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| Mariano Marcos State University  COLLEGE OF ARTS AND SCIENCES  Batac, Ilocos Norte 2906  **DEPARTMENT OF COMPUTER SCIENCE**  **CLINICAL INFORMATION SYSTEM** |

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**October 11, 2011**

**ACKNOWLEDGEMENT**

The researchers would like to thank:

Mr. Reynold P. Villacillo for the supervisions and for the patience checking the revisions of the different diagrams and artifacts that were presented. The researchers owe the completion of the design to Mr. Villacillo and for always saying that there should always be “HARDWORK”.

Poly Clinic for letting the researchers make Poly Clinic as the pilot agency for the system they designed.

Dr. Nenita Navarro for allotting time for the interview that the researchers conducted for them to gather information about the clinic.

The researchers want to thank also their family for the financial and moral support they’ve given.

Last but not the least, to the Almighty God who guides them all through the process of the project and for giving them the strength and courage to finish what they have started.

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**INTRODUCTION**

At these times, people are prone to sickness and it’s human nature to take care of one’s health. Undergoing medical examinations are part of human life to prevent and cure ourselves from sickness. Clinics and hospitals play a big role and have a great significance in our lives. Without these when people get sick, people won’t be able to do their tasks which is a responsibility and duty for their own good. Issues like slow improvement and processing of hospitals and clinics are complaints of the majority. And because of this, the researchers would like to develop and implement a system, a Clinical Information System, that could lessen the slow processing in clinics.

The researchers have chosen Poly Clinic as their pilot agency because they want to help and improve the way of implementing the processors inside the clinic. Their purpose is not just to help the clinic but also to put the patients under consideration and make something at their convenience.

A system related to this system is the hospital Informative System (HIS). This system is usually used in big hospitals like Mariano Marcos Medical Center. On the other hand, Clinical Information System (CIS) is used for clinics or small areas of hospitals.

**STATEMENT OF THE PROBLEM**

Poly Clinic is currently using a manual recording of information that leads to slow processing of information in the clinic.

**ISHIKAWA DIAGRAM**

**OBJECTIVE OF THE STUDY**

This study generally aims to design and develop a Clinical Information System for Poly Clinic. Specifically, it is aimed to conduct researches in order to gather information for the development of an appropriate Clinical Information System and use tools, methods and techniques in the analysis, design and implementation of the proposed system.

**SIGNIFICANCE OF THE STUDY**

The Clinical Information System is an improved way to lessen the slow processing of information in the Poly Clinic. This design substitutes the manual recording of information. It implements computerized storing of information. This is improves and provides a faster way of retrieving the information/records stored in the database of system.

**SCOPE AND LIMITATION**

This study focused on the development of Clinical Information System.   
The system covered the following processes: admission of patient, recording of laboratory tests, recording of diagnosis, recording of prescription and paying bill.

**CONTEXT DIAGRAM**

**USE CASE DIAGRAM**

****

**USE CASE DESCRIPTION**

|  |  |
| --- | --- |
| **ADMIT PATIENT** | |
| Use case ID: | 1.0 |
| Use case Description: | This use case allows the patient to be admitted in the clinic |
| Actor(s): | Patient, Clerk |
| Pre condition: | The patient must give patient details/record |
| Post condition: | The clerk records the patient details and the patient will be admitted. |
| Normal Flow | 1. The clerk checks the database if the patient is already been admitted or already have a record. 2. If there is already a record, the clerk updates the record of the patient. 3. The clerk clicks the Save button. 4. The system stores the patient record. |
| Alternate Flow | 2. If there is no record yet, the clerk creates a new record for the patient. |

|  |  |
| --- | --- |
| **RECORD LABORATORY TEST RESULTS** | |
| Use case ID: | 2.0 |
| Use case Description: | This use case allows the clerk to record the laboratory test results of the patient |
| Actor(s): | Clerk |
| Pre condition: | The patient should have undergone laboratory test |
| Post condition: | The patient receives laboratory test results |
| Normal Flow | 1. The clerk enters the laboratory test results given by the laboratory 2. The clerk clicks SAVE button 3. The system stores the laboratory test results. |

|  |  |
| --- | --- |
| **RECORD DIAGNOSIS** | |
| Use case ID: | 3.0 |
| Use case Description: | This use case describes how the clerk records diagnosis |
| Actor(s): | Clerk |
| Pre condition: | The doctor must have the diagnosis |
| Post condition: | The patient receives diagnosis |
| Normal Flow | 1. The clerk enters the diagnosis given by the doctor 2. The clerk clicks SAVE button 3. The system stores the diagnosis. |

