SOFTWARE DEVELOPMENT PROJECT MANAGEMENT [D]

Project

Group-3

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Hospital Management System

Introduction

In this project, we are designing a hospital management system so that ordinary people may connect with doctors in the most effective way possible in our technologically sophisticated environment. So that people may discuss their concerns with their doctors and receive advice and prescriptions without physically visiting the hospital. Furthermore, with online implementation, the administration and personnel can simply control the entire hospital process and operation without any difficulty or problem.

Objectives

The primary goals of a Hospital Management System are:

- Create a registration system and system for better patient care.
- On requirement, Management Information System records must be made available to improve departmental cooperation.
- Top leadership is provided by effective control.
- Constructing a system to keep monitoring hospital activities and processes.
- A secure method of controlling the financial aspects
- A strategy that makes hiring and removing employees effectively.
- Lower the expense of running the facility.

Justification

The hospital management system is the subject of the project. This project is intended to keep all essential information that will need to be retrieved at any moment. This approach is considerably easier for diverse users to utilize. The project has a massive impact. This management system may considerably help users such as patients, physicians, and staff. They may all approach the project from different perspectives depending on their needs. This management system allows them to monitor their working hours, appointments, room availability, and compensation, among other things. A project like this is far more important in the present world for a hospital management system to manage time and responsibility. Furthermore, this project simplifies the lives of people who are involved with this system.

Systems Overview

We have four panels in our hospital administration system:

- Admin,
- Doctor,
- Patient
- Employee.

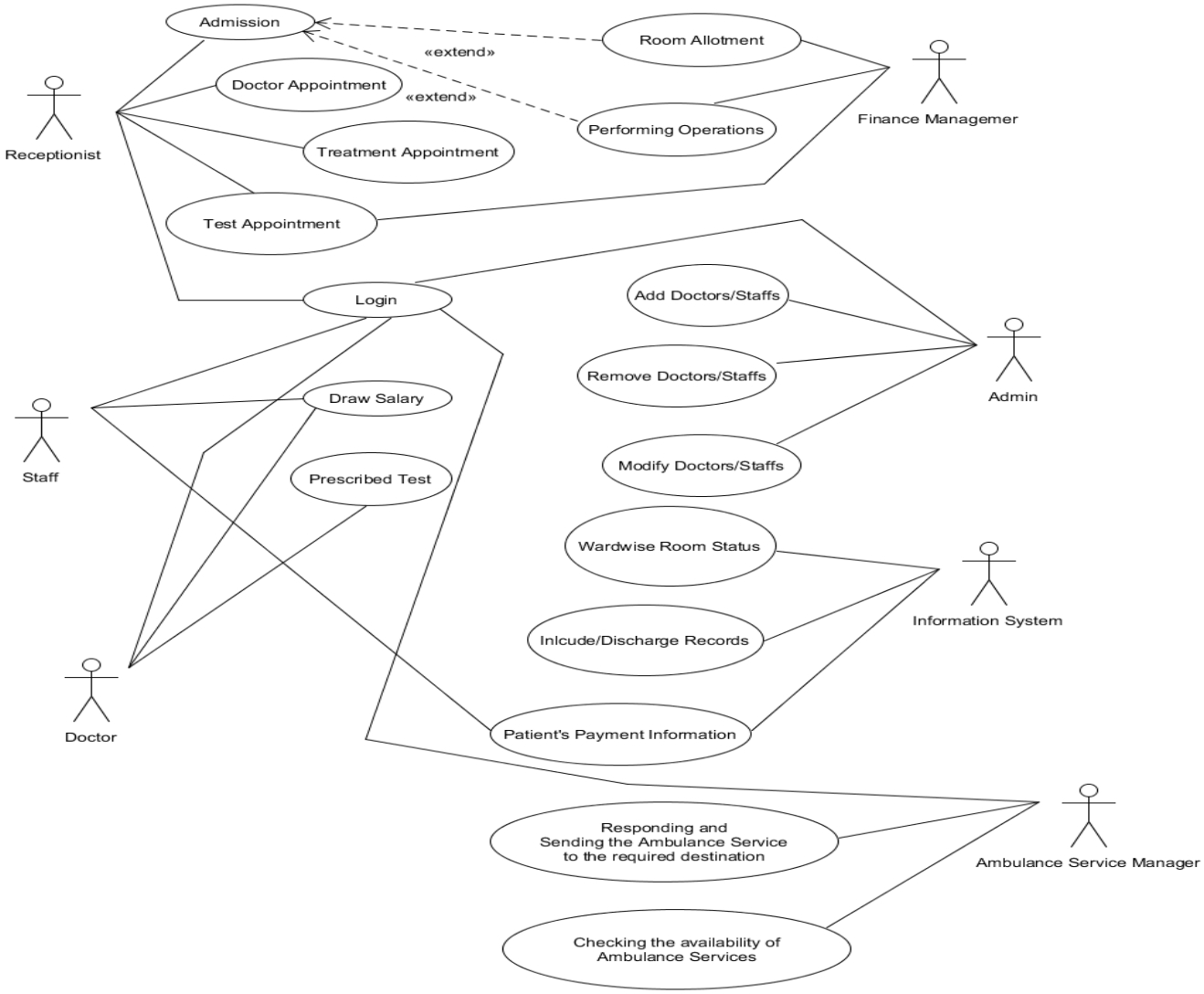
Admin’s Panel may add physicians and workers as well as administer several main hospital functions.

