Design Notebook Guidelines and Standards

The following description provides the basic document organization, and *required* information. See the example artifacts file to determine exactly how to layout and format your document. The example artifacts provide very important information about content for each part or section of the document. Remember, all headings must be followed by text (not another heading).

- **Title page**
- **Abstract**
- **Frontmatter (table of contents for sections, figures and tables)**
- **Introduction**
  - Project purpose and goals
  - Design approach (SSA/SD is required)
  - Traceability approach
  - Background
  - Organization of this document
- **Requirements analysis (summarize major requirements)**
- **Design Representation**
  - Context diagram
  - Steps 1-2: Data flow diagrams (augmented with 1-3 P-specs)
  - Step 3: Transaction analysis
    - Divides a complete system DFD from Steps 1 and 2 into clusters or parts.
    - Purpose is to separate the components of a large design into a network of cooperating subsystems.
    - Output is to identify the event-stimulus/activity/response-effect transactions.
    - Transactions should correlate with the parts (e.g., withdrawal at an ATM).
    - This activity should identify important test cases that are used to verify a transaction is working correctly. *Place a description of any such test cases in Appendix D.*
  - Transform analysis
    - Non-hierarchial diagram with central transform (optional) called NHDFD
    - Structure chart
  - Design decision log (Optional [may contain summary remarks])
- **References (all references must be cited in the main body of the test)**
- **Glossary (may be part of the introduction subsection [but is preferred to be here])**
- **Appendix A: Data dictionary**
- **Appendix B: Project schedule**
- **Appendix C: Requirements traceability** (with DFD column completed)
- **Appendix D: Identified test cases** (optional)

Here is an example of how the material should be organized (based on SSA/SD [see Budgen text Chapter 10 and pages 97 - 111, and/or see Griffiths book for information about SSA/SD]):

1. **Introduction**

1.1. Project Purpose and Goals (problem description)

1.2. Design Approach (include brief outline of methodology and any tailoring)

1.3. Traceability Approach

1.4. Background

1.5. Organization of this document

2. **Requirements Analysis** (break out functional and non-functional requirements)

2.1. Top-level Requirement

2.1.1. Associated Low-level requirement(s)

2.2. Top-level Requirement

2.2.1. Associated Low-level requirement(s)

2.3. Top-level Requirement

2.3.1. Associated Low-level requirement(s)

3. Design Representation

3.1. Context Diagram (with description)

3.2. Level 1 Data Flow Diagram and P-specs (with description)

3.3. Level 2/3 Data Flow Diagrams (with P-specs as necessary)

3.4. Transaction Analysis (with description)

3.4.1. Partitions of the System DFD

3.4.2. Identified Transactions

3.5. Transform Analysis (includes NHDFD optionally and structure charts)

3.5.1. Non-hierarchial Data-Flow Diagram with Central Transform

3.5.2. Structure Chart (not optional)

3.6. Design Decision Log (contains major design decisions and rationale for each)

4. References

5. Glossary

6. Appendix A: Data Dictionary

7. Appendix B: Project Schedule

8. Appendix C Requirements Traceability Matrix

9. Appendix D: Identified Test Cases

An Example Introduction:

This project primarily involved modifications to an existing program. Therefore, a tailored Structured System Analysis/Structured Design (SSA/SD) process was followed which included reverse engineering, as well as forward engineering activities. The reverse engineering activities involved analysis of the existing CSPN code, and the development of a level 1 data flow diagram (DFD) for the existing system. A top-down SSA/SD process was then used to forward engineer only those parts of the existing CSPN system that required modification.

A context diagram was produced for the overall CSPN system, and additional level 1 and level 2 logical data flow diagrams (DFDs) were generated for any new functions, or functions that were significantly modified.

The existing legacy transactions were analyzed in terms of events, stimulus, activities, and response. Based on this analysis, a top-level structure chart was then generated for the CSPN system, and the modified functions were identified. The top-level structure chart was refined to identify the specific changes required to the modified functions using pseudocode and/or C code constructs. These code modifications were then integrated and tested with the existing legacy code.

SSA/SD Structured System Analysis and Structured Design Method Overview

Steps 1-2: Structured systems analysis (see Budgen Figure 10.5)

* Level 0 = context diagram.
* Level 1 = top level DFD.
* Level 2 = explosion of level 1 DFD bubbles.
* Level 3 = use this level as appropriate.

Step 3: Transaction analysis step and has five basic components:

1. The **event** in the systems environment that causes the transaction to occur;
2. The **stimulus** that is applied to the system to inform it about the event;
3. The **activity** that is performed by the system as a result of the stimulus;
4. The **response** that this generates in terms of output from the system;
5. The **effect** that this has upon the environment;

Therefore, you will need to identify a simple but comprehensive example of a transaction (see page 218 and Figure 10.8 of Budgen) that accounts for all of the five items described above. This will help you to define a good set of test cases. There should be 4 transactions identified. These will be your main starting points for the demonstration.

Step 4: Identify the central transform in the DFD:

You do not have to redraw the DFDs but if you add a "boss" bubble redraw showing where the boss fits. Which will allow you to develop a hierarchical structure chart. Develop structure charts for all of your level 1-2 DFDs.

Step 5: Merge the Structure Charts

The objective of this step is to produce a single structure chart (see Figures 10.23, 24 of Budgen).