

Vanier College
Faculty of Continuing Education

SYSTEM DEVELOPMENT

TEAM PROJECT INSTRUCTIONS

Course Number: 420-940-VA **Teacher:** Tiago Bortoletto Vaz

OVERVIEW

The general objective of the course is to simulate the process of developing software that you are likely to encounter in any analyst or programming work environment. The specific objectives are to learn about project management, information and requirements gathering, data modeling, information-level design, user interface design and prototyping. You will also develop the necessary skills to act as both leader and regular member of a team.

The LIA (Learning Integration Assessment) for this course consists of two major parts: the development of a prototype database information system (the development project), and documentation about the process of building that system (the documentation project). The course will be conducted using various remote communications environments and technologies that are currently being used to develop commercial information systems.

Students will be exposed to tools and technologies that are currently being used commercially, some of which will be new for them. You are expected to explore and learn how to use them on your own using on-line tutorials, web sites and the provided reference material. This is in accord with what you will find in your professional path: new tools, technologies and techniques are constantly being developed, and as someone working in this field you are expected to keep yourself constantly up to date.

If you happen to know an interesting tool or technology not mentioned by the teacher for the purposes of the course, don't hesitate to bring it up! This course is about mutual learning based on exchanging experiences and sharing knowledge.

TEAMS ORGANIZATION

Each student in the class will be a member of a development team for the duration of the course, experiencing the reality of system development process. Team members will collectively work on the project, and each student in the team will receive a grade based on their contribution to the project and on the overall quality of the project. Work should be divided equally among team members in whatever manner the team determines to be fair. Ideally, this should be decided by consensus, and not dictated by the team leader. Try to build a "cross-functional team", where you identify each other's strengths, and areas where you would like to develop skills. This requires a bit of reflection on the part of the team members in order to identify everyone's strengths.

Below are some of the important points for the team project:

- The composition of the team should reflect a real working environment as much as possible. Therefore, the teacher will compose the teams based on criteria that include previous professional experience, technical knowledge and interests (based mainly on the answers to Quiz 0), as well as diversity, for example avoiding teams made up of only one gender, or teams made up of members from a single country of origin.
- Each team consists of 3-4 members.

- It's recommended that members of a team help with the whole process even if they want to focus on a specific domain.
- If one member drops out of a team, the remaining members are responsible for the completion of all team assignments.
- Much of your work for this course will be done during team meetings, which you may hold either during lab periods or during your homework time.
- Members are responsible for sharing the tasks and ensure equal workloads and smooth team operation. Note that each member will be individually graded by their commitment towards the team's goals.

JOURNALS

There are two different journals to be maintained: A **team logbook**, and a **personal journal**.

The team logbook records all decisions and activities taken by the team. It records what happened and who participated in team organizational meetings. Do not use it to record the working meetings. It is also a record of who was responsible for what, who did what, when things are due, and when certain events took place. For example, you would record all the client meetings, who was present at them, what the client said, and what was supposed to be done as a result of the meeting. The team logbooks must be properly formatted and submitted as part of each LIA deliverable at times specified in the course schedule.

The second kind of journal is the personal one. You will find the personal journal being extremely helpful when you write your LIA individual report. Furthermore, if you develop the habit of maintaining a daily journal, you will also find it useful when working in a corporate environment, in particular when you are subject to performance evaluations. In the personal journal you should record your own activities to refresh your memory and to document both how you and your team members are performing. Keep track of project and team events as they occur during the semester, as well as the amount of time you spend on the different parts of each deliverable in the project. Also, record the amount of the time you spend viewing lectures as distinct from time spent working on the deliverables, assignments and preparing for quizzes. You should be recording how much time you spend on each specific task. Also, record where you work on this course: at home, at the coffee shop, on the bus, etc.

Since this is a personal journal, do not include any details about the decisions taken during the team meetings. These will be recorded in the team logbook. You should, however, record how well you think the other members of your team are performing, and any other observations about the functioning of the team. This journal is a personal one, and the instructor will be the only one reading it. Feel free to also add your personal impressions about what you have learned, what has worked well in the project and what should be improved for the next steps.

TEAM FUNCTIONING

One of the key goals of this course is learning how to both manage a team, and function as a member of a team. You will be provided with guidelines about how to do this, but it is your responsibility, both individually and collectively, to see that the team functions smoothly.

A different member of the team will be responsible for each deliverable. This person becomes the team leader for that part of the project. The team is responsible for determining who will lead each stage of the project. Under exceptional circumstances, this assignment may be changed by the instructor. The team leader is the person who coordinates activities and through whom the instructor can contact the team. The team

leader will also make a short presentation about the work that was done during their tenure, following the submission of each deliverable, as per the schedule.

Both parts of the project (documentation and development) are self-managed and self-directed by the team. The instructor's role is to provide advice and counsel, and to evaluate your work, but not to get involved with day-to-day team management, except in rare cases. It is your responsibility to stay on schedule, decide who will do what, and when, and to decide how to prepare the deliverables you create. In general, you must decide how to organize your team to ensure that the various parts of the project are completed on time. Furthermore, each team member is responsible for making an equal contribution to any group work. This requires personal maturity, professionalism, and commitment. Specifically, it is your responsibility to deal with personal matters within your team. There may be considerable diversity in experience, age, technical expertise, and other factors among the team members. Use this diversity to your advantage! Only when repeated attempts on your part to resolve disagreements or conflicts produce no outcome should you involve the instructor. The instructor will remain available for consultation about any aspect of the course.