Doctors may check all of their appointments, adjust their own calendars, and offer crucial advice to particular patients based on their health in the Doctor’s panel. They can also prescribe the medication they recommend.

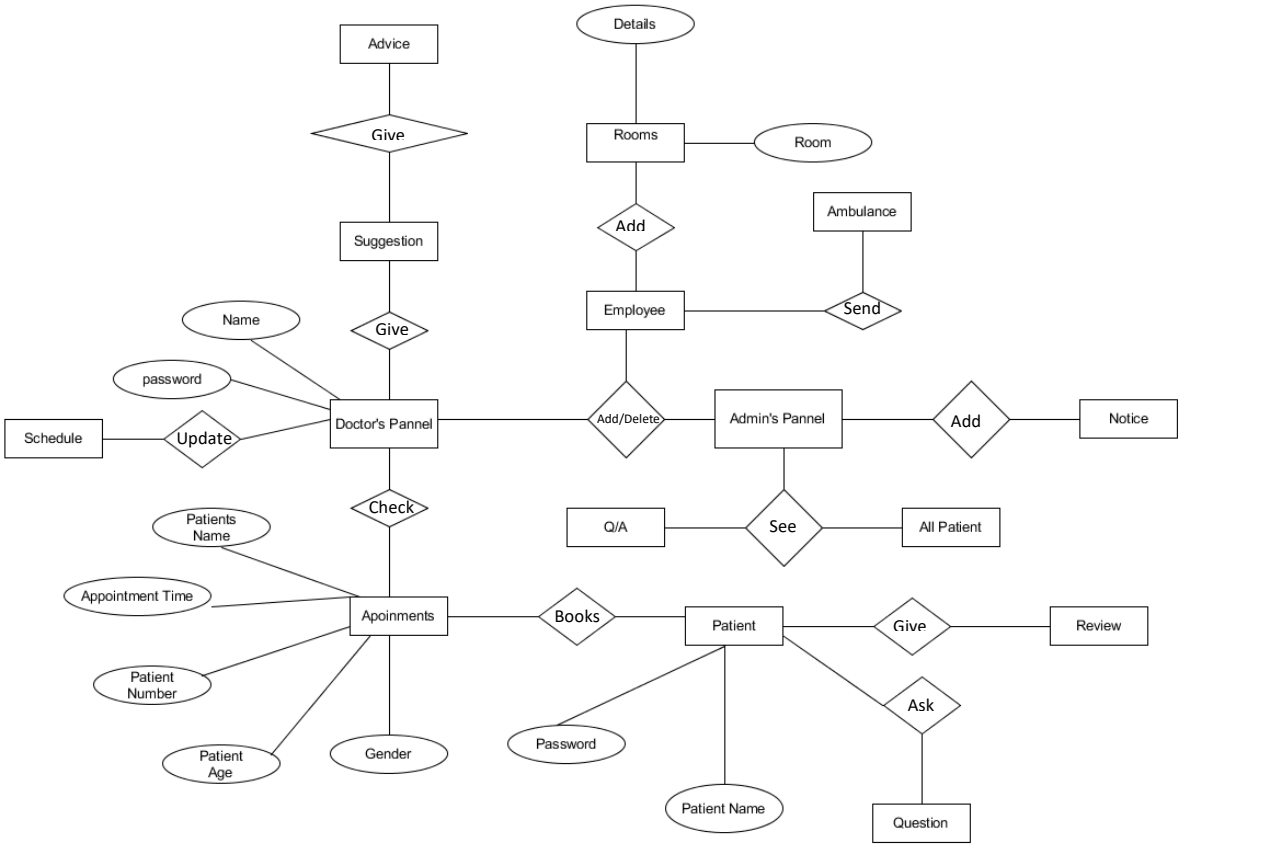
The Patient’s Panel includes the ability to fill out the form for scheduling a medical appointment, summon an emergency, ask physicians' concerns, and post opinions.

The Employee’s Panel allows patients to book rooms, ambulances, and enroll appointments for certain physicians, examine salary data, and yearly holiday lists, and monitor their working schedule.

