

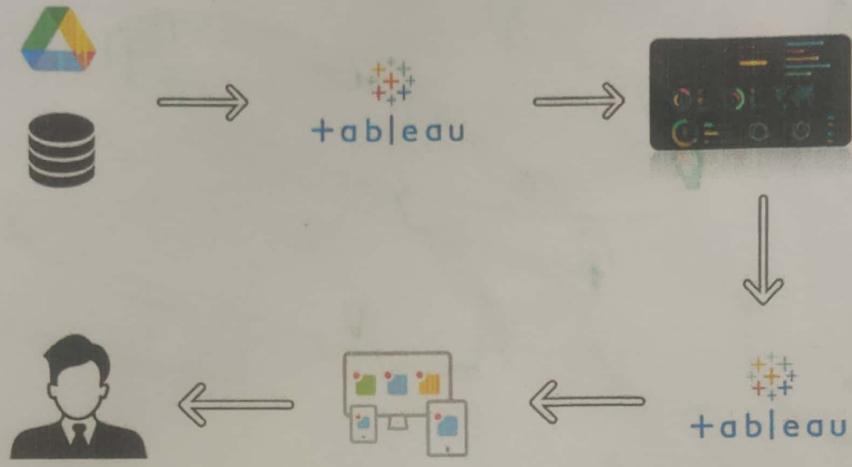
# Heart Disease Analysis

Heart disease describes a range of conditions that affect the heart. Heart disease includes blood vessel disease such as coronary artery disease, irregular heart beats (arrhythmias), disease of the heart muscle, heart valve disease.

According to the National Heart, Lung and Blood Institute in USA, the most important factors in the development of cardiovascular disease in humans are obesity, sedentary lifestyle and smoking.

In this Heart Disease Analysis project we are trying to analyze the Heart Disease related data and be able to extract some insights from that data using some tools. To extract the insights from the data and put the data in the form of visualizations, dashboards and story we employed a Tableau tool.

## Technical Architecture :-



## Project Flow :-

To accomplish this, the listed below activities has to be done.

- Define Problem / Problem understanding.
  - Specify the business problem
  - Literature Survey
  - Business Requirements
  - Social or Business Impact

- Data Collection and Extraction from Database
  - Collect the dataset
  - Storing data in DB
  - Perform SQL operations
  - Connect DB with Tableau
- Data Preparation
  - Prepare the data for visualizations.
- Data Visualization
  - No. of Unique Visualizations.
- Dash Board
  - Responsive and Design of Dashboard.
- Story
  - No. of stories of a story
- Performance Testing
  - Amount of Data Rendered to DB
  - Utilization of data filters.
  - No. of Calculation fields
  - No. of Visualizations / Graphs
- Web Integration.
  - Dashboard and Story embed with UI with flask
- Project Demonstration and Documentation.
  - Record explanation video project end to end solution.
  - Project Documentation- Step by step project development procedure.

## Mile Stone 1: Define Problem / Problem Understanding

### Activity 1: Specify the business problem

According to the National Heart, Lung and Blood Institute in USA, the most important factors in the development of Cardiovascular disease in humans are obesity, sedentary lifestyle and smoking.

### Activity 2: Business requirement.

The health care industry produces a huge amount of data. This data is not always made use to the full extent and is often underutilized. Using this huge amount of data, a disease can be detected, predicted or even cured. These business requirements for analysing the Heart Disease in world include identifying patterns and comparing factors of Heart Disease, creating interactive dashboards and reports, identifying areas for improvement making data driven decision, comparing to the current situation.

### Activity 3: Literature Survey

A literature survey for the Heart Disease Analysis would involve researching and reviewing previous studies, articles and reports on the topic. This would include information of the methods and techniques used for analysing heart disease, as well as the results and conclusions of these studies.

Comprehensive literature survey should include peer-reviewed journals, scientific databases (e.g. PubMed, Scopus), conference proceedings, and authoritative sources in the field of Cardiovascular medicine. The survey should encompass a range of studies, including clinical trials, observational studies, systematic reviews, and meta-analysis to provide a comprehensive overview of the current knowledge landscape in the field of heart disease.

