Unit B4: Structures, 10/3/03

Exercise 1: Human Body

Formally define a structure (call it **HumanBody**) that would represent **two** complete human bodies. Naturally, you need to include complete formal definitions of all the structure components. For relations and functions, you must also give their "types" (**as discussed in class**).

Your structure must contain at least the following components:

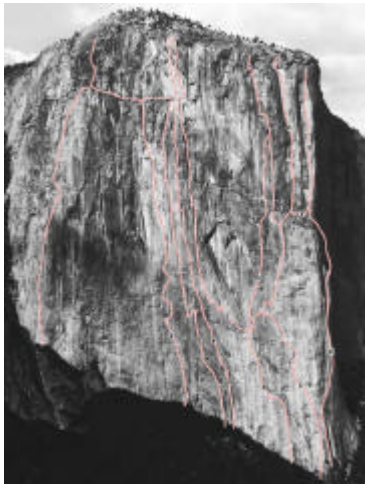
- Set of eyes, *E*
- Set of mouths, *M*
- Set of heads, *H*
- Set of body parts, *P*
- Set of ID numbers for each individual, *ID* = {1, 2}
- Function to identify all the body parts with an ID number, *identifiedAs*
- Irreflexive and antisymmetric relation to represent body part attachment, *attach*

Furthermore, add at least one more structure component (relation or function), to make your structure unique to you. If your additional relation or function involves a set not already defined, you must also add necessary set(s) so that your structure definition is complete.

Note: Format your structure as follows:

HumanBody = (...)
Types and definitions of structure components

Exercise 2: El Capitan



El Capitan in Yosemite National Park is an incredible rock climbing site. It is three times taller than the Empire State Building, and people may spend a week hanging on the rock. If you are interested in, there are a number of routes available to follow, thanks to earlier climbers. On the photo at right, these routes appears as if they were on a flat surface, but to be precise, all these routes must be mapped in a 3 dimensional space. In this exercise, you will represent routes on El Capitan. The important point is that you must be able to represent routes that may grow in any direction in 3D. You must contain all the necessary structure components: set(s), relation(s), and/or function(s). For relations/functions, give their "types." Since you do not have real data, it is not possible to define the structure components that would reflect the reality. For this exercise, make up your own data. Demonstrate that your structure *could* represent even all the routes on El Capitan, if you are given real data.

Requirements/Instructions:

- Call the structure **ElCapitan**.
- Your structure must contain sufficient information for us to be able construct a 3D model of the routes on El Capitan.
- Try to limit the number of structure components to the minimum. For example, do not include information such as rock type (including hardness), availability of shade, existence of a bird nest, although some of these may be important for climbers.

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