Use Case Diagram



ER Diagram



Stakeholders Analysis

Stakeholders are people who have an interest in the project. They are often project team members, project managers, administrators, funders, and consumers. A project will impact them at any stage of its life cycle, and their involvement can have a direct influence on the result. To participate in the project, strong stakeholder engagement and ongoing communication are required. As a result, stakeholders play a critical role in the project.

The stakeholders we have included,

1. Primary Stakeholders,
2. Internal Stakeholders,
3. Secondary Stakeholders.

Primary stakeholders: These are the people who will be most affected by the implementation or completion of our project. It makes no difference whether the initiative has a generally negative impact on them. They include doctors, HR managers, IT teams, executive officers, nurses, office staff, accountants, pharmacists, therapists, and patients.

Internal Stakeholders: Those that work internally for our company are considered internal stakeholders. Team members, the project manager, and the director of resources are the Internal Stakeholders.

Secondary Stakeholders: These are people and organizations that our project and organization don't directly influence. The hospital's operator is one of our project's secondary stakeholders.

Feasibility study

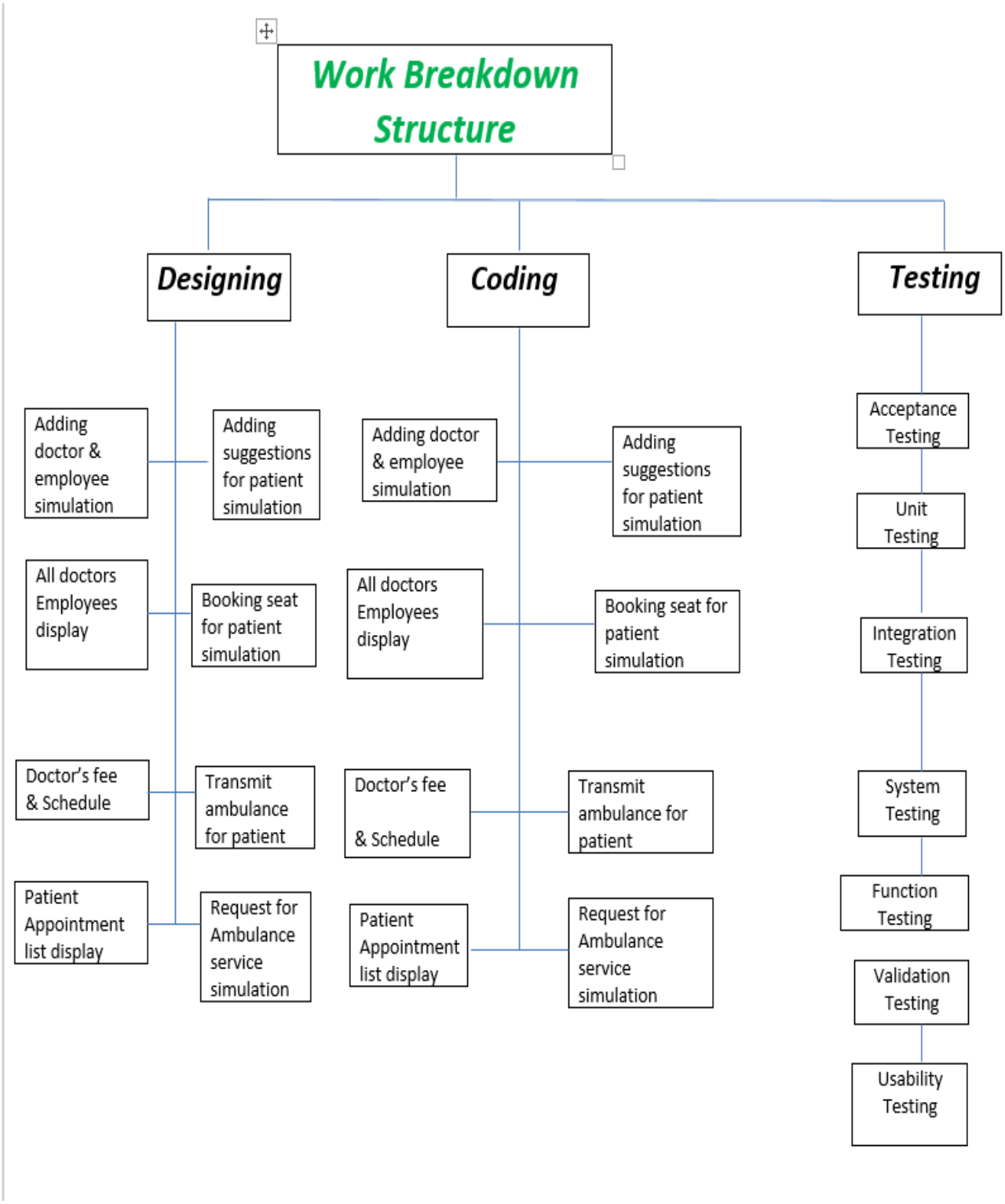
The hospital management system's web project has a wide range of features and production expertise. Both technological features and restrictions are present. The website contained sections for the admin panel, doctor panel, employee panel, and patient panel, each of which had its own functions. Due to time constraints and lack of competence, the design was produced largely. However, the concept may be given a comprehensive, high-performance system with extra time and effort. This system was designed to oversee, govern, and regulate the whole management system. If it is provided to the professionals, they may use their knowledge to remove whatever limitations the system may have. It’s similar to how excessive user access can slow down the system and perhaps result in temporary blocking. Due to the project's limited user base, there is still more work to be done in the future. In order to prevent multiple people trying to access the system from being stuck, it must be user-friendly and speedier for the users. To prevent hacking or unauthorized management of the project's security system, it must be administered by a professional. The project needs a lot of effort to be one of the greatest management web projects. Because it was originally built with a deadline, the price is now low. However, if we set a deadline for completion, it can be expensive. The cost of hiring experts, the timeline, and the amount of labor put into this project will all depend on these factors. However, hiring professionals like developers and programmers would raise the projects' performance and price.