|  |  |
| --- | --- |
| **RECORD PRESCRIPTION** | |
| Use case ID: | 4.0 |
| Use case Description: | This use case allows the clerk to record prescription |
| Actor(s): | Clerk |
| Pre condition: | The doctor must have the prescriptions |
| Post condition: | The patient receives prescription |
| Normal Flow | 1. The clerk enters the prescriptions given by the doctor 2. The clerk clicks SAVE button 3. The system stores the prescriptions |

|  |  |
| --- | --- |
| **PAY BILL** | |
| Use case ID: | 5.0 |
| Use case Description: | This use case allows the patient to pay the bill |
| Actor(s): | Patient, Clerk |
| Pre condition: | The doctor must have the prescriptions |
| Post condition: | The patient receives receipts |
| Normal Flow | 1. The clerk enters the prescriptions given by the doctor 2. The clerk clicks SAVE button 3. The system stores the prescriptions |

**EXPANDED DATA DICTIONARY**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Data Flow Name: | | Patient Record | | | | |
| Description: | | This document contains information about the patient | | | | |
| Alias: | | Patient Chart | | | | |
| Timing: | | Every time the patient undergoes check-up | | | | |
| Volume: | | Used one at a time | | | | |
| Composition: | | This data flow contains: | | | | |
| **FIELD** | **DATA TYPE** | | **LENGTH** | **DEC** | **FORMAT** | **REMARKS** |
| ID\_number | char | | 7 | - | 99-9999 | Primary Key |
| Fname | char | | 25 | - | a@25 | required |
| Mname | char | | 25 | - | a@25 | required |
| Surname | char | | 25 | - | a@25 | required |
| Age | Int | | 2 | - | 99 | required |
| Gender | char | | 6 | - | a@6 | required |
| Status | char | | 10 | - | a@10 | required |
| Address | Char | | 70 | - | a@70 | required |
| Cpnum | char | | 11 | - | @11 | required |
| Telnum | char | | 9 | - | a@9 | required |
| Birthday | date | | - | - | mm/dd/yy | required |
| Date | date | | - | - | mm/dd/yy | required |
| Symptoms | char | | 250 | - | a@250 | required |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Data Flow Name: | LABORATORY TEST REQUEST | | | | | |
| Description: | This document contains the request for taking the laboratory tests. | | | | | |
| Alias: | None | | | | | |
| Timing: | Every time the patient needs to undergo in a laboratory test | | | | | |
| Volume: | Used one at a time | | | | | |
| Composition: | This data flow contains: | | | | | |
| **FIELD** | | **DATA TYPE** | **LENGTH** | **DEC** | **FORMAT** | **REMARKS** |
| Patient name | | Char | 50 | - | a@50 | required |
| Gender | | Char | 1 | - | a | required |
| Age | | Int | 2 | - | 99 | required |
| Address | | Char | 50 | - | a@50 | required |
| Birthday | | Date | - | - | mm/dd/yy | required |
| Examination desired | | Char | 250 | - | a@250 | required |
| Date requested | | Date | - | - | mm/dd/yy | Required |
| Date to undergo test | | Date | - | - | mm/dd/yy | Required |
| Requesting physician | | Char | 50 | - | mm/dd/yy | required |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Data Flow Name: | | LABORATORY TEST RESULT | | | | |
| Description: | | This document contains the result of the lab test | | | | |
| Alias: | |  | | | | |
| Timing: | | Every time the patient undergoes lab tests | | | | |
| Volume: | | Used one at a time | | | | |
| Composition: | | This data flow contains: | | | | |
| **FIELD** | **DATA TYPE** | | **LENGTH** | **DEC** | **FORMAT** | **REMARKS** |
| Patient name | Char | | 50 | - | a@50 | required |
| Date | Date | | - | - | mm/dd/yy | required |
| Lab test | Char | | 250 | - | a@250 | required |
| Results | Char | | 250 | - | a@250 | required |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Data Flow Name: | | DIAGNOSIS | | | | |
| Description: | | This contains the disease found after the lab test | | | | |
| Alias: | | none | | | | |
| Timing: | | Every time the patient undergone lab test | | | | |
| Volume: | | Used one at a time | | | | |
| Composition: | | This data flow contains: | | | | |
| **FIELD** | **DATA TYPE** | | **LENGTH** | **DEC** | **FORMAT** | **REMARKS** |
| Patient\_name | char | | 50 | - | a@50 | required |
| Lab test | char | | 250 | - | a@250 | required |
| Diagnosis | char | | 250 | - | a@250 | required |
| Doctor | char | | 50 | - | a@50 | required |
| Date | date | | - | - | mm/dd/yy | required |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Data Flow Name: | | PRESCRIPTION | | | | |
| Description: | | This document contains the medicines the patient should take | | | | |
| Alias: | |  | | | | |
| Timing: | | Every time the patient undergoes check-up | | | | |
| Volume: | | Used one at a time | | | | |
| Composition: | | This data flow contains: | | | | |
| **FIELD** | **DATA TYPE** | | **LENGTH** | **DEC** | **FORMAT** | **REMARKS** |
| Medicine | char | | 250 | - | a@250 | required |
| Dosage | char | | 250 | - | a@250 | required |
| Doctor name | char | | 50 | - | a@50 | required |
| date | date | |  | - | mm/dd/yy | required |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Data Flow Name: | | RECEIPT | | | | |
| Description: | | This document contains the payment of the patient | | | | |
| Alias: | | - | | | | |
| Timing: | | Every time the patient pays for the bill | | | | |
| Volume: | | Used one at a time | | | | |
| Composition: | | This data flow contains: | | | | |
| **FIELD** | **DATA TYPE** | | **LENGTH** | **DEC** | **FORMAT** | **REMARKS** |
| Name | char | | 50 | - | a@50 | required |
| Recipient | char | | 50 | - | a@50 | required |
| Receipt number | char | | 10 | - | a@10 | required |
| Amount | int | | 5 | - | 9@5 | required |
| Date | date | | - | - | mm/dd/yy | required |

