



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA

---

## SOFTWARE REQUIREMENTS SPECIFICATION

---

PROJECT NAME: ARCANE ARCADE

CLIENT: TONY VD LINDEN

TEAM NAME: TERABITES

### TEAM MEMBERS

NG Maluleke	D Mulugisi	C Nel	LE Tom
13229908	13071603	14029368	13325095

May 21, 2016

# Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>Vision</b>	<b>2</b>
<b>3</b>	<b>Background</b>	<b>2</b>
<b>4</b>	<b>Architecture Requirements</b>	<b>3</b>
4.1	Access channel requirements . . . . .	3
4.2	Quality requirements . . . . .	3
4.3	Integration requirements . . . . .	3
4.4	Architecture constraints . . . . .	4
4.4.1	Technologies . . . . .	4
4.4.2	Architectural patterns/frameworks . . . . .	4
<b>5</b>	<b>Functional requirements and application design</b>	<b>5</b>
5.1	Use case prioritization . . . . .	5
5.2	Use case/Services contracts . . . . .	5
5.3	Required functionality . . . . .	5
5.4	Process specifications . . . . .	5
5.5	Domain Model . . . . .	5
<b>6</b>	<b>Open Issues</b>	<b>6</b>

## 1 Introduction

The project is called *Arcane Arcade*, which references the esoteric language users will have to use, as well as the gamification approach to try and make it as fun as possible.

## 2 Vision

The vision is to provide a fun and easily accessible platform that can be used to gauge the programming aptitude and capabilities of existing or future software developers using a custom esoteric programming language.

## 3 Background

There are many models in which to ascertain whether a prospective employee has the required skills or aptitude to be a valuable software developer. On-line assessments are easy to execute, but lack the insight provided by manual and proprietary testing of how the candidate reasons. Manual and proprietary testing on the other hand is time-consuming and expensive to execute. In addition, company proprietary tests become stale and are leaked into the industry reducing the value tests may have.

BBD has thus opted to use an esoteric programming language in order to test the skills and aptitude of prospective employees, regardless of their programming experience or preferred programming language. A mobile and online platform is thus required to test prospective employees while keeping the tests fun by using gamification principles. The tests should also indicate in which area the user is likely to be better suited, by looking at how the user completed the challenges, such as whether the user used any hints.

## 4 Architecture Requirements

### 4.1 Access channel requirements

The system requires two interfaces:

- Web interface
- Android app (Could also be a mobile website)

### 4.2 Quality requirements

The following quality aspects needs to be addressed:

- **Performance:** Performance is the most important quality requirement for this application. This requirement pertains to how fast the application responds to certain actions within a set time interval. The application will be compiler based and since compiler converts the program to native code of the target machine (object code), faster performance can be expected.
- **Scalability:** The system will be used by minimum of one administrator and the number of players (potential employees) is infinitely.
- **Security:** Passwords will be hashed with the SHA512 hashing algorithm. Authentication will be achieved via the Authentication module of the website. Players need to log in with a valid username before they can use any functionality of the website.
- **Reliability:** An automatic partial dump backup can be done everyday at 00:00 and each back up will be kept for a week. On top of this a full dump will be done once a week and will be kept for at most 3 weeks. Alternatively the backup can be done by an external program.
- **Audibility:** Every change should be logged and the person responsible for that log will be recorded. This will allow the administrators to track the users information/data.
- **Maintainability:** Maintainability is amongst the most important quality requirements for the application. Since the future of the application may require total change of the esolang developers should be able to easily and relatively quickly change aspects of the functionality the system provides or add new functionality to the system.

### 4.3 Integration requirements

## 4.4 Architecture constraints

### 4.4.1 Technologies

- HTML and JavaScript for the front end functionality for both the browser and game application
- Java will be used for backend functionality.
- PostgreSQL for persistence because it is a mature, efficient and reliable relational database implementation which is available across platforms and for which there is a large and very competent support community.

### 4.4.2 Architectural patterns/frameworks

**4.4.2.1 Three-tier Architecture** The main reason for using three-tier architecture is to allow any of the three tiers to be upgraded or replaced independently, when changes in requirements or technology require such upgrades or replacements. Thus addressing **maintainability** the application.

- **The three tiers in a three-tier architecture are:**

- **Presentation-tier:** This will be represented the front-end of the management or maintenance portal which will communicate with other tiers by sending results to the browser and other tiers in the network.
- **Application-tier:** This is the logical tier which provides the application's functionality.
- **Data tier:** All the data persistence mechanisms which will be used. Data in this tier is kept independent of application servers or business logic.

**4.4.2.2 Authentication Enforcer pattern** This pattern will help us improve security of the system while keeping the scalability and performance well maintained since the Authentication Enforcer pattern provides a consistent and structured way to handle authentication and verification of requests across actions within Web-tier components and also supports MVC architecture without duplicating the code.

## **5 Functional requirements and application design**

### **5.1 Use case prioritization**

#### **5.1.0.3**

### **5.2 Use case/Services contracts**

#### **5.2.0.4**

### **5.3 Required functionality**

#### **5.3.0.5**

### **5.4 Process specifications**

#### **5.4.0.6**

### **5.5 Domain Model**

#### **5.5.0.7**

## 6 Open Issues

6.0.0.8