

## **Comp2147 Group Project: ABC clinic**

**Group Size:** Maximum Six Students (from any CRN with no minimum number of students in a group requirement)

**Deadline:** Monday December 1, 2025 (11: 59p.m)

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Your company has been awarded the contract to create a **“Clinical Management System”** software using Object Oriented /Unified Process methodology for the **ABC family medicine and walk in clinic**. Some members of your team interviewed the client; the clinic manager, to collect requirements about the proposed system and took the following interview notes.

### **Case Description by clinic manager**

I am building a new family medicine and walk-in clinic (ABC clinic) in the Greater Toronto Area. We are anticipating to serve to approximately 1500-2000 patients per week on the average. We will initially have ten physicians (doctors), six nurses and eight receptionists and two Assistant managers to help me in running the day to day affairs of the clinic. Our clinic will be open 9a. to 7p.m Monday to Saturday.

I have almost twenty (20) years’ experience of managing medical clinics. We would like to store patient related data electronically as there is a governmental regulation to store and safeguard patients’ information for confidentiality and privacy reasons. I have seen some very sophisticated software systems implemented in some clinics which offer almost all electronic features and are

practically paperless and would like to have something like that for our clinic. Our Budget is 1 million dollars and the system should be implemented (completed) within 9 months timeframe.

Based on our discussion today I am summarizing the main functions that we would like to have in the software. I might forget to mention some items here and in case you need further information/clarification please don't hesitate to contact me at any time (as a group or in the class/lab). I might also send you any additional information at a later stage.

Our business motto is to deliver best possible healthcare to our patients and we hope that the system that your team will develop will help us achieve excellence. I would be delighted to answer any further questions from your side and please let me know in case you would like to interview other potential user (doctors, nurses, and receptionists) and I will arrange it as well.

New Patients will have to call the clinic to book an appointment with a physician and if they decide may become permanent patients of one of our physicians by filling up Ministry of Health's forms. We are required to send these paper forms to the ministry (and keep one copy for our records). Once they become permanent patients, they can either book, cancel or reschedule an appointment either online or by calling the front desk. Once booked an appointment can only be cancelled or rescheduled until 24 hours before the scheduled time. No shows or missed appointments are charged 30\$ Patients do not have to pay for medical services in Canada however they are certain items that are not covered by the government

and the patients will be required to pay for these services such as medical/sick notes, travel vaccinations etc. We will accept payments in cash or via a major credit card.

Patients may also come as a walk-in patient during the business hours and are put in the queue for the first available physician at that time (They cannot book a walk-in appointment). The system should keep a track of patients' appointment and change the status accordingly: booked, cancelled, arrived, Checked IN, Checked OUT, LWT(left without treatment), No show etc.

Walk in patients are checked in, placed in the queue and are seen by the next available doctor. There are two exceptions to this process; a patient may request to be seen by a particular doctor and a patient may jump the wait line in case of an urgent need i.e. the triage process (i.e. chest pain, wound treatment etc.). The default time slot for patient appointment with doctor is 15 minutes but patients with special circumstances can be scheduled for double time (30 minutes).

The system should store patients' basic information including her name, address, contact, health card, and his or her previous history of visits, treatment, medications, and lab results. Upon arrival (both scheduled and walk in) the receptionist would verify each patient's health card in real time (linked directly with ministry's system), address and contact details and then the secretary marks

“checked in” status. At the end of the appointment, the secretary marks a “check out” status.

The nurse will then take the patient to an examination room and enter his or her temperature, height, weight blood pressure and brief history of problems/symptoms and notes it down in the system. The patient is then seen by a doctor who would enter patient’s complaints/symptoms, diagnosis and medications prescribed.

The doctor should be able to accomplish the following tasks either by generating a print out from the system (and hand it to the patient) or send directly to the external party electronically (if the third party offers an electronic interface).

- a. Log patient’s visit history including the symptoms, prescribed medicines or tests, and referrals.
- b. Prescriptions (print out given to the patient or sent to the pharmacy electronically)
- c. Lab Requisitions (print out given to the patient or sent to the Laboratory electronically: and receiving the test results back electronically as well).

- d. Specialist Referrals (print out given to the patient or sent to Specialists doctors' offices electronically: and receiving the specialists notes/letters back electronically as well)

The system should be able to store scanned copies of paper documents in some situations (for instance: in case of receiving paper based lab results/specialist letters.

In case of any abnormal lab test results, patient should be recalled back to the clinic immediately to be seen by a doctor and discuss the results. The system should keep a track of all the calls made or messages sent to the patient by the clinic.

The physicians are paid directly by the government for the services rendered to the patients. The system should provide the capability for the doctors to bill the government for their services and see their payments.

There are however some patients who do not have government health coverage and they may pay cash, or may have coverage by an insurance company and the system should provide the Accounts Receivable and payable functionality for these and other cash payments (non-covered services mentioned before).

