

Write Up for Assignment

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Assignment 2

Task A – Dataset Upload and Binary conversion

What I did:

Loaded and examined a binary dataset where each row represents a person and each column is a feature (like gender or disease stage). Each cell had either **0** (absent) or **1** (present).

Main variables: `header`, `data`, `file`, `row`

Process/Algorithm:

- Read the CSV file line by line.
- Stored the first row as `header` (feature names).
- For each person (row), stored the binary values as their data.
- This allowed us to associate each person with the set of features they have (**1s**).

Task B – Graph Construction

What we did:

Created a graph where **nodes are features**, and an **edge** connects two features if they co-occur in the same person (i.e., both have value **1**).

Main variables: `G`, `ones`, `header`, `row`

Process/Algorithm:

- For each person:
 - Identified all the features marked **1**.
 - For every pair of these features, added an edge in the graph.

- This formed a co-occurrence graph showing which features often appear together.

Task C – Graph Visualization

What we did:

Displayed the graph from Task B so the feature relationships could be seen

visually. **Main variables:** `G`, `plt`, `output_filename`

Process/Algorithm:

- Used a graph layout (like circular or spring) to position nodes.
- Drew the graph using edges and labeled nodes.
- Saved the graph as an image.
- For better clarity, separate graphs could be drawn for male and female groups using filtered data.

Task D – Shortest Path Visualization

What we did:

Computed and highlighted the **shortest path** between two given features (e.g., "Gender_Male" and "Stage_2") on the graph.

Main variables: `path`, `G`, `source`, `target`

Process/Algorithm:

- Applied **Breadth-First Search (BFS)** (used by default in shortest path functions for unweighted graphs).
- Found the shortest path (minimum number of edges) from the source feature to the target. •

Drew this path on the same graph, using different colors to highlight it.