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Cal Poly Software Engineering Capstone Project
Call for Proposals
April 8, 2021

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Proposals are solicited from industrial, entrepreneurial, and non-profit sponsors for the 2020-2021 Cal Poly Software Engineering Capstone Project. The type of project specified, developed, and deployed in the SE Capstone strongly influences the intellectual content of these courses.

The SE Capstone consists of three courses over three academic quarters:

    CSC 402 Software Requirements Engineering (Fall)
    CSC 405 Software Construction (Winter)
    CSC 406 Software Deployment (Spring)

Typically four to six teams of four to six upper-level undergraduate students develop systems for the sponsor. The sponsor serves as the business customer, establishing requirements and acceptance criteria in consultation with the Cal Poly faculty. While the courses include academic activities such as lectures, readings, and exams, the project is the focal point and primary outcome.

The capstone experience is frequently cited by students and alumni as their most significant learning experience at Cal Poly. It is praised for its real world character and launching off point for software engineering careers. Sponsors find value in the opportunity to work with Cal Poly faculty and students, the opportunity to explore requirements, architectures, and prototypes for applications of interest, and the opportunity to explore new technologies and software development practices.

Proposals should be one to two pages and should propose a specific project. Proposals should identify an executive sponsor and a primary contact person who would serve as the project customer throughout the project. Proposals will be accepted until the capstone customers are selected, but preference will be given to proposals received prior to June 22, 2021. A notice of intent to submit a proposal would be appreciated, and we would be happy to answer questions and help you identify an appropriate project and primary contact person. Questions and proposal submissions should be directed to faculty Bruno da Silva (bcdasilv@calpoly.edu) and BJ Klingenberg (bklingen@calpoly.edu). At least two projects are expected to be accepted for the 2021-2022 SE Capstone starting in Fall 2021.

1 Requirements

Every software engineering capstone project must have the following characteristics:

1.1 Real World Character

The product must meet needs of real users and be deployed for use by those real users. The problem domain must be accessible to our students. Domains that require specialized knowledge are undesirable unless accessible domain experts are provided. In order to establish a legitimate customer role, domains for which students are not a primary user are preferred. For example, a system that is primarily used by a nurse, small business owner, or real estate buyer might be desirable.

1.2 Strong Sponsor Commitment

The sponsor must agree to support the project for the three academic quarters (September through June). Weekly or every other week customer meetings will occur on Tuesday or Thursday during the window of 8-11am or 12-3pm PDT (could vary in later quarters). Meetings will typically last an hour and include communication with students on requirements and acceptance criteria, formal reviews of product deliverables, periodic visits to the classes (in-person or remotely), and other activities necessary to meet the "real world character" of the project. Customer meetings may occur remotely via conference call or face-to-face.

1.3 Project Size and Scope

The project must have sufficient substance to provide several team members major development tasks over three quarters. These three quarters represent about 30 weeks. Most likely students will produce the highest amount of new code translating to new features from week 11 to week 25. The first 10 weeks will most likely be on scope understanding, upfront design, architectural exploration, and some

initial feature implementation. The last 5 weeks will most likely be on bug fixing, packaging, and final deployment. Intentionally, we do not provide a precise range of project size in this call for proposals, as we believe it would not be precise enough to guide customers and project partners in writing their proposals.

1.4 Language/Platform

Based on current curricular considerations, projects with a significant web and/or mobile application component are preferred. Additional platforms will be considered.

1.5 Project Completion

Completion of project must include: beta-level functionality of an advanced prototype, compliance with formal style guidelines, completed inline documentation, and other internal quality standards as determined by the instructor. Project requirements will be initiated by the customer. Complete project requirements will be developed collaboratively by the customer and the capstone students, and must include a set of nonfunctional quality attributes such as reliability, safety, legality, etc.

1.6 Customer Expectations

Industrial sponsors are expected to understand that students are not subcontractors. Projects should not be on any critical path in commercial development since students and faculty have limited skills, time, and structure available to dedicate to the project. The capstone is only one of many courses that students will be taking. Students and faculty will make "best efforts" in completing the project, but the primary goal is an educational experience, bounded by the constraints of the academic calendar.

1.7 Interaction Support

We have access to video-conference tools such as Zoom and MS Teams. If additional tools are necessary for interaction between the sponsor and student teams, the sponsor must provide the necessary support. It is appreciated that sponsors visit the class for a face-to-face presentation near the end of each quarter. *Note: During the COVID-19 pandemic this may not be possible.*

1.8 Funding

The sponsor must provide funding to cover direct expenses required for the project (e.g. specialized software tools/hardware/devices, cloud services credits, and other potential overhead associated with the class and project). In addition, if the project involves intellectual property retention on the sponsor side, the Corporate Engagement and Innovation (CEI) office at Cal Poly will work with the industry sponsor on the necessary requirements and paperwork.

Regardless of intellectual property retention, the Department of Computer Science and Software Engineering asks that the sponsor make a donation to the department in order to offset substantial faculty costs of the capstone project and maintain equipment, laboratory and classroom facilities used by the student teams and instructors. The suggested donation for industry sponsors is $5,000. If the sponsor is not able to make a donation, the proposal is welcome but we would expect a justification addressing this matter in the proposal submission.

2 Other Expectations

In addition to the mandatory requirements, projects might include some of the following characteristics:

2.1 GUI Interface

The project may include a GUI interface that has menus, controls, and dialogs. Accessibility and localization requirements are welcome.

2.2 Reuse of Existing Components

The project may include some use of existing components and services such as open-source libraries or a database engine (e.g. MySQL, cloud db) for storing persistent state.

2.3   Algorithmic Module

At least one significant module of the developed project may perform a practical task requiring algorithmic analysis, and the project would ideally include two or more algorithmically distinct implementations of this module to compare performance.

2.4   Intellectual Property and Non-Disclosure

Open source projects are ideal, but it is acceptable for the customer to retain Intellectual Property rights. It is preferred that non-disclosure agreements **not** be required. It is very desirable that students be able to talk freely about and share artifacts from the capstone course when applying for jobs.