1. **Work Breakdown Structure (WBS)**
2. Project Overview:

Title: PetStarz Integrated Management System

Team: Curious Comets (Samantha Bogen, Lisa Kamdem, Dorian Laycock, Markus Luthi, Rolan Ho)

1. Major Deliverables:

* System Design
* Database and Backend Development
* Frontend Development
* Testing and Quality Assurance
* Documentation

1. Tasks Breakdown:
2. System Design:

* Finalize Use Case Diagrams
* Create Activity and State Machine Diagrams
* Develop and Refine System Architecture

1. Database and Backend Development:

* Set up MongoDB Database
* Develop Backend Logic (Supplier Network, Fraud Reporting, Community Engagement Features etc.)
* Implement API Endpoints

1. Frontend Development:

* Develop User Interface for Pet Search, Foster Application, Supplier Review
* Implement User Authentication and Authorization
* Integrate Frontend with Backend Services

1. Testing and Quality Assurance:

* Unit Testing for Backend Services
* Integration Testing for Frontend and Backend
* User Acceptance Testing

1. Documentation:

* Technical Documentation
* User Manuals
* Final Project Report

1. Team Member Assignments:

* Samantha Bogen: Testing and Quality Assurance
* Lisa Kamdem: Backend Development, Database Management
* Dorian Laycock: UI/UX Design, Frontend Development
* Markus Luthi: System Design, API Development
* Rolan Ho: Project Management, Documentation

1. **Gantt Chart**
2. Duration:

* 10 weeks (2.5 months)

1. Key Milestones:

* Week 2: Completion of System Design
* Week 4: Backend Development Milestone
* Week 6: Frontend Development Milestone
* Week 8: Testing Completion
* Week 10: Final Documentation and Project Submission

1. Task Allocation:

* Map each task in the WBS to a timeline, indicating start and end dates.

1. Progress Tracking:

* Update the Gantt chart regularly to reflect the actual progress against the planned timeline.

1. Tools:

* Use free online software tools like GanttProject for creating the Gantt chart.

1. **Estimating Lines of Code (LOC) and Productivity**
2. Estimate LOC:

* Based on the project components (UI, Database, Backend, etc.), estimate the total lines of code.
  1. Database and Backend Development:

Assume 10 classes with an average of 100 LOC each: 10 classes \* 100 LOC = 1,000 LOC.

* 1. Frontend Development:

Assume 15 UI components with an average of 80 LOC each: 15 components \* 80 LOC = 1,200 LOC.

* 1. Testing:

Assume 20 test cases with an average of 50 LOC each: 20 test cases \* 50 LOC = 1,000 LOC.

* 1. Total Estimated LOC:

1,000 LOC (Backend) + 1,200 LOC (Frontend) + 1,000 LOC (Testing) = 3,200 LOC.

1. Team Size and Project Duration:

* Assuming the team consists of 5 members.
* The project duration is 10 weeks or 2.5 months.

1. Calculate Person Months (pm):

* Total Person Months = Team Size \* Duration.
* Therefore, Total Person Months = 5 members \* 2.5 months = 12.5 pm.

1. Productivity Calculation:

* Productivity is measured as LOC per Person Month (LOC/pm).
* Productivity = Total Estimated LOC / Total Person Months.
* Productivity = 3,200 LOC / 12.5 pm = 256 LOC/pm.

1. Effort Estimation Using PNR Equation:

* Assume the value of m = 20. This is a hypothetical value reflecting a moderately lower efficiency and productivity typical of student projects.
* td = nominal delivery time for schedule = 12.5 pm
* ta = optimal development time (in terms of cost), using COCOMO formula for calculation, assume the scaling factor F = 3.67

1. ta = F x Effort ^0.33 = 3.1 x (12.5 pm ^0.33) = 7.1 months
2. Effort (in Person Months) = m x ( td4 /ta4)

= 20 x (12.54 / 7.14)

= 192.15 pm