ASSIGNMENT 1 -

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1. Choose your project (2 Points)

   A web application that will store and analyze data on the cost of healthcare.

2. Project goal and objectives (4 Points)

   Creating a robust web application to store and analyze healthcare cost data is a pivotal step toward enhancing healthcare efficiency and reducing overall costs. This powerful tool aims to serve potential patients, healthcare providers, researchers, and policymakers by collecting and securely storing data from diverse sources such as insurance companies, hospitals, clinics, and government agencies. Once collected, the data undergoes meticulous analysis, and enables users to identify trends and patterns, while also enabling certain users (i.e., potential patients) to make comparisons between healthcare providers that will facilitate informed decision-making. The overarching goal is to pinpoint areas where potential patients' costs can be minimized (by avoiding unnecessary tests or procedures, or by selecting more cost-effective medication or treatment alternatives) and for organizations (such as hospitals, pharmacies, researchers, etc.) to be able to collect vital data on the consumers/customers.

   The website will facilitate easy comparison of medical procedure costs, medicine prices, and insurance policies from various healthcare providers. It will offer a user-friendly interface with comprehensive data visualization, which will empower users by being able to recognize affordable healthcare options quickly. The website will also collect data, with the user's consent, on what is being searched/selected/viewed on the website and will provide this data to the relevant organizations or individuals that will require it.

3. History leading to project request (4 Points)

   The history of the need for websites or software that track and compare healthcare expenditures is complex, influenced by several variables that are changing the face of healthcare. One significant factor is the ongoing increase in healthcare expenses, which has long been a source of concern for businesses, legislators, and consumers alike. The cost of healthcare has been rising significantly over time in many nations, most notably the US, which has brought more focus to the accessibility and openness of healthcare services.

The lack of pricing transparency in the healthcare system is at the heart of this problem. In the past, customers have had difficulty navigating the opaque and confusing world of healthcare prices. It is difficult for people to accurately evaluate costs and make decisions about their care since different hospitals, clinics, and healthcare providers charge varying amounts for the same medical services.

At the same time, there has been a more general trend toward growing consumer empowerment made possible by technological improvements. People may now easily investigate and contrast costs for products and services, including healthcare, thanks to the widespread use of digital tools and the internet. There is an increasing need for instruments and resources that support well-informed decision-making based on quality, cost, and other pertinent considerations as people want more control over their healthcare decisions.

Proactive government actions have also contributed to the movement toward transparent healthcare prices. Policymakers have realized that fostering openness is critical to empowering consumers and containing rising healthcare costs, especially in nations with intricate healthcare systems like the United States. Provisions designed to increase pricing transparency and promote the creation of tools that let customers compare healthcare costs and quality measures are found in laws like the Affordable Care Act (ACA).

Technological developments have further accelerated attempts to improve healthcare pricing transparency. The gathering, analysis, and distribution of healthcare cost and quality data have been made easier by the broad use of electronic health records (EHRs) and the accessibility of advanced data analytics tools. By utilizing these technological advances, developers have produced mobile applications, software platforms, and websites that provide customers with access to thorough information about healthcare prices and enable useful provider comparisons.

In conclusion, several factors, such as the ongoing rise in healthcare costs, the lack of price transparency, the growing empowerment of consumers, government initiatives, and technological advancements, have combined to create the demand for websites or software that tracks and compares healthcare costs. By tackling these issues, these tools hope to provide patients with the knowledge they need to choose their medical alternatives more wisely, which will eventually lead to increased efficiency, competitiveness, and transparency in the healthcare system.

4. Identify Problem, Solutions & Opportunities (10 Points)

Some issues arise from the large-volume aggregation of medical data. Most countries have stringent laws to protect citizens from misappropriation and misuse of such data. This can make decisions made from the usage of such tools legally vulnerable.

- Medical data is highly protected by laws in many countries, such as the EU, the US, and India. However, opportunity exists in countries where medical information is not strictly regulated, like Bangladesh. The Constitution of Bangladesh provides a right to privacy of correspondence and other means of communication, but it does not explicitly cover personal health data. The government has drafted a Data Protection Act in 2022, but it has not been enacted yet. Therefore, there is a potential market for medical data applications in Bangladesh, as long as they comply with the ethical and legal standards of the data sources and users to avoid misdemeanor or harmful publicity.
- Ensure application is not accessible to people who can misuse the data it offers (ex: insurance companies can figure out what medical care costs the most and abandon it). One solution is to implement a strict verification process to ensure the identity of clients and their legitimate purposes for accessing the data. For example, the application could require clients to provide their credentials, such as name, address, email, phone number, organization, and role. The application could also ask clients to sign a data use agreement that specifies the terms and conditions of data access, use, and sharing. The application could monitor and audit the data usage and report any violations or anomalies to the data providers and authorities. The application could also encrypt the data and use secure protocols for data transmission and storage. Make sure we comply with necessary security protocols to avoid stealing or hacking.

