**Software Design Specification**

When using this template for your project, you may find information in <http://cse.unl.edu/~cbourke/CSCE156/assignments/IEEE1016-2009.pdf> helpful, as this template is a customization of IEEE1016-2009 for this course.

The Software Design Specification (SDS) sections provide you with guidelines related to the structure and the contents of SDS document. The Software Design Specification document includes at least these sections.

For the project, your team may have good reasons for wanting to deviate from this proposed outline. If a section is not applicable in your case, do not delete it; instead, give the topic heading and write "Not applicable".

You will note that there is some overlap in the content between different documents (i.e. the User Requirements Specification Document and the Software Design Specification Document.) This redundancy allows each document to stand on its own.

**The Software Design Specification Outline**

**1. Introduction**

**1.1 Purpose of this document**

Full description of the main objectives of the SDS document.

**1.2 Scope of the development project**

This will be similar to what was written in the SRS.

**1.3 Definitions, acronyms, and abbreviations**

Be sure to alphabetize!

**1.4 References**

This section will include technical books and documents related to design

issues. Be certain that the references you give are complete and in

the appropriate format.

**1.5 Overview of document**

A short description of how the rest of the SDS is organized and what can be

found in the rest of the document. This is not simply a table of contents.

Motivate and briefly describe the various parts!

**2. Meta-Architecture**

You will reference a separate [Meta-Architecture Document](../lectures/MetaArchitectureDocumentTemplate.docx) for this. Meta-Architecture includes all of the decisions that affect the design but that are not the design. Any decisions that influence the design are potentially Meta-Architecture. It is also a living document for a team.

For course purposes, we also have a [Meta-Arch rubric](../lectures/MetaArchitectureRubric.docx).

**2. Conceptual Architecture**

Conceptual Architecture is “Context” for the system’s use.

For course purposes, we also have a [rubric](../lectures/ConceptualArchitectureRubric.docx).

**3.1 Overview of modules / components**

This subsection will introduce the various components and subsystems.

**3.2 Structure and relationships**

Make clear the interrelationships and dependencies among the various components. Structure charts can be useful here. A simple finite state machine can be useful in demonstrating the operation of the product. Include explanatory text to help the reader understand any charts.

**3.3 User interface issues**

This section will present the main principles of the product's user interface. Use the personas defined in section 2.1 of your SRS to make specific examples. This section should not touch on technical details. You may want to include sketches and specific text messages.

**3. Logical Architecture**

Lines and boxes are a software architect’s best friend. UML can help with that, if used appropriately. LA includes “high-level design”, “detailed design” and for some components, may extend even to the code.

For course purposes, we also have a [rubric](../lectures/LogicalArchitectureRubric.docx).

**3.1 Component template description**

This section is not part of your design. It is the pattern you will use to describe the components given in subsections 3.2 - 3.n. Expect to put major system patterns in your Meta-Architecture Document and refer to them from there. Each part of the template will be identified by a label. Here in 3.1, you must briefly explain the purpose of each point. To make the presentation clear, use a table or bullet list. You may adapt the template suggested below to your particular needs (although deviations from the suggested template should be minimal and well motivated).

**3.2 X Component (or Class or Function ...)**

Use exactly the template you define in 3.2. If a part of the template is not applicable, then mark it N/A rather than omitting it.

**3.3 Y Component (or Class or Function ...)**

...

**3.n Z Component (or Class or Function ...)**

**4.0 Execution Architecture**

Define the runtime environment, processes, deployment view.

**4.0 Reuse and relationships to other products**

For teams doing enhancement work, reuse is an important issue. Most enhancement work should focus on extending, rather than replacing, the design and product development from earlier semesters. For teams doing new development, reuse can also be an important strategy. In some cases, there is freeware that could be incorporated. In other cases, there are existing modules or classes that could be adapted. Another possibility is the use of special tools that produce open source results and thus permissible under the terms of this course.

This section should include the following subsections as appropriate:

* how reuse is playing a role in your product design
* how reuse is playing a role in your product implementation (and the motivation for changes)
* if you are not reusing material that is available, then give motivation for why it is being thrown out.

**5.0 Design decisions and tradeoffs**

Use this section to motivate any decisions that will help the reader understand

the design that your team is using. This section can also capture good ideas

that were abandoned and the reasons for leaving them out of the design.

**6.0 Pseudocode for components**

**7.0 Appendices (if any)**

**SDS component template**

The template given below suggests a reasonable structure for giving a thorough

description of each component described in Part 3 of the SDS. The specific

information depends in part on the design approach. Your team must adapt this

template to your needs and describe it in section 3.1 of your SDS.

|  |  |
| --- | --- |
| Identification | The unique name for the component and the location of the  component in the system. |
| Type | A module, a subprogram, a data file, a control procedure, a class, etc |
| Purpose | Function and performance requirements implemented by the design component, including derived requirements. Derived requirements are not explicitly stated in the SRS, but are implied or adjunct to formally stated SDS requirements. |
| Function | What the component does, the transformation process, the specific inputs that are processed, the algorithms that are used, the outputs that are produced, where the data items are stored, and which data items are modified. |
| Subordinates | The internal structure of the component, the constituents of the component, and the functional requirements satisfied by each part. |
| Dependencies | How the component's function and performance relate to other  components. How this component is used by other components. The other components that use this component. Interaction details such as timing, interaction conditions (such as order of execution and data sharing), and responsibility for creation, duplication, use, storage, and elimination of components. |
| Interfaces | Detailed descriptions of all external and internal interfaces as well as of any mechanisms for communicating through messages, parameters, or common data areas. All error messages and error codes should be identified. All screen formats, interactive messages, and other user interface components (originally defined in the SRS) should be given here. |
| Resources | A complete description of all resources (hardware or software) external to the component but required to carry out its functions. Some examples are CPU execution time, memory (primary, secondary, or archival), buffers, I/O channels, plotters, printers, math libraries, hardware registers, interrupt structures, and system services. |
| Processing | The full description of the functions presented in the Function subsection. Pseudocode can be used to document algorithms, equations, and logic. |
| Data | For the data internal to the component, describes the representation method, initial values, use, semantics, and format. This information will probably be recorded in the data dictionary. |