Employees of the project	Estimated time of 14 Days	Salary (per day)	Total Salary (BDT)
Designer	7	20000	140000
Project Manager	12	22000	264000
Developer	10	25000	250000
Programming Analyst	12	30000	360000
Specialist	8	40000	320000
Security Engineer	10	25000	250000
Database Administrator	12	20000	240000
Tester	13	30000	390000

Total Cost: 2214000 BDT.

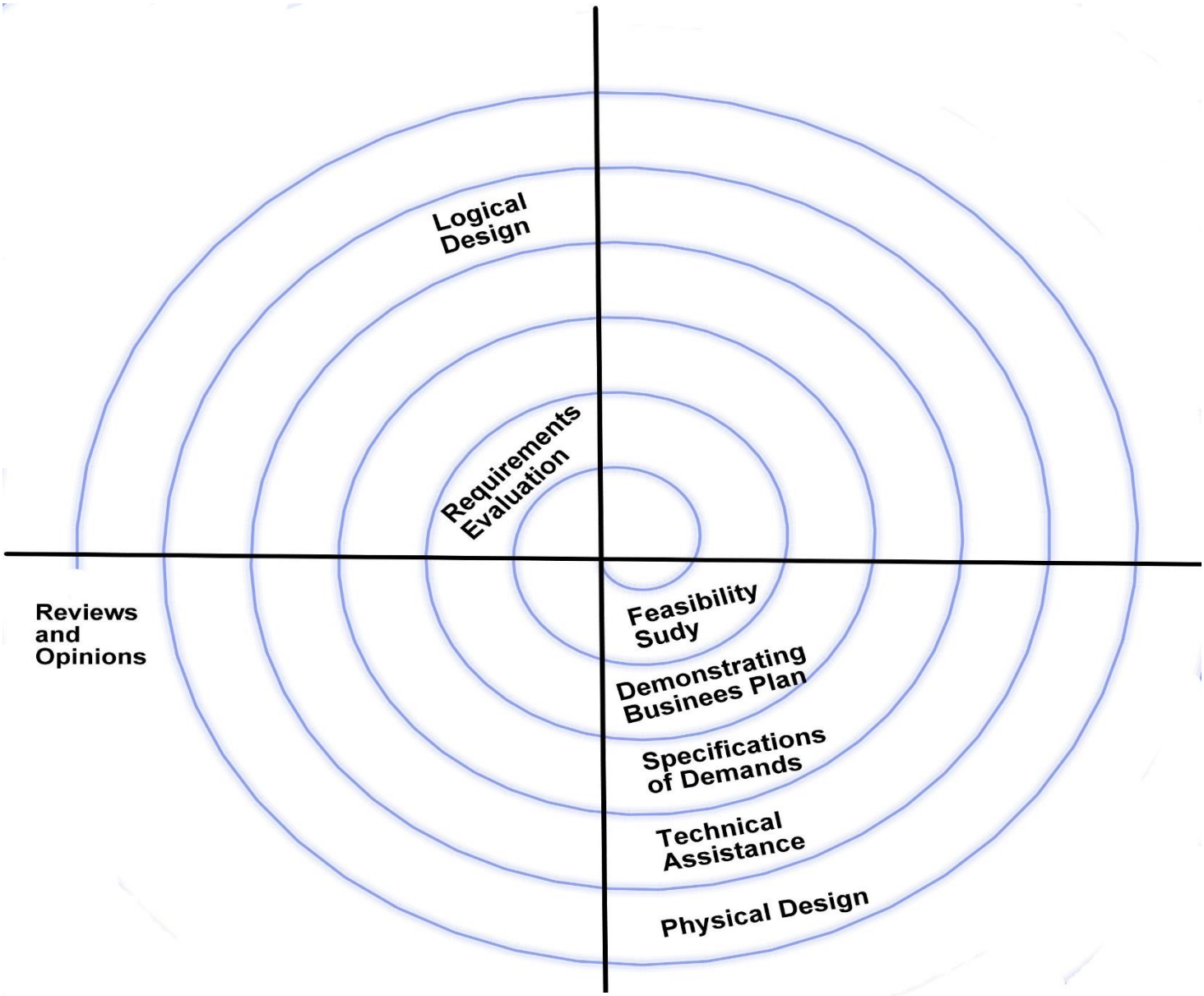
To execute the project and turn it into a perfectly efficient, consumer web project, the estimated cost is approximately 2214000 BDT.