Opportunities: a. A survey system can be implemented which will enable the patients to reveal valuable data by sharing their experiences after visiting an institution. **b**. Institution should be able to promote their business in return for data or revenue.

5. Product Description: (20 Points)
    a. Product Summary:

    The Healthcare Cost Transparency Platform is a comprehensive web-based solution designed to empower patients with essential information about healthcare treatment costs across different hospitals. It aims to bridge the

gap between patients, healthcare providers, and researchers/policymakers by providing transparent and accessible pricing data and data-driven insights into consumer behavior, facilitating informed decision-making in healthcare.

Target Audience:

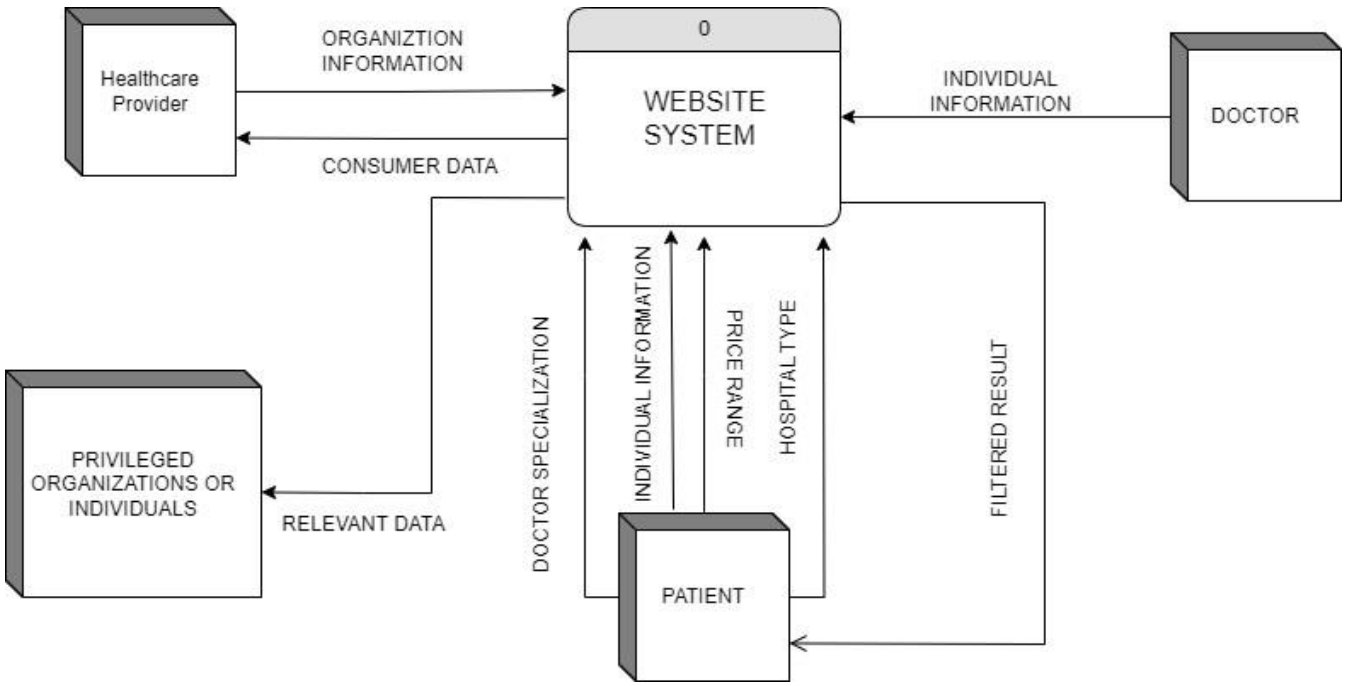
- Patients: Individuals seeking transparency and clarity in healthcare treatment costs.
- Healthcare Providers: Hospitals and healthcare facilities interested in highlighting their services and pricing data.
- Insurance Companies: Entities looking to negotiate prices and provide accurate cost estimates to policyholders.
- Government Agencies: Organizations promoting healthcare access and affordability through transparency initiatives.
- Technology Partners: Companies providing technology solutions and expertise in database management, web development, and data analytics.
- Researchers and Policymakers: Individuals who would benefit from the data collected by the users of the website.

b. Product Stakeholders
    i. Patients: Patients are the primary stakeholders as they are the ones who will use the website to access information about healthcare costs. They have a vested interest in finding affordable and quality healthcare options.
    ii. Healthcare Providers/Hospitals: Hospitals and healthcare providers are key stakeholders as they are the entities that will be listed on the website. They may have concerns about how their pricing data is displayed and may also be interested in using the platform to showcase their services.
    iii. Insurance Companies: Insurance companies have an interest in healthcare cost transparency as it can help them negotiate prices with healthcare providers and provide better cost estimates to their policyholders.
    iv. Government and Regulatory Bodies: Government agencies and regulatory bodies may have an interest in promoting healthcare cost

transparency initiatives to improve healthcare access and affordability for citizens.

