Part 1: Problem Setup

The updated Excel spreadsheet of taste, completion times, per-hour costs, and persons responsible is posted as **ProjectPlan.pdf**.

The directed graph diagram is posted as **DirectedGraph.pdf**.

Some areas of uncertainty regarding the project were who was responsible for each task, how long each task would take, and what the average cost per hour would be for this group, so I used ChatGPT to help me come up with the numbers. The conversation is posted as **ChatGPTLog.pdf**.

Part 2: Model Specification

The linear programming model is specified and posted as **ModelSpecification.pdf**.

Part 3: Programming

The linear programming problem is implemented using Python Pulp and is posted as **NetworkModel.py**.

Part 4: Solution

Best Case Scenario: 86 hours
Expected Case Scenario: 172 hours
Worst Case Scenario: 258 hours

Critical Path: Describe Product/Develop Marketing Strategy, Design Brochure/Requirement Analysis, Survey Potential Market, Software Design/System Design/Coding, Write Documentation/Unit Testing, System Testing, Package Deliverables, Develop Pricing Plan/Develop Implementation Plan, Write Client Proposal

Gantt charts are posted as **GanttCharts.pdf**.

Part 5: Overview

A project to develop a consumer-focused recommendation system based on Yelp reviews would be expected to require 172 hours, or around 4 weeks. The project team would consist of a project manager, a frontend developer, a backend developer, a data scientist, and a data engineer, with the responsibilities of each fluctuating based on the phase of the development project. In order to support the work of the team, the project, excluding software licensing and cloud housing, would cost $52,096.15.

This cost estimate is calculated based on static estimates of the time required to complete each activity within the project. In order to deal with uncertainty, another analysis should be completed that utilizes stochastic programming and constraints that a team member cannot be working on more than one activity at a time. If the customer was able to lend some time of an in-house developer or data scientist, this estimate would be reduced as well.