**DATA FIELDS**

|  |
| --- |
| **Person** |
| Name  Address  Age  Gender  Civil Status  Contact number  E-mail address |
| addRecord();  deleteRecord();  Updaterecord(); |

|  |
| --- |
| **Clerk** |
| Name  Position  Address  Age  Gender  Civil Status  Contact number  E-mail address |
|  |

|  |
| --- |
| **Doctor** |
| Name  Position  Address  Age  Gender  Civil Status  Contact number  E-mail address |
|  |

|  |
| --- |
| **Patient** |
| Name  Address  Age  Gender  Civil Status  Contact number  E-mail address |
|  |

|  |
| --- |
| **Laboratory Test Request** |
| Patient\_name  Age  Gender  Address  Birthday  Examination desired  Date requested  Date to undergo lab test  Requesting physician |

|  |
| --- |
| **Laboratory** |
| Name  Address  E-mail address  Contact Number |
|  |

|  |
| --- |
| **Patient Record** |
| First name  Middle name  Surname  Age  Gender  Civil status  Address  Contact number  Date  Birthday  ID\_number  Symptoms |
| updateRecord();  addRecord(); |

|  |
| --- |
| **Laboratory Test Result** |
| Lab tests  Patient\_name  Doctor  Results |
| addLabTest(); |

|  |
| --- |
| **Diagnosis** |
| Patient\_name  Lab test  Diagnosis  Doctor  Date |
|  |

|  |
| --- |
| **Prescription** |
| Medicine name  Dosage  Doctor name  Date |
| addMedicine(); |

|  |
| --- |
| **Receipt** |
| Payers name  Recipient  Receipt number  Date  Amount |
|  |

**CLASS DIAGRAM**

PERSON

|  |
| --- |
| admits |

|  |
| --- |
| pays |

|  |
| --- |
| submit |

|  |
| --- |
| presents |

|  |
| --- |
| gets |

|  |
| --- |
| given to |

|  |
| --- |
| gets |

|  |
| --- |
| stores |

|  |
| --- |
| issues |

|  |
| --- |
| stores |

|  |
| --- |
| stores |

|  |  |
| --- | --- |
| |  | | --- | | produces |   stores |

|  |
| --- |
| gives |

|  |
| --- |
| issues |

|  |
| --- |
| gives |

|  |
| --- |
| executes |

LAB TEST REQ.

DIAGNNOSIS

LAB TEST RESULT

LABORATORY

PRESCRIPTION

RECEIPT

PATIENT RECORD

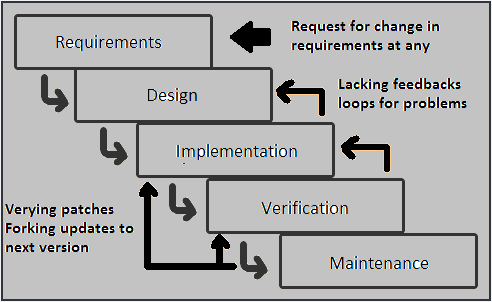
CLERK

DOCTOR

PATIENT

**METHODOLOGY**

In the conduct of this study, the researchers used Waterfall Model as the methodology to develop the design. The phases are requirements, design, implementation, verification and maintenance.



