IE 477 – IE 478 Systems Design

Suggested Contents for the Second Progress Report

Last Revised on October 15, 2023

The Second Progress Report (SPR) will be submitted in the middle of the Spring Semester before the Progress Presentations to the company. As your project is a work in progress, you will build on your First Progress Report (FPR). SPR should contain the seven sections that you had in your FPR with an optional Appendix at the end. For the seven sections, you will need to:

- Extend some of these sections with the new work you have performed.
- Update the sections as needed (shorten, update with new information if available, rewrite for completeness)

It is strongly advised that at this point the project is expected be ready for implementation. The approach must have been verified, validated, and benchmarked; the codes/algorithms must be ready for further use. The project team must provide an implementation plan of the project.

There is no page limitation for the Second Progress Report. On one hand, it is important that you do not miss the issues to be covered. On the other hand, writing too long is not meaningful, as getting feedback will be difficult under such a case. We believe that characteristics of your project will be an important factor in deciding how long to write and what subsections to include. Note that this report should be prepared carefully so that you should be able to carry parts of it as the Final Report (FR). You may always refer to the suggested contents of the previous reports as these documents have more detailed explanations to the sections that are not expected to require much change in this report.

While making changes in your reports, do not keep any information that was once relevant to your project but now totally irrelevant. Your project reports are not a place to log the historical changes you had throughout two semesters. If one wishes to track your changes, they could browse through your earlier reports.

*Please follow the instructions described in the document called "**Report Format**" while preparing your report. **Make sure that neither the format information nor the below description affects the way that you select the section titles that you use in your text. We expect you to select those to reflect your project work rather than being generic.***

The report is expected to include the following information - here presented in mainly eight sections for convenience:

1. **Description of the System:** This section should have now become finalized for the FR. However should update it if needed.

2. **Current System Analysis and Problem Definition:** The analysis of the system should be completed along with the final problem definition (if it has been changed after you submitted the FPR). At this stage, this section should be the well-refined and finalized (or almost the finalized) version of your FR.

3. **Review of Resources:** This section should have now become finalized for the FR. However should update it if needed.
   A. **Relevant Work in the Literature:** Update if needed.
   B. **Engineering Standards and Regulations:** Update if needed.

4. **Proposed Solution Strategy:** Follow the specific directives for updates per subsection.
   A. **Critical Assumptions**: Update if needed.
   B. **Major Constraints:**
      i. **Company Regulations or Restrictions:** Update if needed.
      ii. **Relevant Engineering Standards:** Update if needed.
   C. **Objectives:** Update if needed.
   D. **Solution Approach:** As you make progress in your project, your solution approach might be updated, or extended depending on the limitations of the models you proposed earlier. As before, you need to update this section accordingly to contain the most recent solution approach. Any earlier approach attempt that has in no way any relevance or any relation to your current solution approach must be removed. However, there could be some cases in which you need to propose a heuristic algorithm to cope with the limitations of your earlier model. In this case, you will likely to use your earlier model in computational experiments to show the performance of your heuristic algorithm versus your previous model.
      I. **Conceptual Model:** Update if needed.
      II. **Mathematical Model(s):** Update if needed
      III. **Solution Method:** Update with the results you obtained from your model(s).
   E. **Verification:** This section should have now been completed.
   F. **Validation:** Perform validation to show credibility of your proposed solution strategy. This section should be in progress and about to be completed. However, in some rare circumstances, projects may require validation step to be performed only by the company. In this case, you need to provide a detailed plan with dates indicating how you and the company will perform this step (most likely during the pilot study – See Section 5D).
5. **Outcome and Deliverables:**
   A. **Outcome:** Update if needed.
   B. **Deliverables:** Your deliverables should now be ready to be used by the company. At this stage, we expect your decision support system to be able to perform the basic tasks – accepting inputs, running your model and presenting the outputs to the user. It is acceptable at this stage to have certain parts of your deliverables to get improved, as when the pilot study commences, you will likely to get some feedback from the company about any potential bugs and parts requiring improvement (See Section 5D). Compose a user manual with the description of the tools or interfaces with screen shots (if available) that the company will utilize during the pilot study.
   C. **Benchmarking and Benefits to the Company:** After your validation necessary information to measure the benefits realized from your proposed system when compared to the current one can proceed. State clearly your current figures and/or description of the benefits. Describe the sensitivity analyses (or scenario analyses) relevant to your case. The benefits can be monetary or other (it is usually better to provide a percentage improvement in many cases), but make sure that the figures are reasonable and factual. Note that it is usually not expected to have an improvement of more than 10-20%, unless you have a strong case to explain large %'s. Even an improvement of 3-5% is greatly appreciated by the companies.
   D. **Implementation Plan and Pilot Study:** Once you show and convince the company that your proposed solution strategy is valid (in Section 4F) and beneficial to be used (in Section 5C), you should now construct a detailed implementation plan with the company on how you can integrate your proposed strategy with their current operations. Include **dates of meetings** planned with the industrial advisor (and/or presentations, including the final presentation at the company).

      As a part of your implementation, in most of the projects you are asked to plan for a pilot study in which the company will utilize your proposed solution strategy to a part of their system (or maybe the entire system) and compare the actual realization of the benefits you proposed in Section 5D. The pilot study also provides the company an insight of how your deliverables work in production

environment and will likely to provide you feedback about the parts requiring improvement. Note that along with this decision support system you should also provide a User Manual and any other tool/document that will complement your main deliverable – use company's feedback to upgrade the manual.

6. **Project Plan and Work Package Assignments**: As you make progress in your project, this plan must be updated all the time. Some previously set tasks may already be performed, or may be delayed. Some tasks might be further divided into smaller sub tasks. Also, the tentatively planned later stages become clearer to plan. Once again, consider the deadlines provided in the course syllabus and the deadlines of the second semester provided in the first presentation as a guide to determine the stages that are expected to be completed in your project. Remember that you are a group of 6 or 7 students. The work package assignments should be made in such a way that will allow for parallel tasks to be handled simultaneously by different members.

7. **References:** This section should contain a list of references that you cited throughout your report.

8. **Appendix:** The Appendix section should be used to present the material relevant but not necessarily a part your major findings. As this section is optional, the material in this section should also be considered as optional for the general reader, as well. This means, this section should never have any material, absence of which will cause major problems in following the body of the report. Please make sure that each appendix clearly (and independently) describes the information you place. This means that you may need to explain figures and help the reader to follow what you intend to have in the appendix.