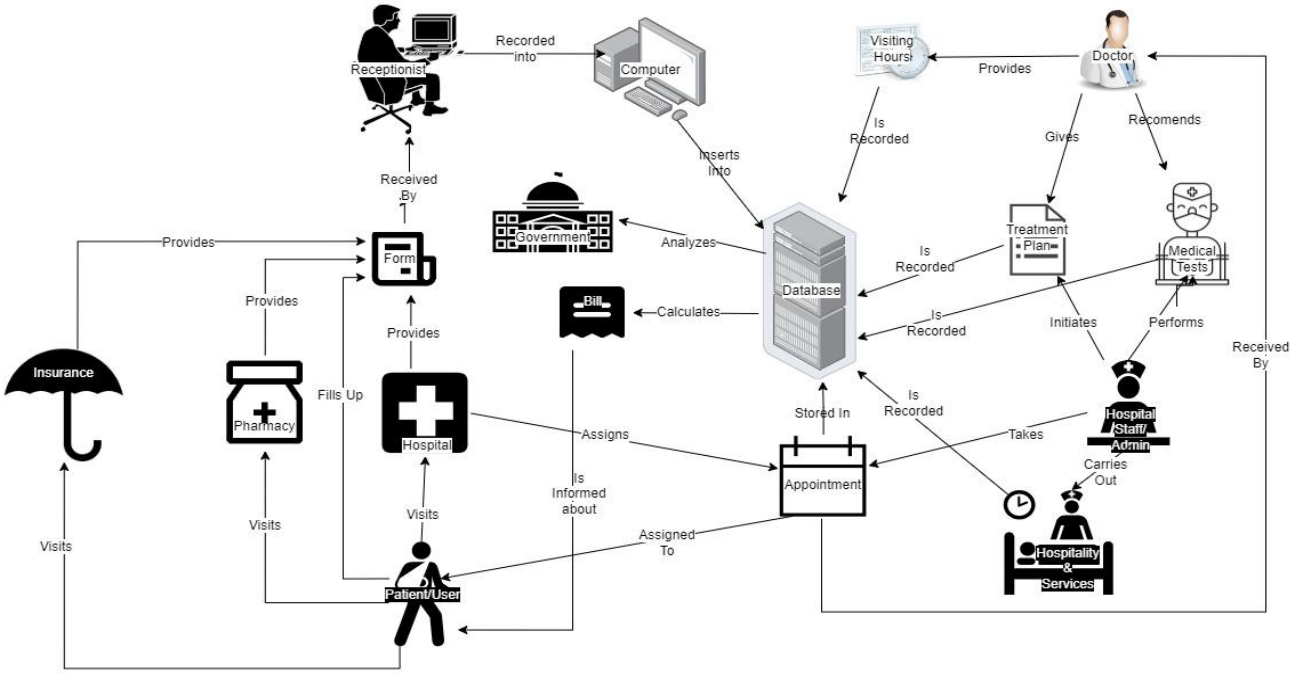
v. Healthcare Administrators: Administrators within hospitals and healthcare systems may be stakeholders as they may be responsible for providing data to the website and ensuring compliance with relevant regulations.
vi. Healthcare Advocacy Groups: Advocacy groups focused on healthcare access and affordability may be interested in supporting initiatives that promote transparency in healthcare costs.
vii. Technology Partners: Companies or individuals providing technology solutions, such as database management, web development, and data analytics, are stakeholders as they play a crucial role in the development and maintenance of the website and system.
viii. Data Providers: Organizations or entities that provide data on healthcare costs, such as research firms or government agencies, are stakeholders as they contribute to the information available on the website.
ix. Investors and Funders: If our project requires funding or investment, they become stakeholders with a personal stake in the success of the project.
x. Ethical and Privacy Advocates: Individuals or groups advocating for ethical use of data and privacy protection may have an interest in ensuring that the website and system adhere to best practices in these areas.

c. Context Level Data Flow Diagram:

