Dr. Khaled Fouad

Eng. Rowaida Adel

CHILDREN MEDICAL CENTER

Information system

Prepared by :

- Amira Elsayed
- Aya Mahmoud
- Nadeen Mohammed

Contents

Section 1. Project Overview

1.1 Project Description

A children's medical center is a center that offers its services exclusively to infants, children, adolescents, and young adults from birth up to until age 16.

Children's Medical Center Information System is a comprehensive, integrated information system designed to manage all the aspects of a hospital's operation, such as medical, administrative, financial, and legal issues and the corresponding processing of services.

The system enhances the ability of health care professionals to coordinate care by providing a patient's health information and visit history at the place and time that it is needed.

1.2 Project Scope

Project Includes
Intake information given by the patients and store them in the center database
Provides a unique number for the patient
Track the interaction of patients with the doctors affiliated to the center
Keeps track of the count of the patients and provides a state of running of the center
Authenticates the user by matching the user ID and the access code against the values stored in the database
Enables in creating new users in the system
Provides a registration form which makes the user to enter the new user's details
Provides templets for doctors and nurses to ease their work
Provides separate billing method for indoor and outdoor patients, corporate and individual patients
Reduces expenses of an organization because of less paperwork, improved safety, and reduced duplication of testing
Improved access to patient medical record
More accurate and accessible data
Efficient methods for updating data

Project Excludes
Accessing the program remotely
The patient's use of the program directly
Deleting stored data as patient records by anyone

1.3 Assumptions

Assumptions
Parents may be unaware of the importance of drug doses for their children, or even the dosing dates, or how to deal with the condition and disease due to work, or whatever, that system deals with this problem by sending the parents a message at the dosing dates and the instructions that must be followed for the sake of the child's health.
Some patients constantly visit the hospital for continuous lab investigations, sessions, or chronic diseases, and it is possible that their condition does not allow them to go long distances to go to the hospital or that transportation is slow and cumbersome, so the system provides scheduling for dedicated vehicles equipped with special equipment to transport patients from their homes in their appointments time to the hospital safely and quickly.
It is certain that there is more than one specialist doctor, but what happens when the schedule of these doctors is full, and an emergency patient that needs a doctor from them came. Well, who will go? There will be a waste of time in choosing one of them, what if 2 doctors was with a critical case and one of them was chosen, so for that the system designs an appointment schedule for each doctor and sees which case exists with each doctor is less critical, and Then sends this doctor an alert to go directly to the emergency.

1.4 Constraints

Constraints
There are members who mainly enter the system (the receptionist, doctors, head of nurses)
Members who enter as admin (the financial director, the director of the center)
Members who enter as guest (surgeons and doctors from other hospital
Problems with the carrier or a poor connection will render the system idle
The data is entered by the members with the highest priority (each member has his own task in the system that performs it)

Section 2. Project Start-Up

2.1 Project Life Cycle

1- Initiation phase

Before starting, we must determine:

- *Scope:*

The proposed software is called Children's medical center management System. This system is designed for managing the entire center, saving time and financial resources. The software application enables center staff to increase quality of treatment and allows them to have more time to devote to patients and not for administration.

- *purpose, vision, mission:*

-Patient Safety: Patients should not be harmed by health care services that are intended to help them. The IOM report To Err Is Human,26 found that between 46,000 and 98,000 Americans were dying in

hospitals each year due to medical errors. Subsequent research has found medical errors common across all health care settings. The problem is not due to the lack of dedication to quality care by health professionals, but due to the lack of systems that prevent errors from occurring and/or prevent medical errors from reaching the patient.

-Effectiveness: Effective care is based on scientific evidence that treatment will increase the likelihood of desired health outcomes. Evidence comes from laboratory experiments, clinical research (usually randomized controlled trials), epidemiological studies, and outcomes research. The availability and strength of evidence varies by disorder and treatment.

-Timeliness: Seeking and receiving health care is frequently associated with delays in obtaining an appointment and waiting in emergency rooms and doctors' offices. Failure to provide timely care can deny people critically needed services or allow health conditions to progress and outcomes to worsen. Health care needs to be organized to meet the needs of patients in a timely manner.

