

17-708: Software Product Lines

Assignment 2: Domain Analysis and Feature Modeling

The key learning goals of this assignment are:

- Apply domain analysis to a specific domain.
- Describe identified features in various ways and understand the complementary nature of those representations
- Reason about configuration spaces
- Make and justify scoping decisions

Scenario

You are the CTO of a medium-sized web development company. Recently, you have developed frontends for payroll/human resource management in three different companies. Those systems have features as managing benefits, viewing your payment status, and handing in timesheets. Your companies strength are significant expertise in slick web applications and smart phone apps, producing apps that people actually understand and like to interact with.

Although all three previous jobs were quite different, you realize that there is a market out there that might be worth exploring more systematically. Many companies still use old and really hard to use solutions, often going back to old mainframe systems and might be willing to adopt a more modern solution. Still, as every company is quite different and you do not have the market power of SAP or Oracle, you do not expect to be successful with a single standard solution.

You consider developing a software product line (or a system that is highly customizable for each customer).

Tasks

1. Analyze the domain and identify the features your product line might include for some or all customers. Document the result as a feature model, describing features and their dependencies.
2. Translate your feature model into a propositional formula.
3. List two valid and two invalid configurations.
4. Exemplarily document two features in detail.
5. Exemplarily explain for one feature why you consider it to be in scope for the product line. Additionally, exemplarily explain for one feature why it could be part of the product line, but you decided that it should be out of scope.

Deadlines, Technicalities, and Hints

Answer the questions in one document with clear subsections for each question. Send it as PDF file to the instructor by Sep 23, 11:59pm.

There are no specific format requirements. You could use FeatureIDE to create and export feature models or just draw them on a whiteboard and take a picture. In general avoid exceeding a page of text for any of the answers (soft constraint).

There is no single correct answer and no notion of completeness. Use your judgment. You are allowed to make assumptions about the domain or the scenario (e.g., you could assume that you could buy a software component that handles all tax-related issues if this is relevant for your analysis), but should list such assumptions as part of the answer. If your domain analysis grows out of hand (say, more than 40 features), focus on a subsystem or indicate omissions.

To understand the domain, you might want to explore Wikipedia and the web pages of various providers of such payroll/HR solutions. For example, CMU has recently introduced workday.com, which also lists a number of white papers with additional information to potential customers. Competitors include closed source and open source systems as paylocity, Flapps, Odoo, and many others.

Grading

We expect

- A recognizable understanding of the domain
- A clear understanding of the feature-model notation
- An accurate translation from feature models to their semantics in terms of propositional formulas and an understanding of the semantics illustrated through two valid and two invalid configurations
- An understanding of aspects of describing a feature beyond just names and relationships described in a feature model, illustrated on two features in the domain
- A justified explanation of two scoping decisions