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PowerEnJoy, Design Document

Table of Contents

1 Introduction 3

1.1 Purpose 3

1.2 Scope 3

1.3 Definitions, Acronyms, Abbreviations 4

1.4 Reference Documents 5

1.5 Document Structure 5

2 Architectural Design 6

2.1 Overview: High level components and their interaction 6

2.2 Component view 6

2.3 Deployment view 6

2.4 Runtime view 6

2.5 Component interfaces 6

2.6 Selected architectural styles and patterns 6

2.7 Other design decisions 6

3 Algorithm Design 7

4 User Interface Design 8

5 Requirements Traceability 9

6 Effort spent 10

7 References 11

# Introduction

## Purpose

FROM WKIPEDIA:

A **software design description** (aka **software design document** or **SDD**) is a written description of a [software](https://en.wikipedia.org/wiki/Software) product, that a software designer writes in order to give a [software development](https://en.wikipedia.org/wiki/Software_development) team overall guidance to the architecture of the software project. An SDD usually accompanies an architecture diagram with pointers to detailed feature specifications of smaller pieces of the design. Practically, the description is required to coordinate a large team under a single vision, needs to be a stable reference, and outline all parts of the software and how they will work.

The SDD usually contains the following information:

1. The [*data design*](https://en.wikipedia.org/wiki/Data-driven_design) describes structures that reside within the software. Attributes and relationships between [data objects](https://en.wikipedia.org/wiki/Data_object) dictate the choice of [data structures](https://en.wikipedia.org/wiki/Data_structures).
2. The *architecture design* uses information flowing characteristics, and maps them into the program structure. The transformation mapping method is applied to exhibit distinct boundaries between incoming and outgoing data. The data flow diagrams allocate control input, processing and output along three separate modules.
3. The[*interface design*](https://en.wikipedia.org/wiki/Interface_design) describes internal and external program interfaces, as well as the design of human interface. Internal and external interface designs are based on the information obtained from the analysis model.
4. The[*procedural design*](https://en.wikipedia.org/wiki/Procedural_design) describes structured programming concepts using graphical, tabular and textual notations. These design mediums enable the designer to represent procedural detail, that facilitates translation to code. This blueprint for implementation forms the basis for all subsequent software engineering work.

FROM TheraWii EXAMPLE:

The purpose of this document is to describe the implementation of the TheraWii Software described in the

TheraWii Business Requirments. The TheraWii Software is designed to create and perform physical therapy

activities.

## Scope

FROM TheraWii EXAMPLE:

This document describes the implementation details of the TheraWii Software. The software will consist of

a two major functions. First to design therapies that are made up of tasks, and the second to perform the

therapies. This document will not specify any actual therapies or the testing of the software.

## Definitions, Acronyms, Abbreviations

FROM TheraWii EXAMPLE:

1.3.1 Physical Therapy

Posture

The orientation of any body segment relative to the gravitational vector. It is an angular measure

from the vertical [1].

Balance

The dynamics of body posture that prevents falling. It is related to the inertial forces acting on

the body and the inertial characteristics of body segments [1].

Center of Mass (COM)

A specific point at which the system’s mass behaves as if it were concentrated

[1].

Center of Pressure (COP)

The point location of the vertical ground reaction force vector. It represents

a weighted average of all the pressures over the surface of the area that is in contact with the ground.

It is also called the Center of Balance (COB) [1].

1.3.2 Nintendo Wii

Wii Remote

Device that communicates through Bluetooth wireless protocol to the Nintendo Wii Gam-

ing System. Data communicated includes button press and releases, accelerometer readings, and an

Infrared (IR) LED pointing system.

Wii Balance Board

Device that communicates the COP through Bluetooth wireless protocol to the Nin-

tendo Wii Gaming System.

1.3.3 Software

Therapy

A series of tasks that is completed in one session.

Session

A given time in which a user completes a therapy.

Task

A subunit of a therapy that has an objective with success and fail criteria.

## Reference Documents

## Document Structure

Explain what chapters from 2 to 5 contain.

# Architectural Design

## Overview: High level components and their interaction

FROM TheraWii EXAMPLE:

- Description of the problem

- Technologies used

- System architecture (list components, informal)

- System operations (sequence diagram example, possibly involving all the components)

## Component view

High level class diagram of the main classes (that are the components, probably).

Diagram that shows the interactions between components.

## Deployment view

Deployment units:

- App

- Server

- Car program

Diagram that shows their interactions.

## Runtime view

Looooots of sequence diagrams.

## Component interfaces

Components class diagrams, very detailed. Text explanations of all classes: what the class does, what its methods do, design constraints, permormance issues…

## Selected architectural styles and patterns

Two tiers, event-based, MVC…

## Other design decisions

Maybe data model (class diagrams, Object Relationship diagrams) and data storage (ER diagrams, SQL stamements for tables creation).

# Algorithm Design

- GPS usage (not sure)

- Search for near cars:

1. App asks server for near cars and sends it its location;
2. Server retrieves cars locations quickly thanks to some spatial data structures (https://en.wikipedia.org/wiki/Spatial\_database);
3. Server sends the locations to the app;
4. App is happy.

- Search for near parkings: similar to search for near cars.

# User Interface Design

All the screens!

How to go from a screen to another.

Description of each screen.

Some scenario examples.

# Requirements Traceability

Table with the following columns:

- Requirement

- Description

- Design reference (all the references in this document that together satisfy the requirement).

# Effort spent

# References