-Patient Centered: Patient-centered care recognizes that listening to the patient's needs, values, and preferences is essential to providing high-quality care. Health care services should be personalized for each patient, care should be coordinated, family and friends on whom the patient relies should be involved, and care should provide physical comfort and emotional support.

-Efficiency: The goal is to continually identify waste and inefficiency in the provision of health care services and eliminate them.6-Equity: The health care system should benefit all people. The evidence is strong and convincing that the current system fails to accomplish this goal.

- ## *objectives:*

The main objective of this software is to intake information given by the patients and store them in the center database. The stored data is used to track the interaction of patients with the doctors affiliated to the center, thus make the process more lucid from the perspective of patients.

Once the unique patient number is generated at the end of the process it is used in future visits of the patient. The system keeps track of the count of the patients and provides a state of running of the organization.

It authenticates the user by matching the user ID and the access code against the values stored in the database. It enables in creating new users in the system. It provides a registration form which makes the user to enter the new user's details. It provides separate billing method for indoor and outdoor patients, corporate and individual patients. The System is an intuitive and easy to use and complies with all the standards of the profession.

- ## *Concerned stakeholders:*

The system keeps all the data for patients from entering the hospital until their exit if possible and preserving them for many years. This makes it easier for doctors to find children's files and their disease history and also maintains a follow-up of the child's condition and whether he is improving or not, and this data also helps researchers to make statistics about common diseases on Throughout the years, which helps to devise any preventive measures or serums to eliminate common diseases

2-planning phase

#First is to determine the requirements, needs, tasks and timeframe:

- ***Requirements:***

1-The system shall generate monthly management reports showing the visits of children treated by each clinic during that month.
2-The system should count the working hours of the medical clinics secretary.
3-The system should contain various process, namely Registration, Check out, Report Generation, and Database.
4-The system helps in generating reports on the availability of the bed regarding the information like bed number unoccupied or occupied, ward name, and more.
5-The system enables users to update the information of the patient as described in the mandatory information included.
6-The system should enable/facilitate communication between the different care teams including the clinical service points (Outpatient department and wards), laboratory, imaging/radiology, radiotherapy, surgery, etc. which are not co-located.
7-The system should therefore have functionalities to assist/coordinate scheduling of patients for the different appointments and care activities during active treatment and follow-up, according their care roadmap, which is fairly standard.
8-The system should support clinical documentation including identification and demographics, clinical history and findings, treatment details, etc., as these are routinely recorded in any clinical setting.
9-The system that can assist in tracking patients and communicating with them e.g. through calls or SMS reminders.
10-The system should assist in making orders for investigations and in managing the results - quickly selecting the orders (e.g. from a predefined list) or automatically generating orders basing on previous information on a patient.
11-The system should be able to Computerize clinical decision support (CDSS) and safety checks.
12-The system should keep track of stock of medications and supplies, and update the different users (prescribers, pharmacists, etc.).
13-The system should allow for mobility or "computer on wheels" because users need to access the system at the bedside during ward rounds.
14-The system should fit into the technological infrastructure e.g. working with unreliable internet connection and electricity supply (or backups should be in place.
15-The system should allow flexibility to accommodate variations and exceptions that are common in healthcare, and to accommodate new requirements that may arise (such incorporation of new medical knowledge).
16-Functionalities such as Clinical decision support System (CDSS) should not take over control from the clinician. Authorized users should be able to make modifications to the rules/functionalities.

- ## *Needs:*

To accomplish my plan:

Everyone who deals with the system must be aware of its importance and aware of this technology.
The system needs people specialized in dealing with people who are aware of it, and it needs someone to fix it if there is any error or malfunction.
Doctors also need to be taught to handle it easily and without any difficulties or consequences.
And, everyone who deals with it needs nurses, laboratories, and even patients themselves, and most importantly of these are parents.
Parents need to be aware of the direction of this technology so that its dimensions are well understood.
And this needs after execution environment, what we will need to execute, will be mentioned down below.

