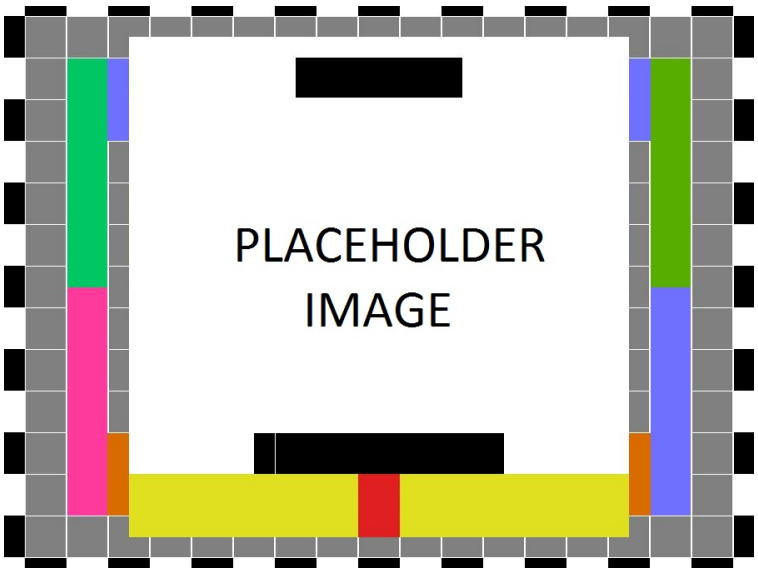
Department of Computer Science & Engineering
The University of Texas at Arlington

Architectural Design Specification
CSE 4316: Senior Design I
Fall 2015



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0.1	10.01.2015	GH	document creation
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1 INTRODUCTION

The "Back Burner Brew" is built with the sole purpose of brewing large batch of beer in the home environment. This product provides home brewers with a low-cost electric home brewing system that allow them to have precise control over the brewing process. The brewing process can be automated with the help of micro-controllers like the ESP32 which is then hosted to a local website or an app interface.

ESP32 is a micro-controller that can receive data such as current temperature of the water or mash from the heat sensors located inside the kettles which can be converted to either analog or digital input. The heating coil can be controled using the input from the user as per their desired either to increase or to decrease the temperature. The electric pump can also be controlled by the user through micro-controllers to regulate the flow of the water in the kettles. The user will be able to communicate with the brewing system through a web interface or app interface.

The user should expect to input desired commands, controls, and specific settings such as temperature and length of time by a easily accessible touchscreen. The touchscreen will be attached to a Raspberry Pi that will handle communications between the user and the various sensors and heating elements. The user can expect that whichever temperature they set for their desired application, that the temperature will remain constant.

The intended audiences for this product would be home brewers or person interested in brewing beer only. Provided that the user manual would be present in the product, any person who wants to brew beer in his local environment can easily use this product. This product is made focusing on how effortless can the brewing process gets simply with the use of micro-controller.

2 System Overview

This section should describe the overall structure of your software system. Think of it as the strategy for how you will build the system. An architectural "layer" is the top-level logical view, or an abstraction, of your design. Layers should be composed of related elements of similar capabilities, and should be highly independent of other layers, but should have very clearly defined interfaces and interactions with other layers. Each layer should be identified individually and should be unique as to its function and purpose within the system. This section should also contain the high-level block diagram of the layers, as shown in the example below, as well as detailed descriptions of the functions of each layer.

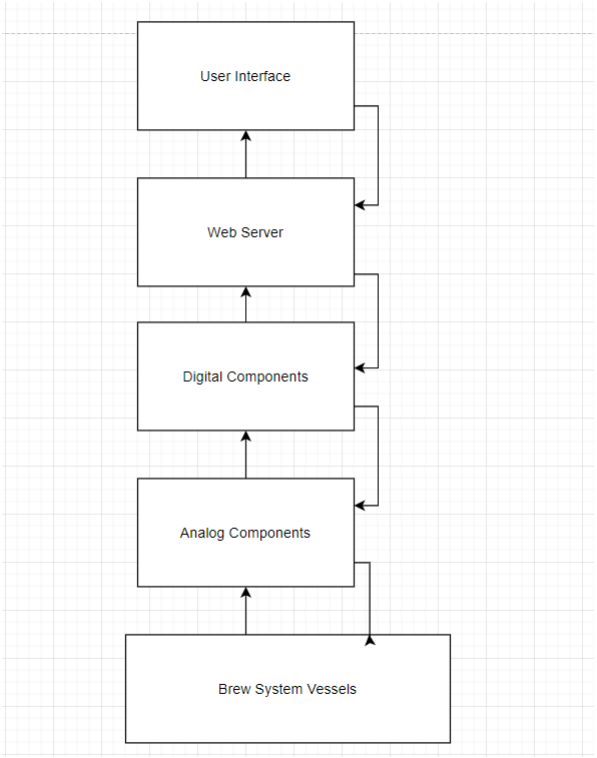

Figure 1: Simple ADS

2.1 Layer X Description

Each layer should be described separately in detail. Descriptions should include the features, functions, critical interfaces and interactions of the layer. The description should clearly define the services that the layer provides. Also include any conventions that your team will use in describing the structure: naming conventions for layers, subsystems, modules, and data flows; interface specifications; how layers and subsystems are defined; etc.

