Computer Simulation: Project Completion Schedule

Day 1: Wednesday (3 hours)

1. Preparation & Understanding (1 hour)

- Read the project document thoroughly.
- Identify key tasks and deliverables.
- Plan file structure and classes (object-oriented design).

2. Basic Framework (2 hours)

- Set up Python project.
- Implement file reading for planetary data (JSON format).
- Define basic object-oriented classes (Planet, System, Simulation).

Day 2: Thursday (8 hours)

1. Beeman Integration Implementation (4 hours)

- Implement Beeman's integration algorithm for motion updates.
- Test with basic planetary motion.

2. Visualization Setup (2 hours)

- Use matplotlib or pygame to display planetary orbits.
- Verify movement correctness.

3. Orbital Period Calculation (2 hours)

- Implement orbital period detection.
- Validate results against real data.

Day 3: Friday (6 hours)

1. Energy Calculations (3 hours)

- Implement kinetic and potential energy computations.
- Ensure energy is logged at each time step.

2. Euler-Cromer & Direct Euler Methods (3 hours)

- Modify code to allow integration method switching.
- Implement Euler-Cromer and Direct Euler.
- Validate energy conservation across methods.

Day 4: Saturday (All Day)

1. Experiment 1 & 2 (5 hours)

- Run simulations for orbital periods.
- Test energy conservation for each integration method.
- Generate plots for comparison.

2. Experiment 3 OR 4 (5 hours)

- Implement the Mars satellite mission **or** planetary alignment detection.
- Run tests and validate results.

3. Code Refinements & Efficiency Optimization (2 hours)

- Refactor code to avoid duplication.
- Optimize for performance.

Day 5: Sunday (All Day)

1. Final Testing (5 hours)

- Run all simulations multiple times to check correctness.
- Ensure stable numerical behavior with different time steps.

2. Report Drafting (5 hours)

- Write introduction, methodology, and results.
- Insert figures and plots from experiments.

3. Code Documentation & README (2 hours)

- Write a clear README file.
- Add comments and docstrings for clarity.

Day 6: Monday (6 hours)

- **Revise the report based on initial draft.**
- **Proofread for clarity and correctness.**
- **Ensure all code and report requirements are met.**

Day 7-8: Tuesday - Wednesday (6 hours per day)

- **Final tweaks and bug fixes.**
- **Run full tests to ensure correctness.**
- **Polish report and refine formatting.**

Final Day: Thursday (6 hours)

- **Final Review & Backup Submission Materials**
- **Compress files into a zip for submission.**
- **Submit early to avoid last-minute issues.**