**COMP1551 - Application Development**

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# 1. Introduction

## 1.1 Purpose

## This Software Requirements Specification (SRS) document defines the functional and non-functional requirements for the Geography Quiz Game application, following established software engineering practices as outlined by Wiegers and Beatty (2013). The document serves as a comprehensive guide for understanding the system's capabilities, constraints, and expected behavior.

## The Geography Quiz Game is designed to provide an interactive educational platform where users can create, manage, and participate in geography-based quizzes featuring multiple question types including multiple choice, open-ended, and true/false questions.

## 1.2 Project Scope

The Geography Quiz Game is a desktop Windows Forms application developed in C# that enables users to engage with geography content through two primary operational modes:

**Mode 1 - Create a Game:** Users can add, edit, and delete quiz questions of three distinct types. The system supports variable numbers of questions stored in memory using object-oriented data structures. Questions are organized as objects implementing encapsulation, abstraction, and inheritance principles.

**Mode 2 - Play:** Users can answer quiz questions with real-time scoring and timing functionality. The system evaluates responses, calculates overall performance metrics, tracks completion time, and optionally displays correct answers upon quiz completion.

The application scope includes comprehensive question management, flexible answer validation (supporting alternative correct answers), performance tracking, and user-friendly interfaces for both quiz creation and gameplay. The system operates entirely in memory without persistent storage, requiring users to recreate questions after application restart.

# **2. Overall Description**

## 2.1 Product Perspective

The Geography Quiz Game operates as a standalone Windows desktop application built using C# WinForms technology. The system functions independently without requiring external databases or network connectivity, utilizing object-oriented programming principles to manage quiz content through in-memory data structures. The application implements a modular architecture where question types inherit from a base Question class, demonstrating polymorphic behavior through specialized answer validation methods.

## 2.2 Users

The primary user base consists of educators, students, and geography enthusiasts seeking interactive learning tools. Educators can create customized quizzes tailored to specific curriculum requirements, while students benefit from self-assessment opportunities and immediate feedback mechanisms. The application accommodates varying skill levels through flexible question difficulty and comprehensive scoring systems that provide detailed performance analytics.

## 2.3 Operational Environment

## The system operates on Windows desktop environments requiring .NET Framework support for C# WinForms applications. The application functions as a standalone executable without external database dependencies, utilizing in-memory data structures for question storage and management. System requirements include standard Windows desktop specifications with sufficient memory allocation for question collections and user interface rendering.

## 2.4 Constraints

The primary system constraint involves the absence of persistent data storage mechanisms. All quiz content exists solely in application memory, resulting in complete data loss upon program termination. This design limitation requires users to recreate quiz content for each application session, though it simplifies deployment and eliminates database dependency requirements.

# **3. System Specifications**

**3.1 Overall**

The **Geography Quiz Game** is an interactive Windows Forms desktop application developed in **C# (.NET 9.0)** that provides a complete platform for creating and playing geography quizzes.  
The system is designed to **demonstrate advanced object-oriented programming (OOP)** and deliver an engaging learning experience with **real-time scoring and timing**.

**Key System Characteristics**:

* **Standalone & In-Memory**
  + Operates without database or internet connection
  + All quiz data is stored in **memory** using List<Question> and cleared on exit
* **Two Main Modes**
  + **Create Game** – Users can add, edit, and delete questions in three formats
  + **Play Game** – Users can take quizzes, receive instant scoring, and track completion time
* **Three Question Types**
  + Multiple Choice (4 options, 1 correct)
  + True/False (boolean answer)
  + Open-Ended (supports alternative answers like “UK” = “United Kingdom”)
* **Material Design UI**
  + Built with **MaterialSkin.NET** for a modern and responsive user interface
* **Real-Time Scoring & Timing**
  + Tracks **total quiz** time
  + Displays **detailed performance analysis** and optional answer review
* **Sample Data**
  + Includes 10 pre-loaded questions for immediate testing and demonstration

**System Architecture**:

* **Presentation Layer** – Windows Forms with Material Design (Main Menu, Question Management, Quiz Gameplay)
* **Business Logic Layer** – QuizManager, ScoreManager, and TimeTracker manage quiz flow, scoring, and timing
* **Data Layer** – Question abstract class with polymorphic derived classes for each question type
* **Utility Layer** – Handles theming, sample data loading, and interface consistency

This architecture ensures **modularity, maintainability, and extensibility**, supporting easy integration of new question types or gameplay features in future versions.

# References

Wiegers, K., & Beatty, J. (2013). *Software Requirements* (3rd ed.). Microsoft Press.