Systems component



Process Model

For our project, we are going to use the Spiral Model. Iterative maintenance and improvement of our software are required using more specifics. In every phase of the project, more specific considerations are made, and a higher level of trust in the project's chances of success should be demonstrated. A Spiral Model can be regarded as dynamically being minimized by constantly looping a set of fundamental project development, which will effectively help in our software improvement. As there are risks involved in Hospital Management System software that are highly important to be controlled, the spiral model can perform comprehensive risk analysis and resolution. For example, there might be a bug or lacks in an ambulance calling feature. The issues can be investigated and reevaluated by this model.



Spiral Model

Estimation for each task

We used COCOMO to forecast for each job. In addition, we've opted to characterize our project as semi-detached based on the mixed or medium level of expertise of our developers.

The values of P (Project Complexity), Coefficient<Efficient Factor>, and T for moderate projects will be different from others.

SLOC = Source Lines of Code.

Effort = PM = Coefficient<Efficient Factor>*(SLOC/1000)^P

The constants **Coefficient<Efficient Factor>** and **P** differ depending on whether the system is organic, semidetached, or embedded.

Our structure is semi-detached here. **Coefficient<Efficient Factor> is therefore equal to 3.0, P is 1.12, and T is 0.35.**

Development Time = 2.5*(PM)^T.

Effort = **3*(SLOC/1000) ^1.12.**

Task No.	Task Description	SLOC	Effort (PM)	Development Time=2.5*(PM)^0.35	Required Number of People
a	Adding Doctors & Employee simulation	2500	8.371707854	5.25926351	2
b	All Doctors, Employee, Patients display	1600	5.078502087	4.415170517	2
c	Adding Employee's salary, bonus simulation	3600	12.59447462	6.067405601	2
d	Remove Doctors/Employees data simulation	3000	10.2682648	5.64890121	3

