02157 Functional programming

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Exercise: Simple Company club

A company has a club for employees, and this club has a register containing names and descriptions of every club member. You may assume that names are unique. The description of a member is a tuple (no, yb, ths), where no is a telephone number, yb is the year of birth, and ths is the themes of interests of the member.

A club arrangement is given by a predicate describing the club members that may be interested in the arrangement. Let, for example, the predicate $p_1(no, yb, ths)$ be true for a given description (no, yb, ths) of a club member when yb is greater than 1982 and ths includes "soccer" and "jazz". This predicate describes an arrangement directed to young club members that are interested in *both* soccer *and* jazz.

Your solution to this exercise should be presented using the model-based approach discussed in Section 4.6 in the textbook. In particular your solution should contain:

1. Types for the important concepts of the problem formulation including, at least, types for the register themes of interests, descriptions and arrangements.

2. A declaration of a register `reg`, a declaration of an arrangement `p1` for the above described arrangement p_1, and a declaration of an arrangement `p2` that is directed to young club members that are interested in *either* "soccer" *or* "jazz" *or both*. These declarations should be constructed so that they can serve as illustrative examples.

3. A declaration of a function `extractTargetGroup` p r that gives a list with names and phone numbers of the members in register r that may be interested in the arrangement p. State the type of `extractTargetGroup` in a comment. Make use of the type names introduced under point 1. above, so that the type reflects the intention with the function.

4. Tests of `extractTargetGroup` involving `reg`, `p1` and `p2`.