the primary structure is a Hanson Table, with a nested Hanson Set for each value in the table, we can create a print function that utilized Hanson's convenient map functions
- c) We will pass in a custom print function to the Fingerprint Groups Table's map function. This will in turn call the map function of each Set (which are the values in our Fingerprint Groups table).
- d) Through this nested map function on the Fingerprint Table and the Sets, we can print all members of the Sets (the names represented as Atom strings)