- ## *Tasks:*

What tasks need to be done to reach my target

-system analysis
-system design
-hardware and software installation
-building desktop app
-server connection
-software testing
-data analysis
-maintenance

- ## *Time frame*

Determine each task time and give a specific time to each one to be done. It is a table calculates time that the task can take, dependence and independence tasks (Table1.1).

3-Excusion phase:

-System analysis
the purposes are to study system and its parts in order to identify its objectives. It is a problem-solving technique that improves the system and ensures that all the components of the system work efficiently.
-System design
defining elements of system like modules, architecture, components and their interfaces and data for a system based on the specified requirements.
-installing software and hardware:
installation of hardware, software and entering of relevant data into the system is done in this level. Software may include operating systems, data base management systems (DBMS) and related application software.
hardware includes the purchasing of computers, peripheral devices, and telecommunication equipment.
-Data preparation

In this stage data is prepared for transfer. Because when new system replace old system there must be transfer of data from the old system to the new system. For this data must be prepared for transfer.

-Building desktop app

-Testing
supervise the project and prevent any errors from taking place ,the testing of system is done to ensure, either the system works effectively or not after the complete configuration.

4- closing

analyze results, summarize key learnings, and plan next steps. Once we've achieved our project goals and the results have been signed off on by your stakeholders, it is time for the project closure stage

2.2 Methods, Tools, and Techniques

Methods

•Software acquisition

In this stage the decisions regarding software acquisition are taken.
Software may include operating systems, data base management systems (DBMS) and related application software.

•Hardware acquisition

In this stage hardware acquisition is done. It includes the purchasing of computers, peripheral devices, and telecommunication equipment.

•Data preparation and conversion

In this stage data is prepared for transfer. Because when new system replace old system there must be transfer of data from the old system to the new system. For this data must be prepared for transfer.

•Installation

In this stage the installation of hardware, software and entering of relevant data into the system is done.

•Testing

In this stage the testing of system is done to ensure, either the system works effectively or not after the complete configuration.

•*Delivery*

After completion of testing phase, the last stage is delivery of system. In this stage the developed system is delivered and fully introduced to the organization.

Procedures

Holding training courses to introduce the system and how to use it.

Programming languages

(Java - SQL).

Tools

IDEs: (Apache NetBeans IDE 12.1 - DBeaver).
Data analysis: Tableau.
Diagrams: (ERD - Data Flow Diagram - Context diagram - Gantt chart - Network diagram).
Planning tools, Tracking tools (tinyPM, processMAX, Agilefant)

Techniques

Object oriented programming
Computer-aided software engineering
Rapid application development

2.3 Estimation Methods and Estimates

System Planning	
Description	*Best*
Effort in person-months or person-hours	*75 hours*
Schedule in calendar months	*From 25 Nov. to 29 Des.*
Budget in dollars	*6000$*
Level of Uncertainty	*Low*

System Analyze	
Description	*Best*
Effort in person-months or person-hours	*60 hours*
Schedule in calendar months	*From 30 Nov. to 27 Des.*
Budget in dollars	*5000$*
Level of Uncertainty	*Low*

System Design	
Description	*Best*
Effort in person-months or person-hours	*45 hours*
Schedule in calendar months	*From 1 Des. to 21 Des.*
Budget in dollars	*4000$*
Level of Uncertainty	*Low*

Hardware and Software Installation	
Description	*Best*
Effort in person-months or person-hours	*45 hours*
Schedule in calendar months	*From 21 Des. To 10 Jan.*
Budget in dollars	*3000$*
Level of Uncertainty	*Moderate*

Building Desktop Application	
Description	*Best*
Effort in person-months or person-hours	*45 hours*
Schedule in calendar months	*From 10 Jan to 30 Feb*
Budget in dollars	*2500$*
Level of Uncertainty	*Low*

