Proposal and Key Document Instructions

Formative Evaluation

August 22, 2019

Purpose

The Proposal defines the scope and objectives of your Capstone project - what your resulting product is, what it does, and for whom. It forms an agreement among all parties of what must be accomplished. It is also the basis for evaluating success which may include an expected level of quality, performance, environmental impact, and/or cost.

Not all aspects of the product (including detailed requirements) may be known or final at the time that the Proposal is written. It documents the consensus between the engineering team and the other stakeholders. Where the project scope is broad and not fixed, it is appropriate for the engineering team to describe the priorities, ensuring that the project will address the most important items even if not all proposed items listed can be accomplished.

The Proposal also includes an initial draft of the Key Documents, i.e. Requirements, Design, and Validation documents (see Key Documents instructions, posted in Canvas). The Key Documents drafts reflect the team's current knowledge based on their project research.

Audience

The proposal should address the stakeholder concerns:
- *User*: Has the team identified the user's needs?
- *Designer*: Has the team described a feasible technical alternative(s) for meeting the user's needs?
- *Business Personnel*: Does the proposal consider the business objectives of the organization and / or client?
- *Legal Personnel*: Does the product respect the laws and values of society?
- *Quality control*: Is there a plan for validating that the proposed system will meet the stakeholders goals and needs?

The stakeholder roles described above may be fulfilled by the client or someone from the client's organization. In some cases the supervising instructor may take on the stakeholder role.

Content

The content must achieve the objectives described in the purpose through effective organization of material, appropriate references and clear explanations and justifications for statements and decisions made.

Proposal

The proposal is an elaboration on the project description provided by the client. Drafting of the proposal allows the client and the capstone team to agree on the project scope and criteria for evaluating success. It includes the following sections:

Background and Context describes the client's mission / vision statement, the problem, and why this problem is significant to their organization. Effectively articulating the background and context will allow the capstone team to focus on solutions that support the client's overall vision.

Outcome describes the specific impacts (results and benefits) that delivery of a successful project will have on the company. The project outcome should align with the client's needs or mission / vision statement. Examples of project outcomes might include:
- Testing the feasibility of a technology in order to justify further research and development
- Producing a prototype in order to identify implementation and manufacturing issues
- Producing a prototype in order to determine customer behaviour
- Developing a service to address a customer's need

Deliverables defines specific products and services that are required in order to achieve the client's project outcome. Each deliverable description should include performance specifications, constraints and qualities that the client requires. For example:
- Produce a coffee mug vending machine from recycled materials which can hold and dispense up to 60 mugs, and which can display data to users in order to educate them about sustainability

Deliverables are stated without reference to a particular technology or solution unless this is a constraint imposed by the client. For example:
- Produce a mobile app which monitors heart rate and movement using the Android operating system

Deliverables may also reference business and / or legal considerations. For example:

- All software used to develop the mobile app must be open-source and the final product must be released under the Open Software License (OSL-3.0)

Budget identifies where financial resources need to be allocated. All projects must provide a budget, however its importance is dependent on the deliverables. The proposal budget should identify the most significant project costs, if additional funding is needed and if so, where this funding will come from.

Project management summarizes important planning and management aspects of the project. The project timeline / milestone summary indicates the initial breakdown for development, testing and delivery of the solution. The risks summary contains the major project risks, as understood at the outset of the project. The project management plan is an agreement among team members and with the supervising instructor (and possibly the client) on how your project will run and how you will report on your progress. It describes who will take on which responsibilities (within the team and for important outside contributors to the project). Your project's supervising instructor will offer more guidance on expectations for the specific project. The project plan should also include conflict resolution mechanisms (i.e. when to escalate an internal disagreement to the supervising instructor's attention) and outline individual's expected behaviour, e.g. availability for meetings, response time to emails, etc.