2.2 Layer Y Description

Each layer should be described separately in detail. Descriptions should include the features, functions, critical interfaces and interactions of the layer. The description should clearly define the services that the layer provides. Also include any conventions that your team will use in describing the structure: naming conventions for layers, subsystems, modules, and data flows; interface specifications; how layers and subsystems are defined; etc.

2.3 LAYER Z DESCRIPTION

Each layer should be described separately in detail. Descriptions should include the features, functions, critical interfaces and interactions of the layer. The description should clearly define the services that the layer provides. Also include any conventions that your team will use in describing the structure: naming conventions for layers, subsystems, modules, and data flows; interface specifications; how layers and subsystems are defined; etc.

3 Subsystem Definitions & Data Flow

This section breaks down your layer abstraction to another level of detail. Here you grapically represent the logical subsytems that compose each layer and show the interactions/interfaces between those subsystems. A subsystem can be thought of as a programming unit that implements one of the major functions of the layer. It, therefore, has data elements that serve as source/sinks for other subsystems. The logical data elements that flow between subsystems need to be explicitly defined at this point, beginning with a data flow-like diagram based on the block diagram.

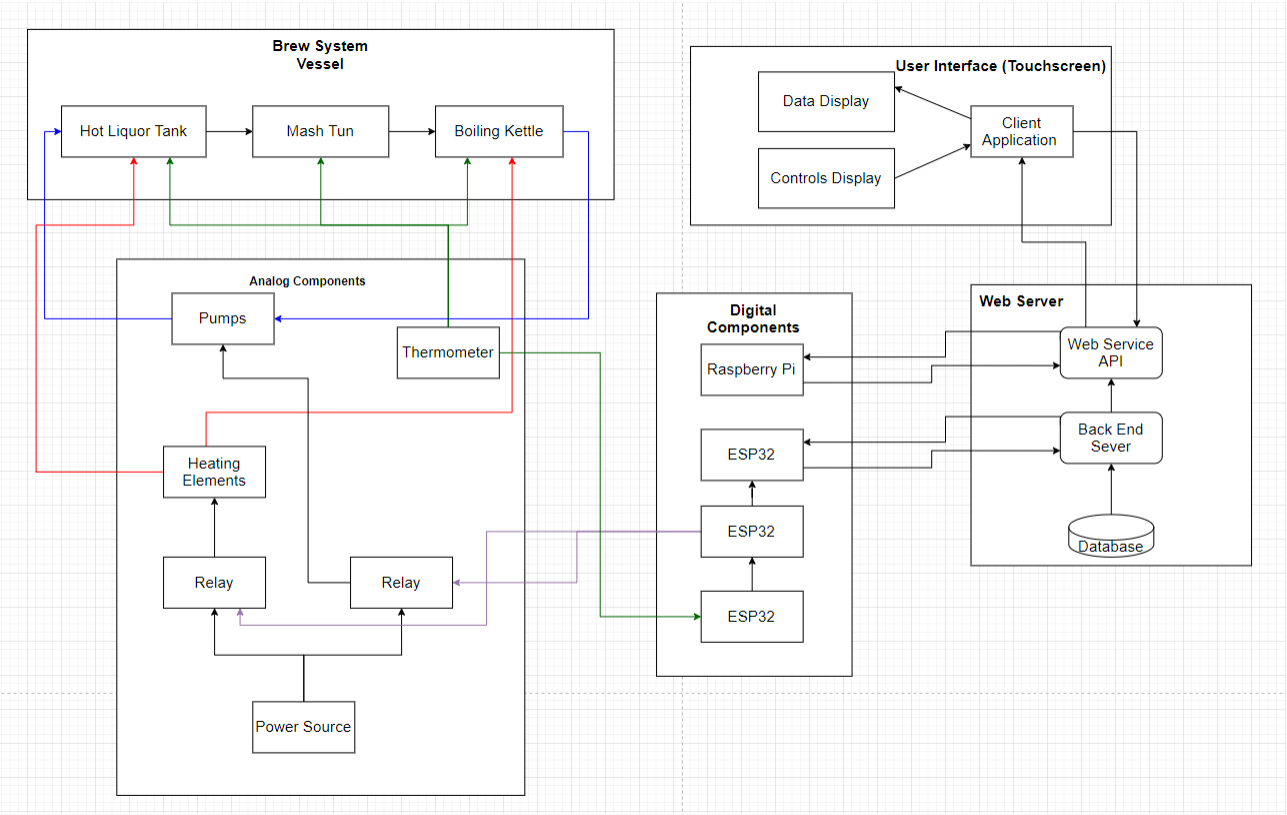

Figure 2: Subsystem ADS

4 X Layer Subsystems

In this section, the layer is described in some detail in terms of its specific subsystems. Describe each of the layers and its subsystems in a separate chapter/major subsection of this document. The content of each subsystem description should be similar. Include in this section any special considerations and/or trade-offs considered for the approach you have chosen.