Server Connecting	
Description	*Most Likely*
Effort in person-months or person-hours	*30 hours*
Schedule in calendar months	*From 10 Jan. to 23 Jan.*
Budget in dollars	*1700$*
Level of Uncertainty	*Moderate*

Software Testing	
Description	*Best*
Effort in person-months or person-hours	*30 hours*
Schedule in calendar months	*From 30 Jan. to 12 Feb.*
Budget in dollars	*2500$*
Level of Uncertainty	*Low*

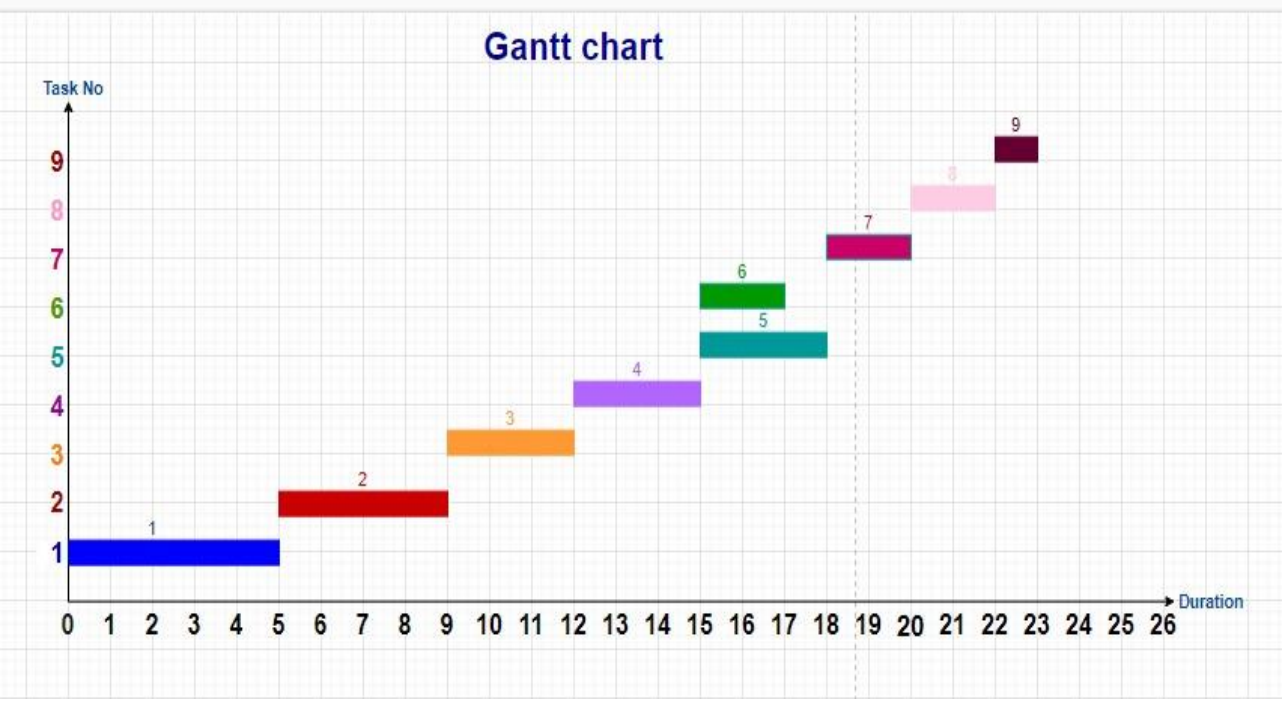
Data Analyze	
Description	*Best*
Effort in person-months or person-hours	*30 hours*
Schedule in calendar months	*From 13 Feb. to 26 Feb.*
Budget in dollars	*6500$*
Level of Uncertainty	*Low*

Maintenance	
Description	*Best*
Effort in person-months or person-hours	*15 hours*
Schedule in calendar months	*From 27 Feb. to 5 Mar.*
Budget in dollars	*3000$*
Level of Uncertainty	*Low*

