Group Project 1 - Description

Inventory management systems, as commonly part of SCM/ERPs, are a combination of management software as well as "on-the-ground" processes and procedures that ensure data is properly recorded so that goods/money/information flow smoothly. That is, BOTH the software AND the data gathering procedures are required in order for these systems to properly function. Of course, all business somehow track various details of incoming and outgoing inventory, using the gathered data to make business decisions informed by statistics, patterns, trends, etc. within the data.

For your group project your team will be creating a web-based inventory management software than can be easily applied across small businesses housed under a single roof with minimal changes (so design your system with portability in mind – what is common across most/all contexts where inventory management systems would be used?). Grading will be based on how scalable, reliable, available, efficient, and maintainable your solution is (further information will be posted at a later date).

Minimum Requirements:

- An interactive website (using HTML/CSS/JS/PHP) that allows a user to meaningfully search through data (stored in a MySQL database) and presents summary results in the most useful fashion (statistics, plots over user-defined time period so they can identify trends/patterns) for the user to make better decisions.
- A set of useful "advanced" searches (e.g., for each product how long on average is it in storage before begin sold, which products spend the least/most time in storage, how may of each product was sold, which products are most profitable after discounting how long they are in storage for, which products were returned the most and for what reason (how much money was lost on these?), who were the most common/highest valued customers? etc)...again, within a user-defined time window.
- The website must also have the ability to create summary reports of the incoming and outgoing inventory, and other relevant business metrics (e.g., profit-loss by week/month/quarter/year, most and least sold products, etc.), and may include the advanced searches (plots/statistics of results, not long tables).
- You must create a 3min 30s to 4 minute Youtube video when submitting the final project that shows how to use your website by interacting with it in ways that show how useful it is
- You must also submit a professional-style user manual (created in .pdf/Latex!) showing how to use your software (with clear figures, no grammar issues, etc.). Further details (e.g., page limit) will be provided at a later date.
- Provide a (long) list of all non-trivial functionality and code testing that has been done (can be stored in a Google Doc and downloaded as Excel to save time).

What you do not need to do:

- create rules for how to properly record data "on the floor", but you will have to create sufficient fictitious data to demonstrate your software works as it should in a variety of situations!
- create an interface for users to make purchases or order inventory.
- embed any intelligence in your software that makes decisions for the user - it should only present data/informaiton so that the user can make good business decisions themselves.

To submit by Sept 8 11:59pm

The project is designed to be challenging to encourage development of many important skills: teamwork, project management, visualization of results, database design, programming, critical thinking, system design, and more. Completing such a project, while learning the skills to do so, can become quite overwhelming if the group isn't well organized, motivated, determined, helping each other, and holding each other accountable in a transparent way. Moreover, your group will also work on the assignment together.

So that your group can start of on the right foot, this question will ask you to clearly outline expectations of each group member so that each is accountable for their efforts, and responsible to the group. You are encouraged to assigned roles to help organize and ensure a quality final product (e.g., somebody in charge of testing, another for report quality, etc.). Be meticulous in this step as team organization, coordination, and communication can "make or break" a project. **Do not underestimate the importance of this.**

Provide brief but complete replies to the following question (failure to do so will result in 5% loss of final course grade):

1. What expectations do you have for each other and the group? Consider at least: group meeting frequency, being on-time and sticking to schedules, homework question completion writing in Latex and submission, weekly hours contributed to the course, participation during meetings (vs just showing up), asking for assistance, timely reply to emails, homework writing process and proof reading, etc.
2. How will the group manage each member's progress in watching 332 video lectures and attending the discussion sessions (where a lot of very useful information will be provided to understand the material and complete homework/project, and not posted to Brightspace)?
3. What is considered "meaningful" contribution to a homework question and to the project? How will the group measure this? How will the group ensure contribution is equal at each homework and final project submission? What should happen to those not equally contributing (be as specific as possible)?
4. How do you intend to keep track of your own and each others' engagement with the project activities and homework to prevent group members from falling behind on their understanding of the course material and project responsibilities?
5. How will the group go about making important design, coding, or other strategic decisions?
6. How will the group handle conflict resolution? (i.e., if one or more members are not contributing sufficiently or fail to attend team meetings, differing opinions to a specific problem, etc.)
7. How will the group conduct a fair procedure for the firing of a non-contributing or disruptive group member?

