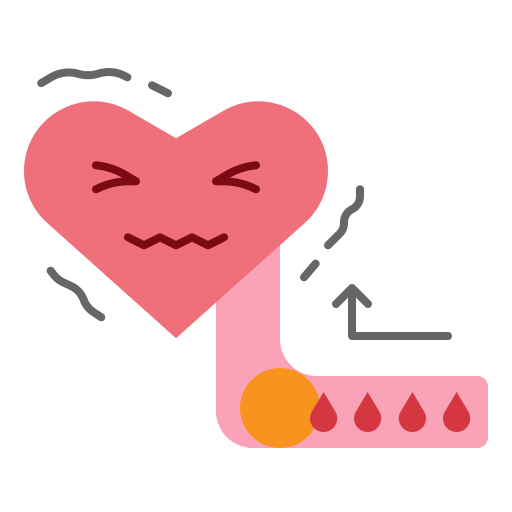
Low Level Design (LLD) Heart Disease Diagnostic Analysis

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**Piyush Birle**

**Document Control**

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# Introduction

## What is Low Level Design Document?

#### The goal of the Low-level design document (LLDD) is to give the internal logic design of the actual program code for the Heart Disease Diagnostic Analysis dashboard. LLDD describes the class diagrams with the methods and relations between classes and programs specs. It describes the modules so that the programmer can directly code the program from the document.

* 1. **What is Scope?**

#### Low-level design (LLD) is a component-level design process that follows a step- by-step refinement process. The process can be used for designing data structures, required software architecture, source code and ultimately, performance algorithms. Overall, the data organization may be defined during requirement analysis and then refined during data design work.

## Project Introduction

Heart disease, an umbrella term encompassing various cardiovascular disorders, has become an even more pressing concern in contemporary times. Recent data underscores a stark reality – the incidence of heart diseases is on the rise, and the associated mortality rates continue to be alarming. Today, heart diseases stand as a formidable adversary, claiming a significant number of lives and emerging as a leading cause of mortality worldwide.

In the current landscape, especially in regions like India, the prevalence of heart diseases has reached unprecedented levels. Recent statistics indicate a concerning trend, with a surge in the number of deaths attributed to heart-related conditions. The data paints a vivid picture of the urgency of addressing this health crisis.

For instance, from the most recent years up to the present day, the mortality rate due to heart diseases has witnessed a distressing increase. In India, as of the latest available data, heart diseases have solidified their position as the primary cause of death. The numbers reveal a substantial uptick, emphasizing the critical need for immediate and effective interventions.

# Problem Statement

Health is real wealth in the pandemic time we all realized the brute effects of covid-19 on all irrespective of any status. You are required to analyse this health and medical data for better future preparation. A dataset is formed by taking into consideration some of the information of 303 individuals.

# Dataset Information

Age (आयु):

Short Name: age English: The person's age in years. Hindi: व्यक्ति की आयु वर्षों में।

Sex: Short Name: sex English: The person's sex (1 = male, 0 = female). (1 = पुरुष, 0 = महिला)।

Chest Pain (सीपी): Short Name: cp English: The chest pain experienced (Value 1: typical angina, Value 2: atypical angina, Value 3: non-anginal pain, Value 4: asymptomatic). Hindi: मुख्य दुखि (सीपी) अनुभव किया गया छाती में दर्द (मूल्य 1: सामान्य एंजाइना, मूल्य 2: असामान्य एंजाइना, मूल्य 3: नॉन-एंजाइनल पेन, मूल्य 4: असंज्ञानात्मक)।

Resting BP (आराम से बीपी): Short Name: trestbps English: The person's resting blood pressure (mm Hg on admission to the hospital). Hindi: व्यक्ति का आराम से ब्लड प्रेशर (हॉस्पिटल में प्रवेश पर मिमीमी ऑफ़ हाइड्राजन पैराबार)।

Cholesterol (कोलेस्ट्रॉल): Short Name: chol English: The person's cholesterol measurement in mg/dl. Hindi: व्यक्ति का कोलेस्ट्रॉल माप (मि.ग्रा./डेसी.एल)।

Fasting Sugar (उपवास शुगर): Short Name: fbs English: The person's fasting blood sugar (> 120 mg/dl, 1 = true; 0 = false). Hindi: व्यक्ति की उपवास से ब्लड शुगर (> 120 मि.ग्रा./डेसी.एल, 1 = सत्य; 0 = असत्य)।