#### Activity 4: Social or Business Impact

Social Impact - Analyzing heart disease has profound social impacts, ranging from individual-level health outcomes to community empowerment and public health initiatives. By promoting prevention, equitable health care access, and research advancements, heart disease analysis play a crucial role in improving the well-being of individuals and society as a whole.

Business Impact - Analyzing heart disease has substantial business impacts across various sectors, including health care, insurance, research, workplace wellness, and consumer products. It creates market opportunities, drives innovation, and influences policy and advocacy efforts in the fight against heart disease.

## Milestone 2: Data collection and Extraction from DataBase

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypothesis, evaluate outcomes and generate insights from the data.

### Activity 1: Data understanding

Data contains all the meta information regarding the columns described in the csv files.

#### Column Description of the Data Set:

1. Heart Disease - Target trait
  - females suffering from mental health are also suffering from heart disease nearly 1522 female population are suffering from both.
  - 1074 men are suffering from heart disease, who are also suffering from mental-health.
2. BMI - Body Mass Index is a value that indicates a person mass and weight and judge whether the mass is insufficient or sufficient or excessive.
  - We found that people who are underweight and obesity are suffering from heart disease.
  - Sufficient BMI count as healthy and low risk of heart disease.

### 3. Smoking:

It is a major risk factor for cardiovascular disease. When smoke from cigarette is inhaled the reaction of cardiovascular system damages upto 30% within 10 minutes of smoking.

- As per analysis out of 100 every 50% of people who smokes suffers from heart disease.

### 4. Alcohol Drinking:

Alcohol causes not only temporary database in functionality of heart but also permanent ones.

- Overall 65% people suffers from heart disease who consumes alcohol.

### 5. Stroke:

- Ischemic stroke occurs 4 times more than hemorrhagic, because of suffering from heart disease.
- people having count of heart 41 suffers from a stroke.

### 6. Physical Health:

- Average people suffering from heart disease suffers from low physical health day i.e; averagely 3.3 days in a week.

### 7. Mental Health:

- out of 7 days a week people suffering from heart

heart disease 4.3 days from poor mental health.

Sex:-

- As per the analysis men suffers more than female from heart disease.
- women are at higher risk of stroke but at older age.

Age Category:-

- Younger people ranging from 18-34 are likely to have lower risk of heart disease.
- Mostly men from 45 and older have high chance of heart disease.
- women after 55 and older can suffer from heart disease.

Diabetic:-

people who are diagnosed with diabetic have twice as likely to suffer from heart disease than normal people who are healthy.

Physical Activity:-

Adults who reported to have physical activity or exercise has less percentage to suffer from heart disease.

Sleep Time:-

- People suffering from health disease has a rate of 45% to increase insomnia.

## Asthma:

- Nearly 533 (15%) people had diagnosed of asthma who developed heart disease.

## Kidney disease:

- 26% people who are diagnosed with kidney issues get their heart effected increasing the chances of heart disease.

## Activity 2:

Storing Data in DB and perform SQL operations.

• we will store the data in form of rows and columns, it is stored in data pages in defined size.

## Activity 3:

Connect DB with Tableau

→ The data base can be connected to Tableau by connecting the database sever.

## Milestone 3: Data Preparation

### Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualization to gain insights into the performance and efficiency. Since the data is already cleaned we can move to visualization.