4.1 Subsystem 1

This section should be a general description of a particular subsystem for the given layer. For most subsystems, an extract of the architectural block diagram with data flows is useful. This should consist of the subsystem being described and those subsystems with which it communicates.

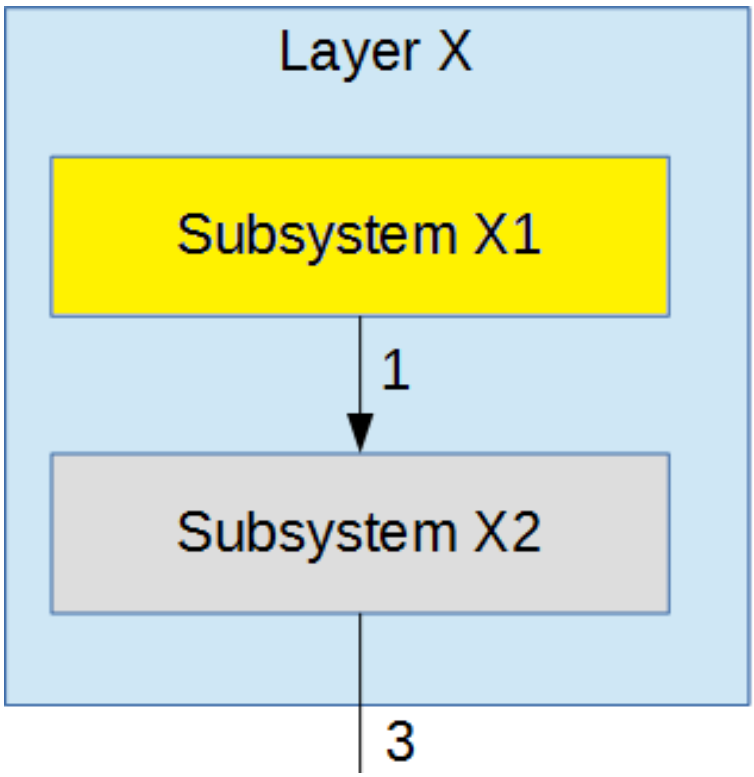

Figure 3: Example subsystem description diagram

4.1.1 Assumptions

Any assumptions made in the definition of the subsystem should be listed and described. Pay particular attention to assumptions concerning interfaces and interactions with other layers.

4.1.2 Responsibilities

Each of the responsibilities/features/functions/services of the subsystem as identified in the architectural summary must be expanded to more detailed responsibilities. These responsibilities form the basis for the identification of the finer-grained responsibilities of the layer's internal subsystems. Clearly describe what each subsystem does.

4.1.3 Subsystem Interfaces

Each of the inputs and outputs for the subsystem are defined here. Create a table with an entry for each labelled interface that connects to this subsystem. For each entry, describe any incoming and outgoing

data elements will pass through this interface.

Table 2: Subsystem interfaces

ID	Description	Inputs	Outputs
#xx	Description of the interface/bus	input 1 input 2	output 1
#xx	Description of the interface/bus	N/A	output 1

4.2 SUBSYSTEM 2

Repeat for each subsystem

4.3 SUBSYSTEM 3

Repeat for each subsystem

5 Y Layer Subsystems

In this section, the layer is described in some detail in terms of its specific subsystems. Describe each of the layers and its subsystems in a separate chapter/major subsection of this document. The content of each subsystem description should be similar. Include in this section any special considerations and/or trade-offs considered for the approach you have chosen.