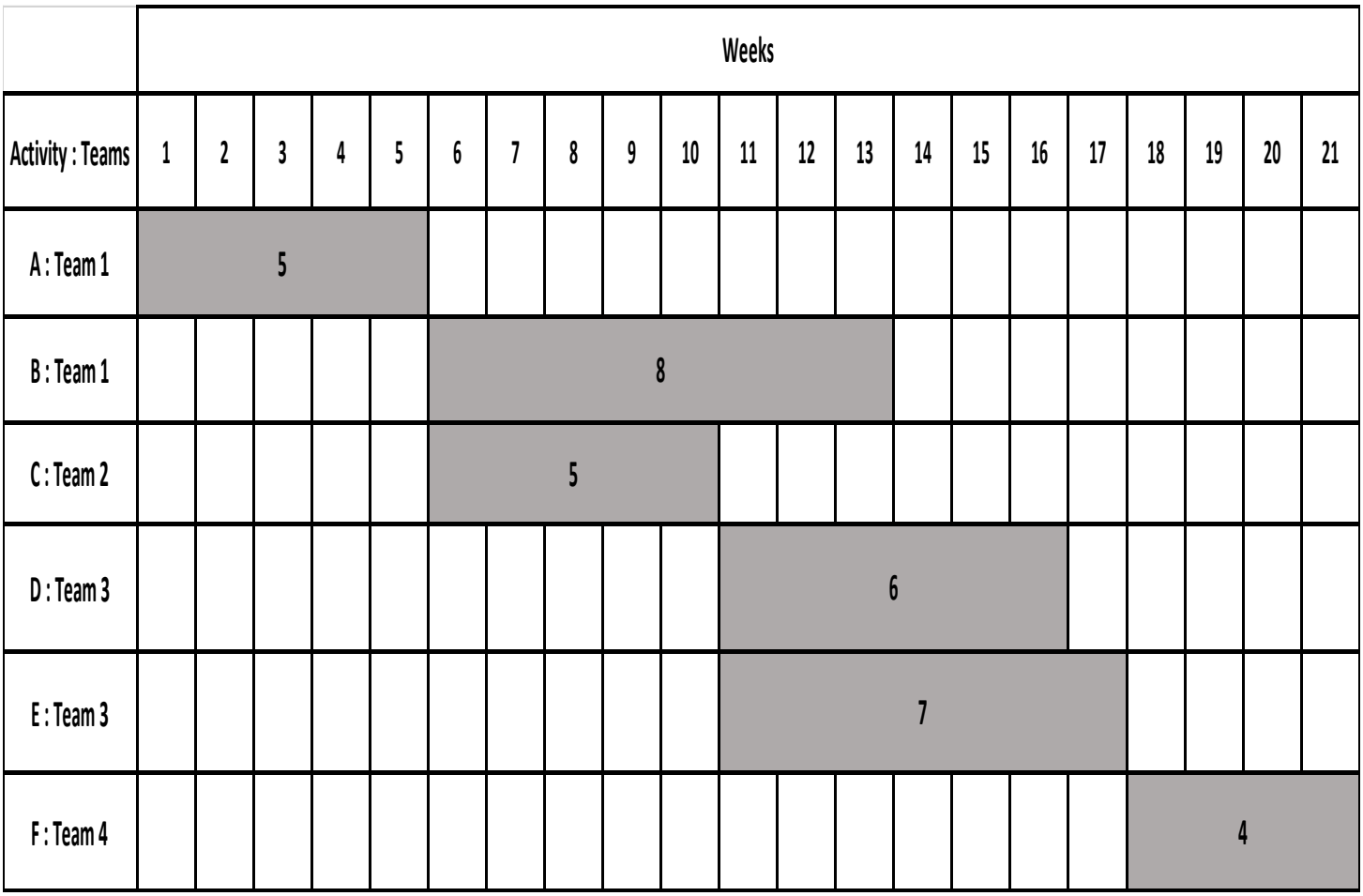
e	Question & Answer display	1100	3.337959493	3.812048175	3
f	Doctor's schedule display	1500	4.724365233	4.304871788	2
g	Adding notice for Doctors/Employees simulation	13500	55.34712615	10.18646002	4
h	Patient's appointment list display	2500	8.371707854	5.25926351	3
I	Doctor's fee list display	8000	30.80222154	8.297432398	5
j	Booking seat/cabin for patient simulation	2000	6.520409175	4.818770091	3
K	Adding suggestions for patient's simulation	9500	37.33977465	8.875648632	6
l	Release patient list display	3500	12.20330496	6.000771934	3
m	Available cabin/seat display	2500	8.371707854	5.25926351	2
n	Regular surgery schedule display	3600	12.59447462	6.067405601	3
o	Emergency admit simulation	10000	39.54770216	9.0559173	5

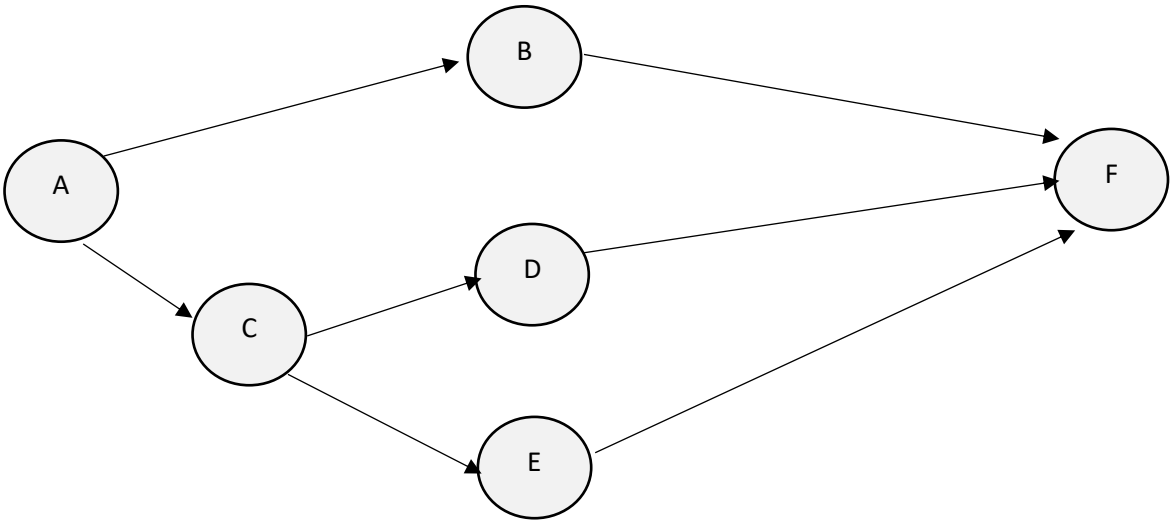
P	Request for ambulance service simulation	2650	8.936277232	5.380774978	3
q	Busy/Free ambulance service list display	7500	28.65430437	8.090147934	5
r	Transmit ambulance	32600	148.5678939	14.39175467	9