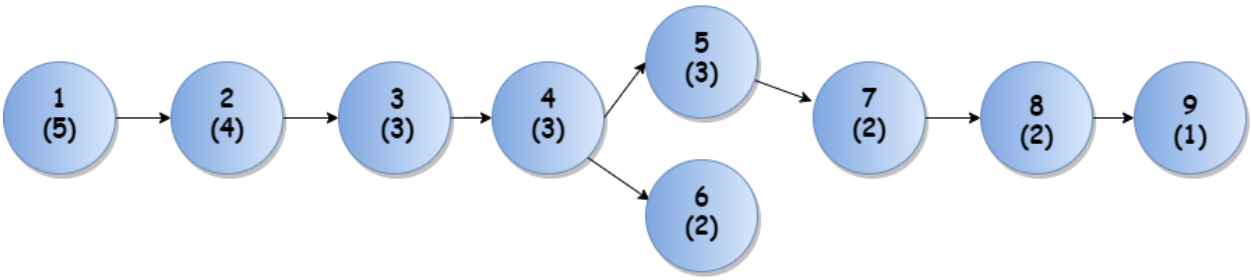
2.4 Schedule Allocation

Table1.1

Task Name	Task No.	Duration (weeks)	Pre-task
System planning	1	5	-
system analysis	2	4	1
system design	3	3	2
hardware and software installation	4	3	3
building desktop app	5	3	4
Server connection	6	2	4
software testing	7	2	5
data analysis	8	2	7
maintenance	9	1	8



Network Diagram



2.5 Resource Allocation

constraints are the rules that allow the entry and exit of members from the system, and according to that, there are those who have the highest priority and most importantly for entry, and those who enter working hours only according to preserving the patient's secrets as well as work secrets. Therefore, we find that there are members who mainly enter the system, and these surgeons and doctors, the nursing staff, the receptionist, the financial director, the director of the center, the patient, and the parents of the patient, and this will result in the following: Doctors, surgeons, financial managers, and the director of the center will enter the system as an admin by name, password, and national number The doctor has the right to file reports for the patient, write the medicine for the patient, review the daily appointments for him in the center, as well as add anything new about the patient. Daily notes pertain to him and also other notes he leaves for the nursing as well as the patient's surgeon. The financial director has the right to Enter also by name, password, national number, and his own working date. The director of the center has the right to enter where he wants to see all administrative, financial and medical affairs while the nursing staff has the right to enter through his own e-mail to record his business and his daily notes and send them To the head of the nurse for review and supervision that all the tasks were done correctly and they are sent to the doctor to review them and to reassure the patient on an ongoing basis, so that the admission of the staff The nurse has the name, email, work time and number, as well as the receptionist who enters continuously because he has a great responsibility to review the entry and exit data for patients, as well as doctors and the center's staff, and give a warning when there is a need to attend, so he has the right to enter mainly, but less It has priority as it is entered with the name, national number, work date, email and password

Section 3. Risk Management

Risk Description	Probability	Impact	Strategy
System failure	*Low*	*High*	*There must be a specialist in fixing faults. When any error occurs, they are called.*
Security issues	*Low*	*High*	*It is possible that there are some problems with the security. To avoid this, access to the system should be panned except only a certain category who are responsible for that.*
Absence of doctors responsible for prescribing medication (prohibited)	*High*	*Low*	*Giving doctors special devices to deal with the system remotely (from home).*
Communication issues	*Low*	*High*	*Ensure that all branches are connected to each other and departments inside the hospital and allow the possibility of exchanging data between them.*
Absence of a certain doctor (having a surgery or something important)	*High*	*High*	*Sending an alarm to the doctor to alert.* *If he is not coming, sending alarm to the other branch to find an alternative doctor immediately.*
Violation of the privacy of patients	*Medium*	*High*	*Persons who do not have the authority are not allowed to access patient data.*

Section 4. Appendices

Appendices
-provides registration card
-allows for mobility
-alarm in dangerous casus for getting doctors from other branches or hospital
-assists in making orders for investigations and in managing the results basing on previous information on a patient
-prints prescription
-The system automatically records the attendance of doctors and staff because their work hours are recorded