Each proposal will vary depending on the client and the nature of the project. Your supervising instructor may also have specific requirements that may need to be considered and reflected in your Proposal. Please see the lecture slides on the Proposal for further information. The Proposal document should be approximately six pages in total as summarized in the table below:

Section	Typical Section Content	Pages
Title page / Executive Summary	- Project name, authors and affiliation - Executive summary	1
Background and Context	- Description of the organization - Values promoted by the organization	0.5
Outcome	- Description of the problem from the perspective of the organization - Impacts the successful project will have on the organization	0.5
Deliverables	Technical formulation of the problem	1

	● Identification of the artifacts (products, services, documentation, etc) and their function as required by the organization. ● Identification of constraints imposed on the project's solution	
Budget	● Identification of major expenses ● Determination whether more funds are needed for the project ● Identification of additional funding if required	0.5 - 1
Project Management	● Major project milestones ● Project risks and dependencies ● Roles and responsibilities ● Individual team member expectations ● Conflict resolution	1.5

Key Documents

The team must produce an initial version of the Key Documents as described on the Capstone Canvas site. The scope of the initial version includes:

- Definition of the key documents' format (font, headings, references, etc)
- Implementation of a change log for each document
- Reformulation the objectives and deliverables sections in the proposal document into functional / non-functional requirements and constraints in the requirements document.
- Reorganization of the information contained in the proposal to the appropriate document
- Research demonstrating the project's viability recorded in the appropriate document.

Document format:

The proposal document must have the following format
- 12 point type, 1.5 line spacing
- Letter sized paper
- PDF format for submission. See the Canvas site for more information.

Evaluation

The proposal document evaluation is a formative evaluation which confirms what you are doing well and identifies what needs improvement. A detailed description of the capstone course

evaluation can be found in the syllabus. Marking rubrics and instructions are available on Canvas under the Milestone 1 - Proposal Assignment.

Your proposal document will be evaluated by the:
- *Supervising instructor* who assesses the technical content, and correctness as it applies to the project. The supervising instructor will use technical rubric for assessment. The proposal document will make up a portion of the grade for milestone 1.
- *Supervising TA* who will assess the technical content as it applies to the project and make a recommendation to the supervising instructor.
- *Communications TA* who will assesses the written communication as it applies to the organization, clarity, and quality of english and make a recommendation to the instructor. The communications TA will use the proposal communication rubric for assessment.

Your proposal review presentation and your proposal document evaluation will be combined to give your grade for milestone 1, the proposal review.

Appendix A: Style Guidelines

These documents are long-lived. They represent the best of the knowledge of the designers at some given time, for a given design cycle.
- Use present tense and active voice. Using the future or conditional will create some confusion 3 months later when the feature has been implemented.

Final Document Statement	
Unacceptable **(passive, future, conditional)**	**Acceptable**
When the surface mounted resistors are received in milestone 2 the product will meet the form factor requirement R1.	We are using surface mounted resistors to meet the form factor requirement R1.

- Use bulleted and numbered list, rather than long paragraphs.
- Avoid names of specific individuals.
- Include only information relevant for the audience of the document. It is not a narrative of what happened or will happen in the project. you are not writing a novel, e.g.

Unacceptable	Acceptable
...and by Christmas Joe decided that the Mongo DB database was a fantastic choice, so eagerly soon after New Year eve, he immersed himself in a total refactoring of the persistency layer, forgoing some fantastic skiing in Whistler that winter.	The persistency layer is implemented around Mongo DB (url), which satisfies all the storage requirements of section 4.5, and is demonstrably faster than a relational database such as MySQL (a 37% improvement).

- Keep track of major changes in the document in a table at the beginning with this information: date, author(s), change, reason for the change if useful, e.g.

Date	Author	Location	Change
2019-5-19	PBK	section 5.6 to 5.8	change to Mongo DB, performance issue

- Avoid duplication of information. Use the single point of maintenance principle. Any information that is duplicated runs the risk of an incomplete update, and will rapidly lead to confusion, disconnect, errors, or at minimum a distrust of the documentation.
- Identify elements of your requirements document so that you can easily reference them in subsequent documents, i.e. use some unique ID, such as UC7 (for use case number 7), or P4 (for performance requirement 4). This will orient the reader without you having to repeat statements from the requirements document.