Activity Diagram:

Activity	Duration (week)	Precedents
A (Software tools and Hardware Identifications)	5	NONE
B (Hardware Configuration)	8	A
C (Software Designing)	5	A
D (Coding and Adding features)	6	C
E (Coding and Initial Testing)	7	C
F (Setup and Test)	4	B,D,E

Project Plan as a Bar Chart





Network Diagram

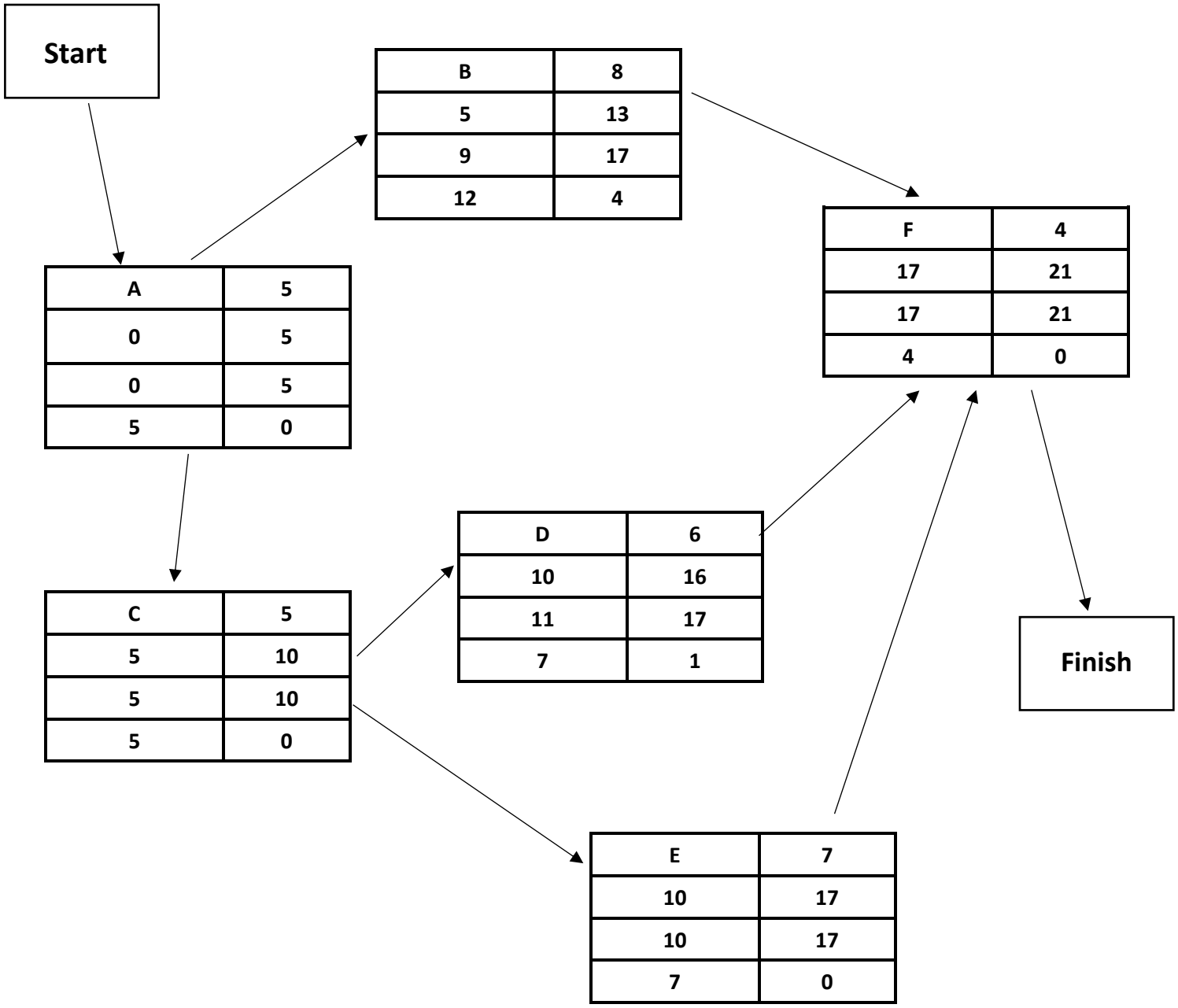
Earliest Start (ES) = Maximum of Earliest first (EF),

Earliest First (EF) = Earliest start (ES) + Duration,

Latest Start (LS) = Latest Finish (LF) - Duration,

Latest Finish (LF) = Minimum of Latest Start (LS).