## Milestone 4: Data Visualization

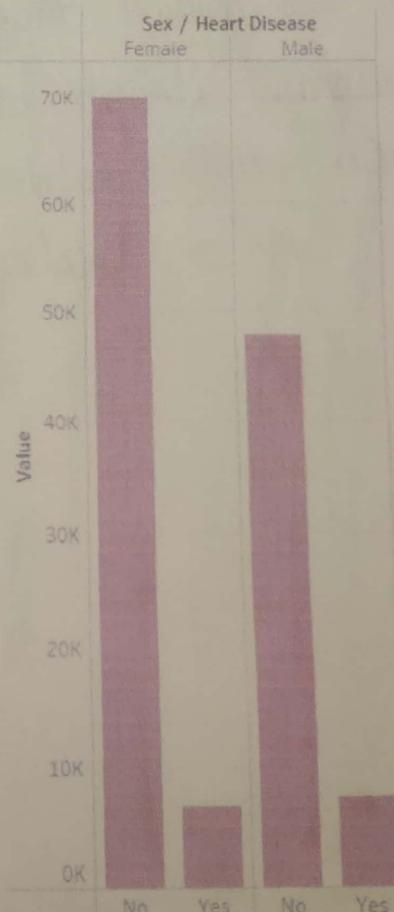
Data visualization is the process of creating graphical representation of data to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive and easier to interpret. By using visual elements such as charts, graphs, and maps - Data visualizations can help people quickly identify patterns, trends and outliers in the data.

## Activity 1: No of Unique Visualizations.

The number of unique visualisations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the performance and efficiency of banks include bar charts, line charts, heat maps, scatter plots, pie charts, maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables, breakdown of revenue and customer demographics, workload, resource allocation and location of banks.

### Activity 1.1 - Gender VS Heart Disease

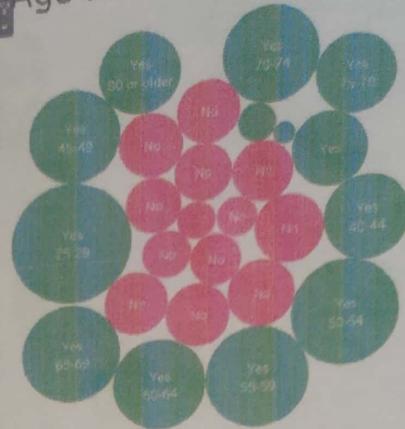
Men typically develop this plaque buildup in the largest arteries that supply blood to the heart. Women are also likely to develop this buildup in smaller blood vessels, known as microvascular disease. In both sexes it is only partly due to accumulation of cholesterol.



## Activity 1.2 : Age Vs Heart Disease

In men, the risk of heart disease or heart attack increase significantly after the age of 45. In women, heart attacks are more likely to occur after the age of 50.

Age Wise Heart Disease



## Activity 1.3 : Diabetic Vs STROKE.

Diabetes increases the chance of having a stroke, which can damage brain tissue and cause disability or even death. To prevent stroke, people with diabetes should manage blood pressure, cholesterol and weight.

## Activity 1.4 : Impact of Smoking and Alcohol on Heart Disease.

Alcohol consumed to excess over several years can produce an alcoholic cardiomyopathy, in which alcohol acts as a toxin to weaken the heart.

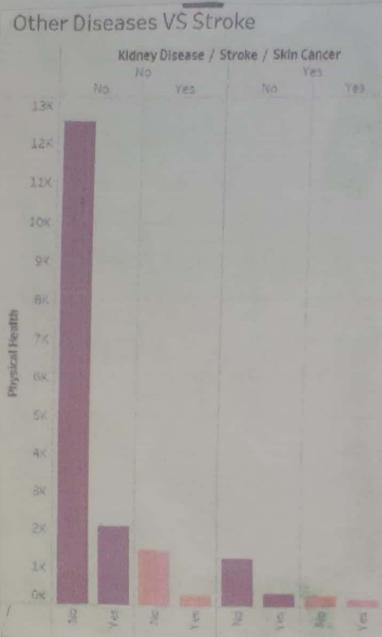
Cigarette smoking also is a strong risk factor for congestive heart failure in general population.

## Activity 1.5 Other Health Disease Vs Stroke.

Stroke is a condition in which the brain can't get enough blood flow.

This happens because one or more blood vessels leading to the brain are blocked or have burst.

Other forms of include coronary heart disease.



## Activity 1.6 - Race wise Heart Disease

It tells about the Race wise Heart disease.