Resting ECG (आराम से ईसीजी): Short Name: restecg English: Resting electrocardiographic measurement (0 = normal, 1 = having ST-T wave abnormality, 2 = showing probable or definite left ventricular hypertrophy by Estes' criteria). Hindi: आराम से इलेक्ट्रोकार्डियोग्राफिक माप (0 = सामान्य, 1 = एसटी-टी वेव असामान्यता है, 2 = एस्टेस के मानक के अनुसार संभावित या निश्चित बाएं वेंट्रिक्युलर हाइपरट्रोफी दिखा रहा है)।

Max Heart Rate (अधिकतम हृदय दर): Short Name: thalach English: The person's maximum heart rate achieved. Hindi: व्यक्ति की अधिकतम हृदय दर जो प्राप्त की गई।

Exercise Angina (व्यायाम एंजाइना): Short Name: exang English: Exercise-induced angina (1 = yes; 0 = no). Hindi: व्यायाम से उत्पन्न एंजाइना (1 = हाँ; 0 = नहीं)।

ST Depression (एसटी डिप्रेशन): Short Name: oldpeak English: ST depression induced by exercise relative to rest. Hindi: विश्राम के साथ तुलनात्मक रूप से व्यायाम द्वारा उत्पन्न एसटी डिप्रेशन।

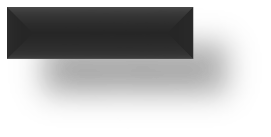
Slope (ढलान): Short Name: slope English: The slope of the peak exercise ST segment (Value 1: upsloping, Value 2: flat, Value 3: downsloping). Hindi: चरम व्यायाम एसटी सेगमेंट की ढलान (मूल्य 1: ऊपर की ओर, मूल्य 2: समतल, मूल्य 3: नीचे की ओर)।

Number of Vessels (नाड़ियों की संख्या): Short Name: ca English: The number of major vessels (0-3). Hindi: प्रमुख नाड़ियों की संख्या (0-3)।

Thalassemia (थैलेसीमिया): Short Name: thal English: A blood disorder called thalassemia (3 = normal; 6 = fixed defect; 7 = reversible defect). Hindi: एक रक्त विकार जिसे थैलेसीमिया कहा जाता है (3 = सामान्य; 6 = स्थायी क्षति; 7 = पुनर्वासी क्षति)।

Heart Disease (हृदय रोग): Short Name: num English: Heart disease (0 = no, 1 = yes). Hindi: हृदय रोग (0 = नहीं, 1 = हाँ)।

# Architecture



Real World

Exploratory Data Analysis (EDA)

Modelling

Deployment

Data Cleaning

Data Pre- Processing

Raw Data Collection

Reporting

* 1. **Architecture Description**

### Raw Data Collection

The Dataset was taken from iNeuron’s Provided Project

### Data Pre-Processing

Before building any model, it is crucial to perform data pre-processing to feed the correct data to the model to learn and predict. Model performance depends on the quality of data feeded to the model to train.

This Process includes-

* + - 1. Handling Null/Missing Values
      2. Handling Skewed Data
      3. Outliers Detection and Removal

### Data Cleaning

Data cleaning is the process of fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset.

* + - 1. Remove duplicate or irrelevant observations
      2. Filter unwanted outliers
      3. Renaming required attributes

### Exploratory Data Analysis (EDA)

Exploratory Data Analysis refers to the critical process of performing initial investigations on data to discover patterns, spot anomalies, test hypothesis and to check assumptions with the help of summary statistics and graphical representations.

### Reporting

Reporting is a most important and underrated skill of a data analytics field. Because being a Data Analyst you should be good in easy and self- explanatory report because your model will be used by many stakeholders who are not from technical background.

* + - 1. High Level Design Document (HLD)
      2. Low Level Design Document (LLD)
      3. Architecture
      4. Wireframe
      5. Detailed Project Report
      6. Power Point Presentation

### Modelling

Data Modelling is the process of analysing the data objects and their relationship to the other objects. It is used to analyse the data requirements that are required for the business processes. The data models are created for the data to be stored in a database. The Data Model's main focus is on what data is needed and how we have to organize data rather than what operations we have to perform.

### Deployment

I created a Power BI Dashboard