FINDING A CLIENT

From the first day of class, you will be looking for a client. In the past, students have found clients by talking and emailing members of their families, close friends and acquaintances, or by going door-to-door to businesses located either near the College or their homes. The physical location of your client does not matter. A couple of teams in the past developed projects with international clients. While distance does introduce other interesting challenges, such as working in different time zones, this is consistent with contemporary software development. When you are contacting a potential client, you should explain the setting; that is, that you are students doing a class project. Your goal is to develop a prototype DB application that will help improve the client's business. You should emphasize that you will be developing this application *with* them, and not just *for* them.

What is important is that the client is willing to spend some time with you to describe how their business works and discuss the business problems they may be having. Their feedback is critical. The more time you have with them the better, as long as you can capture requirements and break them down into user stories. You will be taught how to do this during your lectures. Your clients typically won't talk to you unless you have something to show them, but by making sure that the feedback loops are short, you can get more iterations in and end up with a higher quality product that is more suited to their needs. Value their time above everything else and be focused, have an agenda and prepare things ahead of time.

When trying to find a suitable client, focus on their business needs. Almost any business can benefit from a database application, but they may not realize it. You should be able to explain to them how using a database will improve their day-to-day functioning, and possibly their bottom line. Use your knowledge of database systems, but in most cases, it is probably better to avoid talking about technical issues. Reassure them about the ease of use of the system you will develop, and of its suitability for their business. You should also explain to them that you will be delivering a prototype of a database system that will answer some of their needs, not a full-blown application that will solve all their information processing needs. You can start by talking about the business processes that are causing the most waste in their organization, leaving the actual database design until later. A process could be "entering a new bicycle into inventory" or "handling a customer refund" or "creating a new customer" or "manage my inventory" or "keep track of my customers". A database will be critical to the success of the project, but it need not be the focus of the business problem. This approach will also help the business identify routine processes and organize their systems accordingly.

In general, it is preferable that you do not work for the company or division that becomes your team's client. All the members of the team will need to be able to interact with the client at different times, so the company needs to be open to dealing with different members of the team. If you are unable to find a real organization, you will have to do a project based on a fictional organization, assigned by the instructor. In this case, the

instructor will act as your client representative for the duration of the project. In the past, students have found this option much more difficult.

In any case, be aware that system development and database design are iterative and recursive processes, so do not be deceived or frustrated by your experiences. It is natural to refine descriptions and designs throughout the project, and it is normal for things to go wrong. You should adopt an attitude of learning, which involves acting, reflecting on the actions taken, consulting on the results, and then moving forward based on the lessons you have learned.

SOFTWARE, HARDWARE, AND TECHNICAL ASSISTANCE

It is recommended that you complete the development project using software that is available to you through the College. It is, however, your choice as to which software you will use for any given part of the project. In particular, it is up to you to decide on a DBMS: MySQL, Postgres, Oracle or something else, and a programming language or environment. Whatever you choose, be prepared to explain your choice. Remember that you will have to develop a good user interface as part of the project, so pick an environment that is flexible and relatively easy to use. One of the key success factors in a project of this nature is the ability for several people to work on different aspects of the project at the same time. In order to facilitate this, developers often use a version control systems (VCS). Git is highly recommended here. Before deciding which tools, you will use, you should do adequate research to determine whether those tools can answer your needs, and whether you can master them sufficiently in time to produce the required output. You should avail yourself of the many free on-line tutorials on these subjects. There is also some material posted on the course Léa site. The following are recommendations based on the instructor's experience and on good results in the past:

- PHP/MySQL for the backend, HTML/CSS/Bootstrap for the frontend
- Git (hosted at Github or Gitlab) for version control
- Jira or Kanboard for project management
- Open-source applications such as Dia and Draw.io for diagrams
- Trello or Miro for User Stories and story mapping
- LibreOffice, L^AT_EX or MSWord for reports
- Figma for UI design

PROJECT DOCUMENTATION

The project grade will be based upon an evaluation of the project deliverables (5 in total). The grade received will be for both content and form. In general, it is a good idea to enhance the professional appearance of your work. In particular, everything you submit must be free of grammar and spelling errors.

The teams should use a Git repository for both the documentation and implementation of the project. The repository can be hosted on Github or Gitlab and can be public or private. In the case of a private repository, the team must provide the instructor with read-only credentials. The instructor will use repository metrics (commits, quality of commit messages, issues, merge requests etc) to evaluate the active participation of each member and to assess the fair distribution of work.

Requirements and other details for each deliverable will be provided throughout the course, respecting the schedule in the course outline.

PROJECT IMPLEMENTATION

The implementation will be evaluated as part of the Learning Integration Assessment, as described in the course outline (20% total):

- Accurate analysis of client requests and requirements (4%)
- Choice of application development standards, methods, and best practices (4%)
- Appropriateness of the design, solution, and implementation techniques (4%)
- Compliance with application development standards, methods, and best practices (4%)
- Accurate drafting of unit, integration, functional, or acceptance test plans (4%)

Attendance is mandatory for all team members at the final presentation (demo) of the project.

During the team project presentation, the instructor will attempt to use the prototype, asking questions to each member of the team in order to verify their understanding of both the code and the various design decisions that were taken to produce the implementation.

You're encouraged to use the MVC (or the Model-View-Template (MVT)) architecture for your implementation. During the presentation, it is also expected that you present your file structure to the instructor and make the source code fully available. The implementation must:

- Have at least five records per table present in the database.
- Have at least five screens as part of the user interface.
- Perform input error checking.
- Conform to well-established UI guidelines.
- Allow the user to:
 - Search for an item, or a group of items, in the database.
 - Add data to the database.
 - Retrieve data from the database and display it on screen
 - Update data in the database.
 - Delete data in the database.
 - Produce at least one nicely formatted summary report of the database contents.