## Activity 1.7 - General Health Vs Heart Disease

This visualization tells us about the General Health Vs Heart Disease.

## Activity 1.8 - Physical Activity Vs Heart Disease

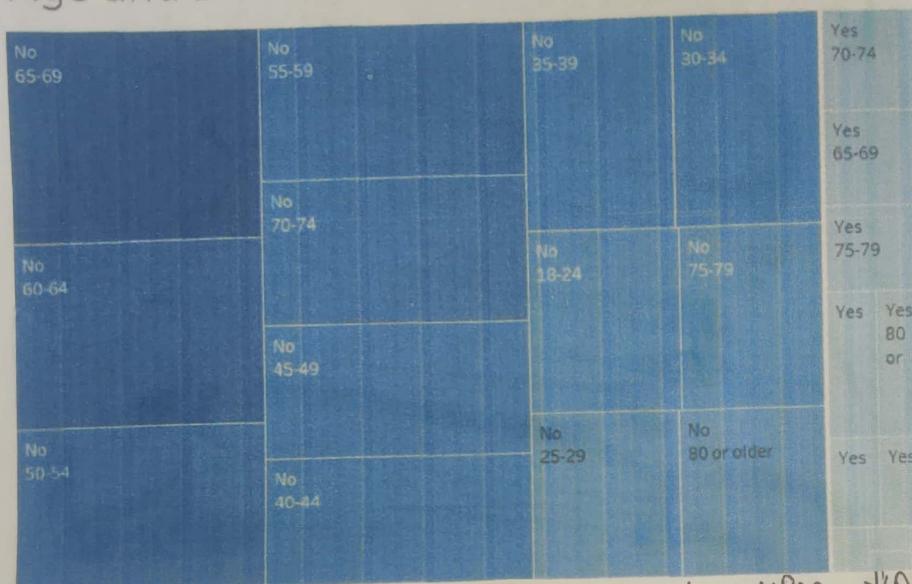
This visualization shows about the Physical activity Vs Heart Disease.

## Activity 1.9 - Age and BMI Vs Diabetic

Higher BM was associated with increased risk of AMI and CHD among both men and women.

This visualization tells us about

Age and BMI Vs Heart Disease



Activity 1.10 - People got stroke suffering from Heart Disease and Diabetic.

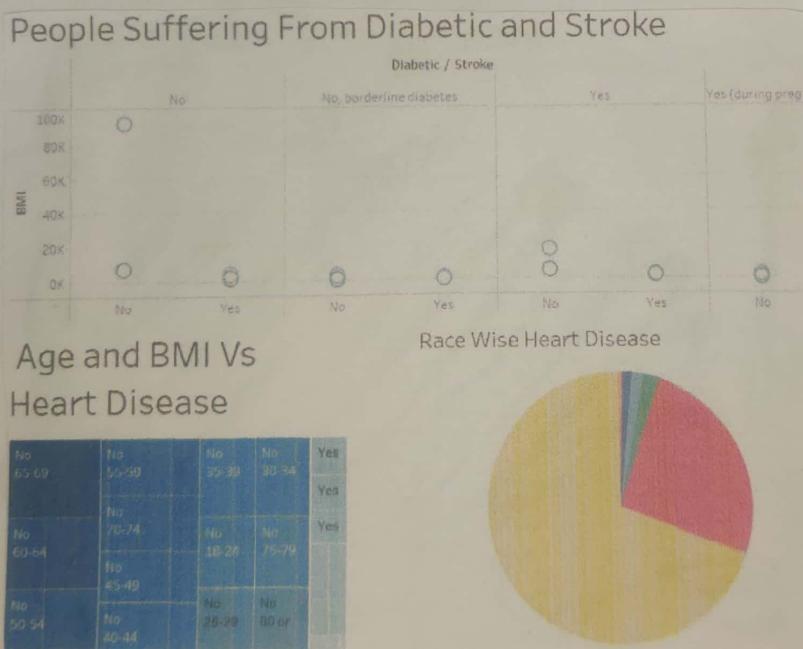
This visualization shows us about or tells us about the people got stroke suffering from Heart Disease and Diabetic.