Project Guidelines

There is obviously significant freedom in your group vision of the project, and creating a realistic plan for success and carrying it out will be challenging. Along the way there will be many choices, often with nuanced subtleties that need careful group brainstorming, analysis and some research. You will also need to make numerous assumptions, but be very careful that they are realistic or have insignificant impact on the final product. Be very careful and thorough in your approach so as to make efficient and effective use of your time. Try not to take on more than you can feasibly do, or try to be too fancy (for bonus points) at the cost of functionality.

Exceeding minimum requirements will be considered for bonus points. Each group has a significant degree of creative freedom in implementing these goals but cannot violate any constraints/requirements. You are highly encouraged to utilize previous experiences in addition to the technologies discussed in this course in order to devise the best possible solution, but check with the Professor or TA if these will have a significant impact on the project (for instance you cannot use Excel, or languages not taught in the labs).

Report Format

All homework and project manuals/reports will be written in 11pt font with 0.75in margin, single-spaced, and must include a cover page with all group members names. The cover page is not included in the page limit nor are any references or the table of contents. Reports MUST be professional and appropriately balance figures/tables/diagrams with clear and concise descriptions in a manner that allows easy reading and discovery of information (e.g., diagrams, tables and lists instead of overly detailed and lengthy paragraphs). **Do not include "filler" text or (oversized) images in your report as it will adversely impact your grade**. Some references and examples for business report writing can be found at the links below, and you are encouraged to seek other examples as well:

- owl.english.purdue.edu/owl/section/4/16/
- www.wikihow.com/Prepare-a-Professional-Report
- www.makeuseof.com/tag/writing-professional-reports-documents/.

Without exception all reports must be in PDF format. A link to hand in reports to Brightspace will be provided.

Assigning Credit to Individual Student Contributions

Given that this is group work, it is important that appropriate credit be assigned to each member of the group. This will be true for ALL submitted items, and the group will decide among itself the **MEANINGFUL CONTRIBUTION** of each member using a 100pt scale as shown in the example below. **This data will be used when deciding individual final grades**. In the event student(s) are not equally contributing to all facets of the class at the expectation level of the group, they will be penalized, or fired from the group. **All group members are expected to know all the material of the homework regardless, as it will be tested in exams and quizzes.** Ex. For a group of three students A, B, C and 2 questions:

Student	Q1	Q2	Overall	DIFF
A	50	33	83	17
B	50	33	83	17
C	0	33	33	-33
St Dev	29	0	29	29

Overall is the sum of the total effort of each student. DIFF is the difference from equal contribution, and for each member is calculated as their overall score - 100*(# of questions) / (# group members), rounded to the nearest whole number. The last row is the rounded standard deviation of the respective column.

Expectations and tips

Although the project has a lot of freedom in how each group realizes the final goal, there are certain expectations that often groups do not realize until it is too late to do much about:

Not investing enough time into the user manual: It is expected to be written as a professional would, appropriately use technical jargon from lecture notes, and in a way that is very clear and succinct using high-quality images. Of course, it should not contain any spelling, grammar, or technical errors (misusing technical terms, misrepresenting data/results, etc.). Poorly graded reports show signs of being rushed, have multiple sources of error, lack focus in explanation, do not use technically correct jargon, include run-on sentences, etc.

Code quality, testing, and standards: In order to develop good code it is important to not rush to program. Take time to think about the purpose of the code, what functions are required and how they interact, etc. Moreover, you will be required to provide test cases and outputs, and it is HIGHLY suggested that the group examine coding standards for how to name functions and variables, and also different versions of code. These things take upfront effort, for sure, but will save a lot of time in the long run. That is, be intentional in everything you do vs ad hoc - the latter typically leads to sloppy code with long runtimes, partially functioning websites, databases that disregard design principles, etc.

Group dynamics: It is important that the group self-police and each member maintains an active role to the expectations of the others. Developing a professional environment to be able to discuss conflict-potential situations (e.g., some member(s) not meaningfully contributing) and resolve them is very important. The longer such things linger, the more harm it does to the project. Note, your individual project grade may be adjusted based on individual contributions...so, doing minimal effort will not only harm your group, but will harm your grade even more.

Attending discussion sessions and lab prep lectures: These sessions will provide A LOT of useful information, tips, etc. to better understand the course material and complete the project. As such, EVERY student is highly encouraged to attend all of these, and actively participate by keeping pace with watching video lectures and completing lab work.