Systems Analysis & Design
Semester 2025-I
Workshop No. 2 — Kaggle Systems Design

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Welcome to the second workshop of the *Systems Analysis & Design* course!

In **Workshop #1**, you performed a detailed *systems analysis* of an *open-priced Kaggle competition*[1], identifying the system elements, relationships, sensitivity considerations, and chaos-theory implications. Now, we will build upon those insights to formulate a robust **system design** that aligns with your analytic findings.

Workshop Scope and Objectives

- **System Architecture:** Develop a design blueprint that encapsulates the core components (e.g., data ingestion, data processing, model training, model deployment) to address the challenges and requirements identified in Workshop #1.

- **Engineering Principles:** Integrate *systems engineering* principles into your design, ensuring modularity, scalability, and maintainability.

- **Chaos and Sensitivity Measures:** Incorporate strategies to mitigate unpredictable behavior (chaos) and manage sensitive elements discovered during your initial analysis.

- **Documentation & Clarity:** Produce a *System Design Document* that clearly articulates your architecture and design decisions, including diagrams and interface definitions.

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[1] https://www.kaggle.com/competitions?hostSegmentIdFilter=1

Steps to Follow

1. **Review Workshop #1 Findings:**

   - Summarize the main outcomes from your systems analysis, emphasizing critical constraints, data characteristics, and any chaos-theory factors.
   - Ensure the proposed design ideas directly address these insights.

2. **Define System Requirements:**

   - Translate analysis findings into measurable design requirements (e.g., performance, reliability).
   - Discuss user-centric needs if applicable (e.g., ease of use, interpretability, security).

3. **High-Level Architecture:**

   - Propose an architectural diagram outlining the flow of data and interaction among components.
   - Label each module and briefly describe its responsibility (extraction, transformation, modeling, etc.).
   - Mention how *systems engineering* principles shaped these structural decisions.

4. **Addressing Sensitivity and Chaos:**

   - Outline how your design addresses high-sensitivity variables or chaotic factors (e.g., feedback loops, random or unexpected data variations).
   - If relevant, propose monitoring or error-handling routines for unanticipated conditions.

5. **Technical Stack and Implementation Sketch:**

   - Recommend tools, frameworks, or coding languages (such as Python or R) along with justification.
   - Provide a brief plan on how components will be implemented and integrated, referencing any chosen design patterns.

6. **Deliverables:**

   - A **System Design Document** in *PDF format*, placed in a `Workshop_2_Design` folder within your GitHub repository.
   - An updated `README.md` explaining the workshop's development process, referencing the architecture diagrams, and linking to the final PDF.

Deadline

Saturday, May 10th, 2025, 8:00
Late work may be subject to grading penalties as outlined in course policy.

Notes

- The report must be submitted in **English**, **PDF format**, and should reference your *analysis outcomes* from Workshop #1.

- Include diagrams, references, and any external sources used in your design approach.

- Pay particular attention to how **chaos theory** and **sensitivity analysis** inform better design decisions.

Good luck, and continue building your skills as a **systems engineer** applying thorough analysis and design methodologies for complex data challenges!