## Milestone 5: Dash Board.

A dashboard is a graphical user interface that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data and typically designed for a specific purpose. They can be used to track key performance indicators, monitor performances metrics and display data in the form of charts, graphs and tables.

### Activity 1 - Responsive and Design of Dash Board.

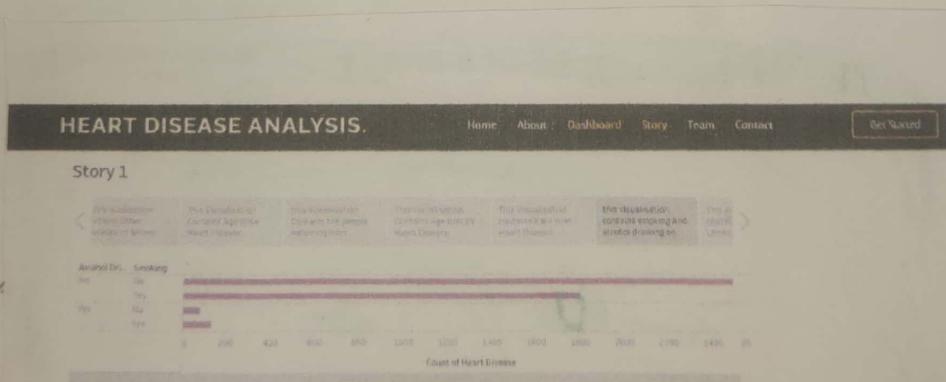


## Milestone 6: Story.

A data story is a way of presenting data and analysis in a narrative format, intending to make the information more engaging and easier to understand. A data story typically includes a clear introduction. Data stories can be told using a variety of mediums, such as reports, presentations, visualizations and videos.

### Activity 1 - No. of Scenes of Story.

The number of scenes in a storyboard for a data visualization analysis of the heart disease will depend on the complexity of the analysis of specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

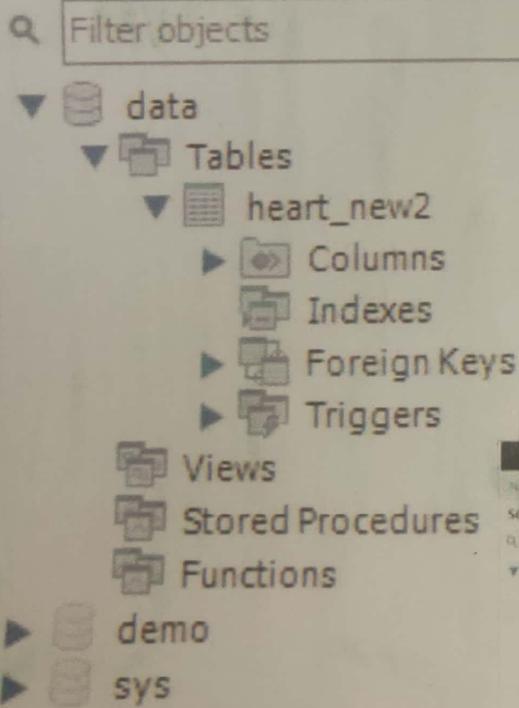


## Milestone 7: Performance Testing

### Activity 1: Amount of Data Rendered to DB

- The amount of data that is rendered to a database depends on the size of the dataset and the capacity of the database to store and retrieve data.
- Open the MySQL workbench, go to the database then click to expand the tables, select the table and click on (?) button to get the information related to table such as column, table, rows etc.

