
General Instruction: To complete the homework set, you are required to do the followings. Your solutions must be typed in \LaTeX using the course homework template. The progression of your homework solution is to be “recorded” by making a git folder specifically for this homework set. The burden of proof is on you, and if your git commit history is sparse, then you may be liable for a penalty. A paper copy of the PDF output of your \LaTeX file is to be submitted to your instructor in class on the due date. *After* submitting the paper copy, but *before* the end of the due date, you will upload your work to your github by making a remote repository specifically for the homework, and post the link to the repository at the designated *Discussion* forum in Blackboard by making a thread just for you. The repository name in your github should be `550400.homeworkset.1` and the discussion forum thread should be named `YourFirstNameMiddleInitialLastName`, e.g., `BaracHObama` and `WillardMRomney`. You have till the end of the due date to finalize your github repository. However, any commit made after the class time of the due date will be inadmissible. *Your attention to details in following this instruction will be critical, and if not followed exactly at the time of collection, the homework set may be graded at 90% of the full score.*

Problem 3 (40 pts): Consider a team of four students, say, A , B , C and D , who just started working on writing a `latex/beamer` file, say `main.tex`, for a class presentation of their work statement. Assume that they do not wish to coordinate their schedules for a concurrent group meeting (both virtually and physically). Assume that:

- A is in charge of *Introduction*,
- B is of *Problem Statement*,
- C is of *Timeline*,
- D is of *Deliverable* part of the presentation.

In other words, their contributions to `main.tex` do not overlap. Then,

- first, devise a work flow strategy for the team so that they can collaborate asynchronously using `git`,
- next, devise yet another `git` strategy different from your earlier proposal.

Finally,

- discuss the strength and weakness of each of your proposed strategies in terms of merge conflicts resolution,
- make the final recommendation.

In order to answer this question, *build* a mathematical model, *following* the guideline from IMM. Use Section 1.4 and Section 1.5 of IMM as *role models*. For example, you are to identify which variables are exogenous and which are endogenous. More specifically, among other things, in your model, is the preamble part of `main.tex` an endogenous or exogenous variable? Note also that in addition to this issue, there are other issues that you are to consider. So, *be sure to consult IMM*.

Problem 3 Solution:

First strategy is that each student builds their own git folder and finishes their part of the project in their own folder. In the end, one person adds all other group members' git folder as his remote repositories. He pulls the content from each repository and merges into one complete document.

The second strategy is that group build only one git folder, but each member of the group make a branch from the master branch. Each member of the group finishes their own part and then merges their part to the master branch.

Every time one is try to merge, it takes additional time and effort to solve the merging conflicts. Also seeing other person's content will improve the quality of the project. Balance between the goal of minimizing merging conflicts and improving the quality is the goal of developing this git strategy. To compare the 2 strategies, we build a mathematical modeling using the 4-step method introduced in the IMM.

Step.1:

The problem is to find a better strategy for group members to use git in their project. A Mathematical model is developed to evaluate each strategy and this model is able to choose the better strategy for the team to follow using the git. This model should include 4 part(introduction, statement, time line and deliverables part of the presentation)of the project and the results of the merging. Since the deliverable part is not really effected by the strategy of the git, this part is the exogenous variables. The rest of 3 parts of the project and the results of the merging is the endogenous variables.

Step 2:

In the first strategy, only one student is doing all the merging at the end of the project. This person needs to solve a lot of merging conflicts. Also, each member of the group works independently, the report will be lack of consistency in term of the content. In the alternative strategy, each student is doing the merging every time one works on the assignments. It increases the work load for each member, but each member has a better understanding of what other members of the group are working on. The report has a better consistency in term of the content. The first strategy is very simple and easy to implement. The alternative strategy shows more collaboration within the group members, but the work load is increased.

Step 3:

The model is useful, because the variables needed in the model is easy to obtain. A clear study of the each person's assignment will decide the importance of collaboration of the project. For example: if the person who is responsible for the Time line part of the project do not need the information from the problem statement. Person who writes the introduction does not need the information from the work statement part of the project. In that case, the first strategy is better. However, if seeing other part of the project is essential for a person to finish his part, then the alternative strategy is better

Step 4:

From the 4 part of the project, each member can finish their part of the assignments independently. The consistency of the report will not suffer much by utilizing the strategy 1. Also, compare to the strategy 2, strategy 1 has less work load for each member.