5.1 Subsystem 1

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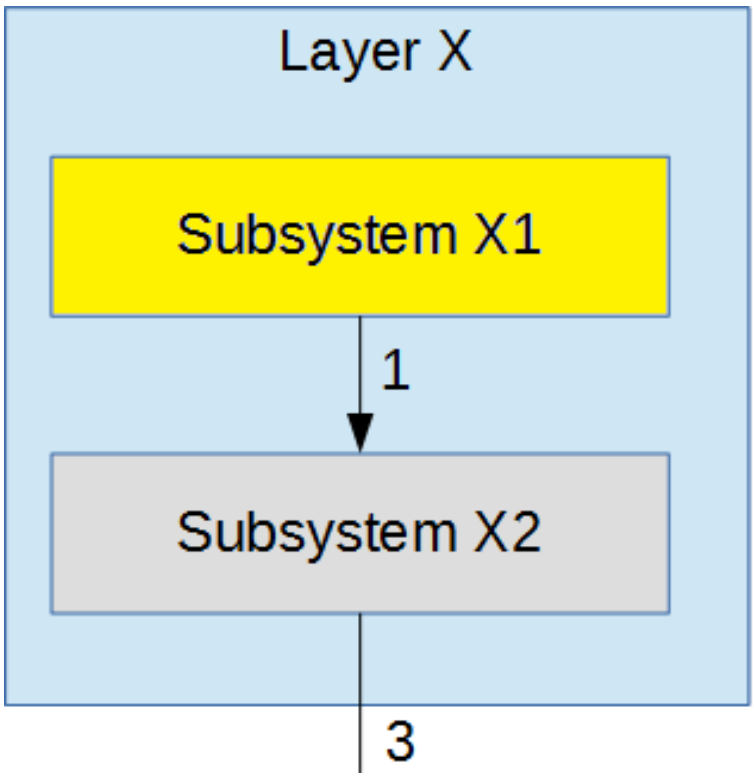

Figure 4: Example subsystem description diagram

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5.2 SUBSYSTEM 2

Repeat for each subsystem

5.3 SUBSYSTEM 3

Repeat for each subsystem

6 Z Layer Subsystems

In this section, the layer is described in some detail in terms of its specific subsystems. Describe each of the layers and its subsystems in a separate chapter/major subsection of this document. The content of each subsystem description should be similar. Include in this section any special considerations and/or trade-offs considered for the approach you have chosen.

6.1 Subsystem 1

This section should be a general description of a particular subsystem for the given layer. For most subsystems, an extract of the architectural block diagram with data flows is useful. This should consist of the subsystem being described and those subsystems with which it communicates.

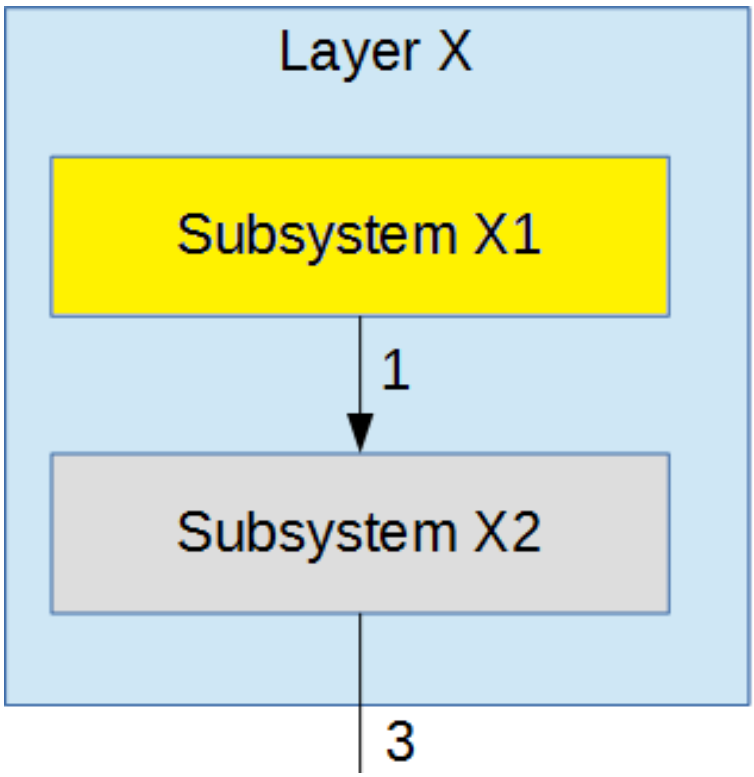

Figure 5: Example subsystem description diagram

6.1.1 Assumptions

Any assumptions made in the definition of the subsystem should be listed and described. Pay particular attention to assumptions concerning interfaces and interactions with other layers.

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6.1.3 Subsystem Interfaces

Each of the inputs and outputs for the subsystem are defined here. Create a table with an entry for each labelled interface that connects to this subsystem. For each entry, describe any incoming and outgoing

data elements will pass through this interface.

Table 4: Subsystem interfaces

ID	Description	Inputs	Outputs
#xx	Description of the interface/bus	input 1 input 2	output 1
#xx	Description of the interface/bus	N/A	output 1

6.2 SUBSYSTEM 2

Repeat for each subsystem

6.3 SUBSYSTEM 3

Repeat for each subsystem

References