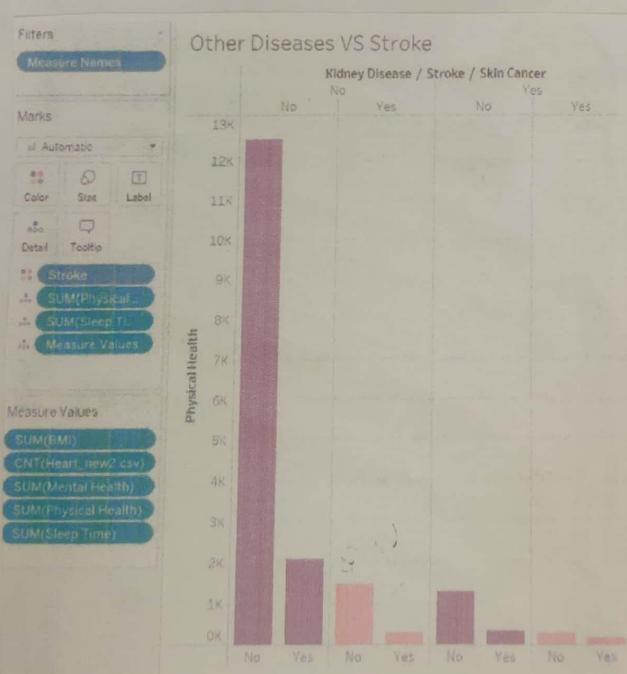
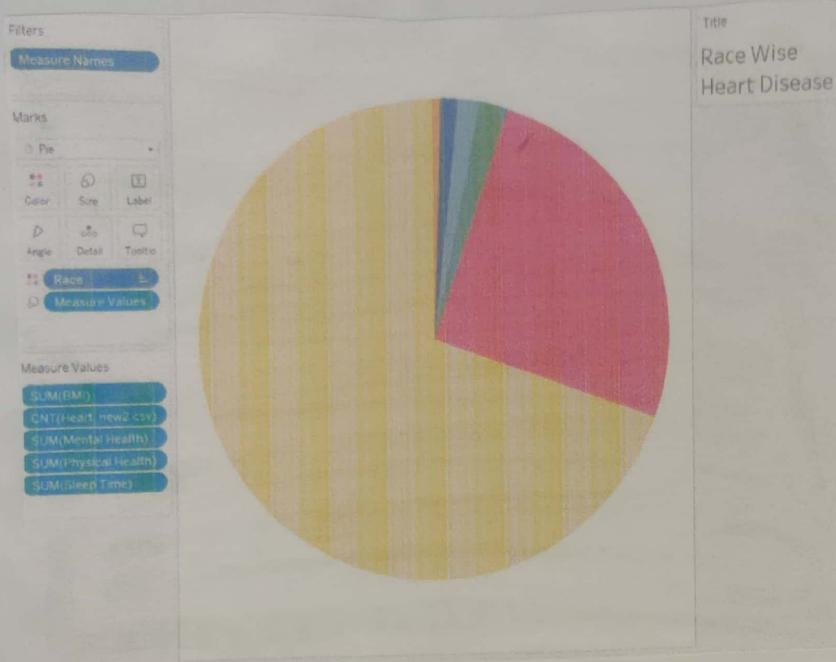
#### SCHEMAS



A screenshot of the MySQL Workbench interface showing the 'Table Details' for the 'heart\_new2' table. The table has the following details:

| Engine                | InnoDB   |
|-----------------------|--|
| Row format            | Dynamic  |
| Column count          | 18   |
| Table rows            | 4416   |
| AVG row length        | 122  |
| Data length           | 528.0 kB   |
| Index length          | 0.0 bytes  |
| Max data length       | 0.0 bytes  |
| Data free             | 0.0 bytes  |
| Table size (estimate) | 528.0 kB   |
| File format           |  |
| Data path             | C:\ProgramData\MySQL\MySQL Server 8.0\Data\data\heart_new2.ibd |
| Update time           |  |
| Create time           | 2023-06-05 15:19:42  |

## Activity 2: Utilization of Data Filters



### Activity 3: No. of Calculation fields.

In this analysis we have not created any new column using calculation field as data found in dataset was clean and sufficient for analysis.

