**The following project is customized from one of the candidate projects in SCORE 2018 (2018 Student Contest on Software Engineering, http://score-contest.org/2018/index.php), which is held every two years, as a part of International Conference on Software Engineering.**

**SCORE Project: *Brew Day!***

**Title: Brew Day!**

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Home brewing, the process of producing beer on a small scale for personal purposes, is an activity that receives growing attention among beer enthusiasts. Every home brewer owns a brewing equipment (kettles, fermenters, pipes, etc.) with a certain maximum brewing capacity, the number of liters the equipment is able to handle in a single "batch". Brewing also requires ingredients, whose actual amounts vary from recipe to recipe; these are various kinds of malts, hops, yeasts and sugars (and of course, water). Brewers like to log their recipes, for future reference, and maintain an updated list of available ingredients, for shopping before the next brew.

The goal of this project is to develop an application for home brewers that allows them to maintain a list of recipes, and adapt existing ones. The application must also maintain a list of available ingredients, update this list after a batch and when new ingredients are bought, and produce shopping lists for the next batch. A special characteristic of the application is the "what should I brew today?" feature: it goes through the recipes, and taking into account the available ingredients and brewing capacity of the equipment selects a recipe that can be brewed with the available ingredients, maximizing the use of the ingredients, and the batch size.

**Project Detailed Description**

**“Brew Day!”** is an application that allows home brewers to maintain an organized database of their beer recipes. The application allows users to create, store and modify recipes, and later on delete them, if the user wishes to do so. The application is intended for "all-grain" brewers only, and thus all recipes are for this kind of brews (the "extract" brews are not supported).

Every home brewer has specific equipment, whose characteristics leads the maximum number of liters that can be brewed on a single run. However，the brewer will decide the batch size in each run, only if it does not exceed the capacity of the equipment. Recipes involve, besides water:

* malts
* hops
* yeasts
* sugars
* additives

However, the number of liters of water required and beer produced should be specified too for each recipe. While brewers prefer to create recipes referring to concrete values, like kilograms of specific malt or grams of a specific hops, the application must show these recipes in some "absolute" measure, that allows for a direct conversion of the recipe according to the batch size in each run. For instance, if malt quantity is expressed as 10 grams for 100 ml beer, then when the batch size is 400 ml, the recipe will show that 40 grams of malt are required. When the quantity is represented in percentage, it should be converted too.

Besides the actual recipes, the application must maintain recipe instances, i.e., particular brews based on a recipe; these instances can be accompanied by notes to refer to issues that may affect the resulting beer and the brewers would like to keep logged. A particular kind of note is the tasting note, that allows brewers to keep track of opinions on a beer from a particular brew.

**“Brew Day!”** must support a useful feature for brewers: "what should I brew today?" goes through the recipes database, and chooses the recipe that maximizes the use of the available ingredients, taking into account the batch size, of course. The application should show the recipes with all required ingredients available at home. If the ingredients at home are not enough for any recipe, then show the recipes which need less kinds of missing ingredients and produce missing ingredients for shopping.

A recipe instance, i.e., a particular brew, should allow users to update the available ingredients list, subtracting used ingredients from the available ones. The available ingredients list should also be updated if the brewers buy ingredients home.

**Project Scope**

The project must implement the features described above, i.e., creation, modification and deletion of recipes, creation of recipe instances (brews), supporting for notes on brews, and keeping track of available ingredients. The "what should I brew today?" is a mandatory feature. Optionally, developers may choose to allow ingredients availability automatically from brews information.

The choice of the development platform, including tools and programming languages to use, is left to the teams. The application may be desktop-based. Besides the development of the software, teams must provide accompanying documentation, including a requirements document, a design document, and a brief user manual (installation and usage of the application).