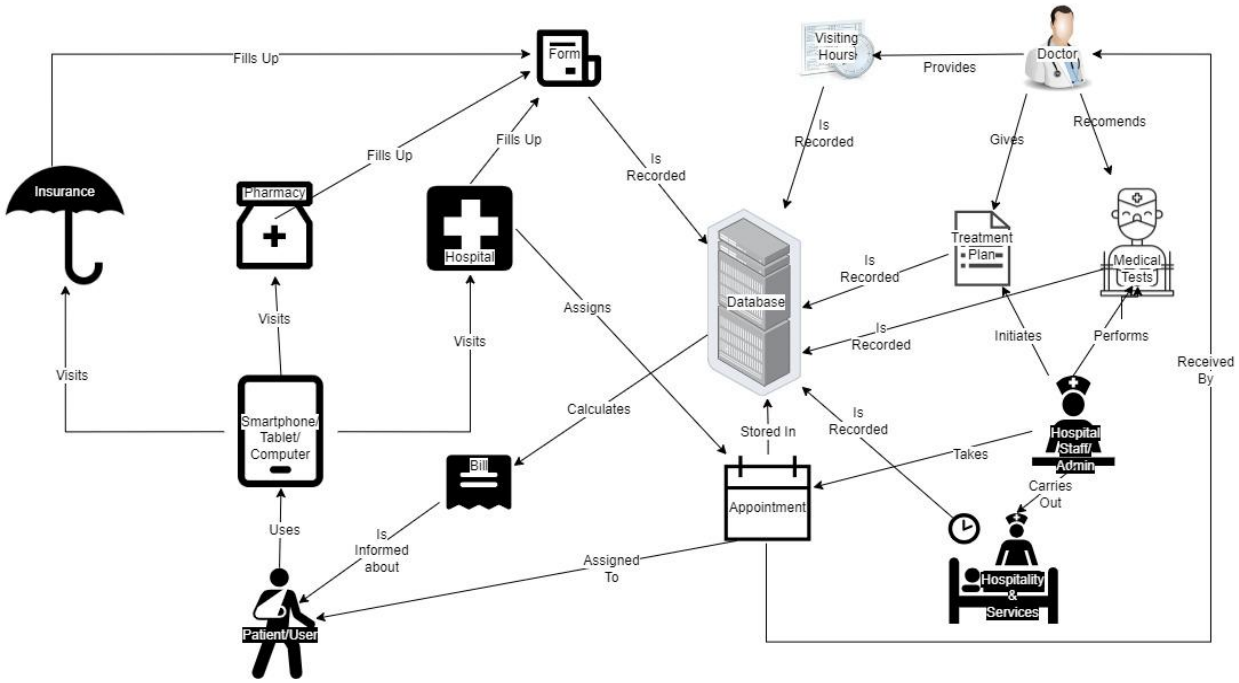


d. Draw a rich picture.

Rich Picture: As IS



Rich Picture: To Be



e. Hardware & Software Details (Include hardware components, software components of the system, hardware architecture, software architecture, any relevant diagrams that would depict your system. Use table to organize your document as needed.)

Software Used:
The system implemented is primarily a web-based system. To make this web-based application a combination of HTML, CSS, PHP, and JavaScript is used. To run these codes properly, Microsoft Visual Studios Code application is used as the primary compiler. To implement the web-based components Live server and Default Web Dev setting with extension are used. The website connects to a back-end server with the aid of a local server using the software phpMyAdmin.

f. Software key technical features

Data Collection and Analysis:
Data was collected from multiple sources, primarily from Healthcare Websites. Local hospitals were visited and consulted with for data however, since healthcare data is sensitive it was quite hard to collect data directly from hospitals. So other sources were used like online and insiders from the hospital in question. The collected data was sorted and stored in a local server by the team members. Each data was categorized by their provider type, for example, medicine was listed under Pharmacy while ECG test was listed under Hospital.

Surveying system:
Patients who already visited an institute may help other patients know about their experiences through a built-in survey system.

Collaborate with healthcare institutes:
Collaborate with doctors by promoting their clinics and hospitals. In the hopes of getting information regarding their capabilities and prices. This feature will also help them get some revenue to further modify the system.

Key Features:

- Centralized Database: The platform aggregates and organizes healthcare cost data from various hospitals and healthcare providers, presenting it in a centralized database for easy access.
- User-Friendly Interface: With an intuitive and user-friendly interface, patients can easily search, compare, and analyze treatment costs based on their specific needs and preferences.
- Cost Comparison Tools: Robust cost comparison tools enable patients to compare treatment costs across multiple hospitals, helping them make informed decisions about their healthcare options.
- Customized Search Filters: Users can filter search results based on factors such as location, type of treatment, insurance coverage, and quality ratings, ensuring personalized and relevant information.
- Privacy and Security: The platform prioritizes patient privacy and data security, adhering to stringent standards and regulations to safeguard sensitive healthcare information.
- Accessibility: The platform is designed to be accessible to a wide range of users, including those with diverse abilities and technological proficiencies, ensuring equitable access to healthcare cost information.
- Continuous Updates: Regular updates and maintenance ensure that the platform reflects current healthcare pricing trends and incorporates feedback from users and stakeholders.
- Data Visualization: Data collected via telemetry is processed and rendered for use in decision-making or statistics