### Activity 4: No. of Visualization /Graphs.

1. Gender vs Heart Disease
2. Age vs Heart Disease
3. People suffering from Diabetic and stroke.
4. Impact of smoking and alcohol drinking on heart disease
5. Other diseases vs stroke.
6. Race vs heart Disease
7. General health vs heart Disease
8. Physical Activity vs heart Disease.
9. Age and BMI vs Heart Disease
10. People got stroke suffering from Diabetes and heart Disease.

### Milestone 8: Web Integration.

Publishing helps us to track and monitor key performance metrics and to communicate results and progress help a publisher stay informed, make better decisions and communicate their performance to others.

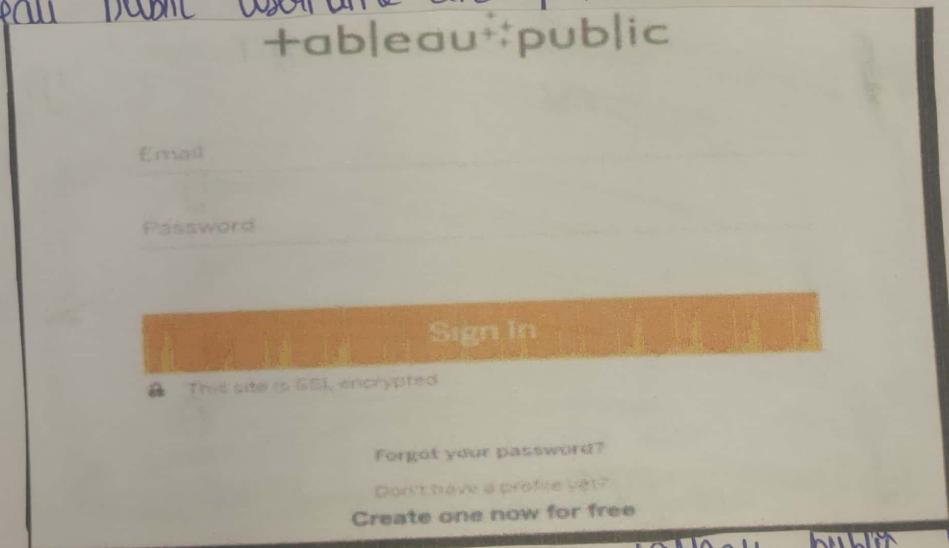
Publishing dashboard and reports to tableau public

Step1: Go to Dashboard / Story, click on the share button on the top ribbon. Give the server address of your tableau public account and click on connect.



Step2: Once you click on connect it will ask you for the tableau public username and password.

+tableau+public



Once you login into your tableau public using the credentials, the particular visualizations will be published into the tableau public.

# Activity 1: Embed Dashboard and Story with Flask.



Home

The screenshot shows the "About" page of the web application. It features a large image of two people working at a desk in an office environment. To the left of the image, there is a section titled "HEART DISEASE ANALYSIS." with a detailed description of heart disease. The text explains that heart disease occurs when plaque builds up in arteries, narrowing or blocking blood flow to the heart muscle, which can lead to other problems like angina. It defines heart disease as several conditions, with coronary artery disease being the most common in the US. The page also notes that heart disease is the top cause of death in the US, causing nearly 700,000 deaths annually. It highlights smoking, high blood pressure, high cholesterol, an unhealthy diet, lack of exercise, and obesity as risk factors. Treatment depends on the cause and type of damage, involving healthy habits like a low-fat diet, regular exercise, and good sleep.

About



Dashboard



**HEART DISEASE ANALYSIS.**

Home About Dashboard Story Team Contact Get Started

**CONTACT US**

Downtown Conference Center

Location: AT&T Ascent, New York, NY 10002

Email: info@example.com

Call: +1 555-55-4444

Your Name

Your Email

Subject

Message

Milestone 9: Project Demonstration and Documentation  
 Below mentioned deliverables to be submitted along with  
 other deliveries.

Activity 1:  
 Record explanation video for the project's end to end solution

Activity 2:  
 Project Documentation Step by step project development procedure