Modhu, 2009

(Author)

**INITIAL INTERVIEW GUIDE**

INTERVIEWEE: **Med. Tech of Poly Clinic**

INTERVIEWER: **Reina Domingo, Kathrina Mae Espejo, Monique Joyce Gonzales**

1. **Introduction**

This rainy season, lots of people had their resistance reduced. Because of this, diseases are widely spread out and transmitted easily from one person to another. In our subject which is CmpSc 140(System Analysis and Design), we are required to make a system for a company or agency. We have chosen your clinic because we want to make a system for the convenience of your clinic and mostly for the patients that make health consultations.

1. **Interview Proper**
2. What are the services of your clinic?

1.1 How fast are the results of your services?

1. What are the different specified works of your staffs?
2. What are the problems do you often encounter in your clinic?

3.1 What do you do to solve these problems?

1. What are the processes you do to record the information of your patients?
2. **Parting Notes**

Thank you for allotting time for us. Thank you for trusting us. God Bless!

**INTERVIEW SCRIPT**

**Interviewer:** Good afternoon ma’am! Thank you for approving our request.

**Q:** We would like to ask your name.

**A:** I’m Nenita Navarro.

**Q:** What’s your position in this clinic?

**A:** I’m the head medical technologist. I supervise the medical technologists and other staffs. I also teach at North Western University.

**Q:** What are the services of you clinic?

**A:**  Our services are:

-Hematology -CDC Platelet

-Erythrocyte Regimentation Rate -Blood Chemistry

-Blood Urea Nitrogen -Fasting Blood Sugar

-Cholesterol -SGPT

-Vidal Test -Dengue Blot

-Triglyceride -Lipid Profile

-Uric Acid -Sodium/Potassium

-Serology -Test for Syphilis

-Proctology -Pregnancy Test

-Occult Blood -Hepatitis B surface

-SGOT

**Q:**  How fast are your services?

**A:**  We use TAT, turnaround time. But when we do routines the results will take 15 minutes. Sometimes when they performed test is blood chemistry, it takes 3 hours to get the result. But usually, it really depends on the test performed.

**Q:**  What are the different specified works of your staffs?

**A:**  The different works are:

-Performance of laboratory test -Extraction of Patient

-Collection of Specimen -Recording of result

-Issuing of result -Maintenance of cleanliness

**Q:**  What are the processes you do to record information of your patients?

**A:**  We do manual recording. Our clerk records information and then we file it in cabinet. In admission of patients, we use log book for the recording.

**Q:**  How’s the retrieval of records?

**A:**  Of course it’s also manual. Every file is alphabetically arranged in a labeled cabinet.

**Q:**  What problems do you often encounter?

**A:**  First problem really is our manual recording. Most of the time especially when there are a lot of patients, we encounter slow processing because we only have one clerk that does the recording. Next is lack of registered medical technologists for our laboratory. They all prefer going abroad.

**Q:**  What do you do to solve these problems?

**A:**  We are thinking of computerized recording but we don’t have that much fund for computers. And besides, there are lots of clinics out there competing with us. It’s not secured that we spend money for computers. On the problem for our lack of registered medical technologists, we advertise that registered medical technologists for our clinic are needed.

**Interviewer:** Thank you for allotting time for this interview ma’am.

**Interviewee:** You’re all welcome! I hope to see you after you finish your system.

**Interviewer:** Thank you again ma’am

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Title: | **Gantt Chart for Clinical Information System** | | | | | | | | | | | | | | | | | | | |
| **ACTIVITIES** | | **DURATION** | | | | | | | | | | | | | | | | | **PERSONS INVOLVED** | |
| June | | July | | | | August | | | | September | | | | October | | |  | |
| W3 | W4 | W5 | W6 | W7 | W8 | W9 | W10 | W11 | W12 | W13 | W14 | W15 | W16 | | W17 | W18 | |  | |
| Conceptualization | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Research on Business Domain | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Creation of Request Letter | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Approval of Request Letter | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | | Mr. Villacillo/Med. Tech. | |
| Interview Guide | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Interview Script | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | | Head Medical Technologist | |
| Ishikawa Diagram | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Context Diagram | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Data Dictionary | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Use Case Diagram | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Expanded Data Dictionary | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Use Case Description | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Class Diagram | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Gantt Chart | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |
| Presentation | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | | Domingo/Espejo/Gonzales/Mr. Villacillo | |

**DOCUMENTATION**

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