Department of Computer Engineering

CENG 415 Senior Design Project & Seminar I (Fall 2016/17)

Area — *Dependable Reuse of Software Components*

Topic — *Model-Based Testing of Software Product Lines (SPL)*

Titles of Theses — ***1.)*** *Coupling Feature Diagrams with Event Sequence Graphs for Testing SPL (upto 2 students)*

2.) *Coupling Formal Concept Analysis with Event Sequence Graphs for Testing SPL (upto 2 students)*

Tools — *Variant Configuration Languages, e.g., XVCL* (XML-based Variant Configuration Language)

Motivation — Reuse is the process of creating new systems from existing ones rather than building them from scratch. Reuse is not limited to the deployment of particular components; it has, moreover, to consider all of the information that is related to the product generating processes, including also documents from requirements definition, analysis, design, and test cases as well as test procedures.

Long period market analyses encourage reuse that tend to have very high return on investment, e.g., in case of software engineering, about $30.00 returned for every §1.00 invested. This explains why reuse of components and systems has a long tradition in the software industry.

Nevertheless, whereas a component may be perfectly suited to one application, it may prove to cause severe faults in other applications. Therefore, an adequate validation process considering the changed purpose and the different application configuration in combination with new, reused, or further used components is needed.

Among technologies for software reuse, *software product lines engineering* (SPLE) has established that attempts, starting from common features, to define a family of products. One immanent validation problem of SPLE is to cope with the validation of immense amount of variants.

Objective — *Feature diagrams* and *formal concept analysis* are emerging means for modeling the variation in SPLE. However, they do not enable considering also the communication and module structure of the system under test, e.g., as performed by *event sequence graphs*. The objective of the seminar and theses is to rationalize the validation process by coupling these models for an efficient bottom-up and top-testing in SPLE, using *variant configuration languages*.

Instructor — *Prof. Dr. Fevzi Belli (belli @upb.de), IYTE and Univ. Paderborn, Germany*

Class Meetings — *Wednesdays, 13:30-15:15 (Check frequently the home page for changes)*

Office Hours *Wednesdays, 10:00-11:00*

Home Page *http://iztech.ivknet.de/ (id and password will be handed during classes)*