The system should also provide reports about patients, visits, financial accounts, usage statistics etc.

My job responsibilities as a manager include scheduling doctors, nurses and receptionists/secretaries for shifts. I calculate the number of hours worked for each non salaried employees (except doctors). I then provide this information to our accountant (external company hired by the owner) and they take care of payrolls and salaries. Full time employee's salaries and payroll is also managed by our accounting firm.

## Project Deliverables

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1. Create a **system service request** for creating a Clinical Management System for ABC clinic as requested by its Manager John Doe (use template from chapter 3-slide 7 Figure 3.2)
2. Develop a professional scale **project charter (1-2 pages)** as stipulated by PMBOK®. (use template from chapter 3-slide 15 Figure 3.7)
3. Create a **Feasibility Analysis** document (4-5 page long) to justify the project based on Economic, Technical, Operational and other factors as described in Chapter-5. Create a Spreadsheet for calculating the NPV, ROI and Payback period (assume reasonable data for initial and recurring costs and benefits).
4. Create a List of **Intangible benefits** for this project (Use example from Table 5.3 Slide 14 chapter 5)
5. Create a **Project Scope Statement** (Use example from chapter 5, Figure 5-10, slide 34)
6. Create a **use case diagram** (first cut) by performing textual analysis of the above provided business description for the ABC clinic in order to identify the candidate actors and use cases.
7. Add the **screenshot (Image) of the Table** created during the textual analysis process containing the Candidate Class, Extracted Text and Type columns (among others)
8. Pick any **FIVE (5)** use cases from your project and create **Written Use Cases** at the Kite Level (bird-eye view, follow the examples in Appendix7-A of the text book (pdf copy on D2L).
9. Create Three (3) **Activity Diagrams** for any three business processes belonging to your project (follow the examples in Appendix7-B of the text book (pdf copy on D2L).

10. Modify the first cut use case diagram created in the above step based on the additional details derived from the written use cases activity diagrams and create a **Refined and Detailed use case diagram** by incorporating <<include>>, <<extend>>, and <<generalizations>> relationships.
11. Create a **context level data flow diagram (DFD)** to capture the scope of your project, use the example in chapter 7 of the text book (fig 7-4 on Slide 13, Chapter 7)
12. Decompose the context level data flow diagram to create the **Level-0 DFD** (text book names it as *Level-0* but the Visual Paradigm tutorials name it as *Level-1*).
13. Pick any one Business Process and create a BPMN diagram.
14. Create a **conceptual Data Model (ER)** model (incorporate entity generalization hierarchies, if any, and business rules for overlap and disjoint)
15. Create an ER Model for fully normalized relations (**Physical Data Model**).
16. Create a **Class diagram** that would display class names, attributes, associations and relationships (generalization, composition, and aggregation)
17. Create **Wireframes** for the following tasks. use example in fig 10-3A (power point for Chapter 10 slide no 11)
  - a. Appointment booking form for an existing (permanent) patient.
  - b. Change the sequence in the Queue form for an emergency walk-in patient.
  - c. Create Staff Schedule report for any given week.
  - d. Store Patient Visit history form (Use a single sample patient)
  - e. Patient Payment Entry form (One form for all type of payments such as doctor note, uninsured service etc.)

18. Create a **Dialogue Diagram** for any **One actor/Scenario**, use example (Power Point chapter 11, Figure 11-19, slide no 45)
19. Create a **testing strategy** for your Project which should include the test types and testing process you would specify [**One-page document**] (use information provided in chapter 12)

## PROJECT SUBMISSION REQUIREMENTS

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### **Project Report:**

Please create a Project Report in the form of a **single pdf document** by adding the above described 19 sections into it along with exported images of all models created in Visual Paradigm or any other software.

**GROUP ENROLLMENT in D2L BrightSpace™:** Please form your groups and start working with your team mates, I will open the Group Enrollment feature on D2L 3 days before the deadline (Nov 28,2024) and it will take a few minutes for all team members to officially pick a group and enroll in it.

I will remove any students who will join a group without the consent/knowledge of all other contributing group members (based on their complaint)

**Deadline:** Sunday December 1, 2024 (11: 59p.m)

**Submission:** Each group will submit one Report file ONLINE via D2L Brightspace Project Submission Link in the form of a **SINGLE pdf document** (just one file per group, don't submit multiple copies for a group).

**LATE SUBMISSIONS** will be subject to penalty as per college Policy.

## Report Organization

Your report should be of a professional/official standard and should include:

1. A **cover page** (containing Group Number, members' full names, student Ids, CRNs of all group members in alphabetic order).
2. A **table of contents which** SHOULD follow the numbering system for individual sections as provided in this document. (For example **Activity Diagrams** is Item No 9 and **Class Diagram** is item number 16).
3. Report should have a footer section on each page, with page numbering and group number (as assigned by BrightSpace™).

**Project reports that do not follow the above mentioned formatting requirements would be subject to a 10% Penalty.**