

## Final Project: Avalance Forecasting

### Intro

We chose to model a centralized database for Avalanche Forecasting Agencies. Currently, many different agencies operate and issue forecasts for the regions they cover. However, this is often inconvenient for end-users, as no central database exists; multiple sites have to be referenced in order to understand conditions. Our database is designed to store forecasts and observations from multiple forecasters and observers across multiple agencies and zones within those agencies.

### Entities and Relationships

Separate entity names are *italicized* to help recognize relationships.

#### Forecast

Our database is built around storing *Forecasts*. Each *Forecast* has an integer id, a date it was issued, and an integer danger rating for below, at, and above treeline. By averaging the three elevation-specific danger ratings, a derived attribute can be generated for the overall danger rating. Every *Forecast* is issued by a *Forecaster*. Every *Forecast* corresponds to a specific *Zone*, specifying what geographical regions the *Forecast* is relevant for. Every *Forecast* has one or more *Problems* associated with it.

#### Problem

A *Problem* is a specific concern identified in a *Forecast*. It specifies a problem type, such as 'wind slab' or 'wet loose', a size and a likelihood. A unique problem id is also assigned to every *Problem* tuple. *Problems* also have multivalued attributes for elevation and aspect (a single problem can exist across many elevations/aspects).

#### Forecaster

*Forecasters* issue *Forecasts*. One *Forecaster* can issue many *Forecasts*. Every *Forecaster* works for a single *Agency*. *Forecasters* are identified by an id number, and have attributes for their first and last name.

#### Agency

*Agencies* preside over one or more *Zones* and can have many *Forecasters* that work for them. Each *Agency* has an id, a name, and a website url.

#### Zone

A *Zone* represents a single geographical region that a *Forecast* can correspond to. Each *Zone* is covered by a single *Agency*. *Zones* are identified by their globally unique name. *Zones* are also referred to by *Observations* that are made within their geographical boundaries.

#### Observation

*Observations* give anecdotal data on conditions seen in the field. They include a date, a boolean specifying if an avalanche was observed, a specific location, and a description of what was observed. They are identified by an id. Every *Observation* refers to a *Zone* (the specific location must fall within the *Zone*). Every *Observation* is contributed by an *Observer*.

#### Observer

*Observers* contribute *Observations*. They are identified by an id and include attributes for first and last name. Because *Observers* can have many levels of qualification, an observer type attribute is included to specify the *Observer's* authority (ie a "Guide" observation may be more reliable than a "Public" observation).