Activity	Duration
ES	EF
LS	LF
Float + Duration	Float (LS – ES – Duration)



Activity Diagram

The Shortest Path: A → C → E → F

Risk Analysis

Depending on its capabilities, this initiative carries some risks. These dangers are foreseen in the future. If the initiative is put into action, many employees and individuals will lose their employment. Their pay will be terminated. The project will be able to multitask concurrently, which is something that many individuals do on a regular basis. Security hazard is yet another concern. Its storage will house a lot of sensitive information. Hackers will be able to obtain sensitive information if any security mechanism is compromised, which would be a major setback for any business. Productivity deterioration is also included in the hazards. If the application is not adequately handled by application experts, its efficiency will also decline with duration. Consequently, project flaws will make it difficult for the staff, physicians, and consumers to receive truthful data. However, if they try to visit the website in a reasonable timeframe, they will either be refused access due to a functioning issue. Engineers may occasionally be required to update and manage the protection for the project. Maintaining it could be expensive for the business. To preserve the proposed optimization, staff may need to be allocated to manage all the functionality and safety precautions. Financial analysis is risky, but it's worthwhile it financially. Therefore, receiving this method to keep its hectic timetable and administrative work would make any hospital delighted.

Impact values:

1- **Catastrophic, 2 - Critical, 3 - Marginal, 4 - Negligible**

Risk Check List

- **Product size (PS),**
- **Business Impact (BU),**
- **Customer characteristics (CU),**
- **Process definition (PR),**
- **Development Environment (DE),**
- **Technology to be built (TE),**
- **Staff size, and experience (ST).**

Risks	Category	Probability	Impact	RMMM (Risk Mitigation, Monitoring, and Management)
A larger number of users than planned	PS	35%	3	Task Analysis; Prototyping; User Involvement.
Loss of Fundings	CU	45%	1	Various Estimation Techniques; Designed to Cost; Incremental Development; Recording and Analysis of Past Projects; Standardization of Methods.
Estimation size can be slow	PS	60%	2	Simulation, Technical Analysis, Prototyping, and Improved Software Evaluation.
Technology that doesn't meet expectations	TE	35%	1	Developed Software Evaluation; Formal Specification Methods; User Surveys; Prototyping; Early User Manuals.
Lack of training	DE	70%	3	Training and Career Development; Staffing with Top Talent; Job Matching; Teambuilding; Early Scheduling of Key Personnel.
Change of Customers Requirements	PS	75%	2	Modify Control and Incremental Development.

Risk Exposure (RE) = (potential damage) x (probability of occurrence)

Risk identification: In reality, only 60% of the software parts planned for reuse will be incorporated into the program. The remaining features will require bespoke development.

Risk probability: 70% (likely).

Risk Impact: It was intended to include 60 reusable software components. When compared to other proprietary software that is planned for development, 16 components would need to be created from the start if only 60% of them could be utilized. The total cost (impact) to build the components would be 20 x 100 x 16 = $ 32,000 because the average component is 100 LOC and local data shows that the cost of software engineering for every LOC is $20.00.

Risk exposure. RE = 0.70 x 32,000 = 22,400

Risk Exposure Possibilities

Risks	Likelihood	Impact	Risk Exposure
It takes longer than intended to specify something.	4	6	24
Modifications made to the requirements definition while coding	7	8	56
Testing of modules reveals design flaws or mistakes	5	7	35
Technology that doesn't meet expectations	5	4	20
Coding modules takes longer than anticipated	3	4	12

Risk Reduction Leverage (RRL) = (REbefore- REafter)/ (cost of risk reduction)

Let's assume, that REbefore is 10% of the Risk Exposure and REafter is 2% of the Risk Exposure.

RRL = {(10% of $22,400) – (2% of $22,400)} / $800 = 2.24

RRL > 1.00, so it's worth doing.

Budget for the project

Number of people = 65

Working hours per month = (5*8*4) hours = 160 hours

[1 week = 5 working days; 1 day = 8 working hours; 1 month = 4 weeks]

Salary per month is 200000 BDT

Salary per hour is (200000 /160) BDT = 1250 BDT

We are assuming that it will take 8 months to complete the project.

Costs	**Amount**
Senior Developers Salary	**(200000*8*30) BDT = 48000000 BDT**
Junior Developers Salary	**(100000*8*35) BDT = 28000000 BDT**
Rent Fee	**(30000*8) BDT = 240000 BDT**
Hardware Fee	**250000 BDT**
Maintenance	**(2500*8*8) BDT = 160000 BDT** **[8 hours of service per month;** **4 months in advance]**
Electricity bill	**(60000*8) BDT = 480000 BDT**
Transport cost	**(5000*8) BDT = 40000 BDT**
Others	**50000 BDT**
Total	**76700000 BDT**

Conclusion

Throughout its useful features, this hospital management system offers the strongest possible link between the administration, physicians, patients, and staff. Physicians and patients may interact with one another in the highest effective way possible thanks to the integrative route that is made available by the sequence in which the applications are designed. We adopted that idea, gave it our own unique development, and included it into our management system.