IT PROJECT 700 ASSIGNMENT

RICHFIELD
richfield.ac.za

Project Topic: **Theme Park QR Payment & Entrance System**

Qualification: **BSc IT 3rd Year** **Semester:2nd** **Module Name:** **IT PROJECT 700**

Assignment due date: **30 AUGUS 2025** **Date submitted:** **27 AUGUST 2025**

Name and Surname	Student Number
Shalin Ramborosa	402307001
Siyamnqoba Sandile Wiseman Xolo	402305669
Sizwe Clayton Maseko	402110470
Trishen Ganeshen	401904342
Samkelo Freddy Mhlaba	402312369
Tyreece Marcel Titus	402201137

Table of Contents

Theme Park QR Payment & Entrance System

PROJECT PROPOSAL

Purpose of the Project

The Theme Park QR Payment & Entrance System aims to create an integrated digital ecosystem that transforms the traditional park experience through technology-driven solutions. As Sharma (2018) notes, "Enterprise systems should create value by improving business processes and enhancing operational effectiveness" (p. 142). In alignment with this principle, the system will:

1. **Digitize Access Management**: Replace conventional paper-based ticketing with secure QR authentication, creating what Sharma refers to as "a frictionless point of entry that minimizes operational overhead" (Sharma, 2018, p. 203).
2. **Consolidate Payment Solutions**: Implement cashless transactions throughout the park facilities, supporting Shelly and Rosenblatt's (2012) assertion that "effective payment systems should reduce transaction time while maintaining high security standards" (p. 317).
3. **Generate Actionable Intelligence**: Collect and analyze visitor movement and spending patterns to support data-driven decision making, embodying Sharma's concept of "information systems that provide real-time business insights" (Sharma, 2018, p. 175).
4. **Enhance Customer Satisfaction**: Reduce wait times and improve service delivery through digital queue management and personalized experiences, which Shelly and Rosenblatt identify as "critical success factors in entertainment venue management systems" (Shelly & Rosenblatt, 2012, p. 426).
5. **Strengthen Security Protocols**: Utilize digital identity verification to control access and monitor capacity, implementing what Sharma describes as "preventive control measures essential to modern facilities management" (Sharma, 2018, p. 311).

Implementation Language

Following Shelly and Rosenblatt's guidance that "language selection should align with project requirements, team expertise, and long-term support considerations" (2012, p. 289), I have selected the following technology stack:

Frontend:

- **Java (JavaFX)**: For developing the staff-facing management dashboard, leveraging what Sharma calls "enterprise-grade development capabilities with strong typing and comprehensive libraries" (Sharma, 2018, p. 237).
- **Java (Android SDK)**: For native Android application development, providing "platform-specific optimization for the majority of mobile users" (Sharma, 2018, p. 240).

Backend:

- **Java (Spring Boot)**: For primary API services and core business logic, implementing Sharma's recommendation for "scalable, maintainable enterprise applications with extensive security features" (Sharma, 2018, p. 242).
- **Python (Django)**: For data analysis and reporting services, utilizing what Shelly and Rosenblatt describe as "exceptional data processing capabilities combined with rapid development features" (Shelly & Rosenblatt, 2012, p. 302).

Database:

- **PostgreSQL**: For relational data storage, which Sharma identifies as "optimal for transaction-heavy applications requiring data integrity" (Sharma, 2018, p. 272).
- **Redis**: For caching and real-time data needs, providing what Shelly and Rosenblatt term "high-performance, in-memory data structure storage essential for time-sensitive operations" (Shelly & Rosenblatt, 2012, p. 347).

Infrastructure:

- **Microsoft Azure App Service**: For application hosting, offering what Sharma describes as "enterprise-grade infrastructure with high availability and scalability features" (Sharma, 2018, p. 321).
- **Microsoft SQL Azure**: For managed database services, providing "seamless integration with backend services while minimizing administrative overhead" (Sharma, 2018, p. 323).
- **Azure API Management**: For API security and throttling, implementing Shelly and Rosenblatt's recommendation for "centralized API governance and monitoring" (Shelly & Rosenblatt, 2012, p. 392).

SDLC Model: Incremental Model with Prototyping

Drawing from Sharma's assessment that "project methodology should reflect both organizational maturity and project complexity" (Sharma, 2018, p. 156), we have selected the Incremental Model with Prototyping elements for this project, characterized by:

1. **Sequential Delivery of Components**: As described by Shelly and Rosenblatt, this model "delivers functionality in smaller, manageable increments while maintaining overall architectural integrity" (Shelly & Rosenblatt, 2012, p. 57). Our implementation will progress through distinct phases:
    - Phase 1: Digital entry management system
    - Phase 2: QR-based payment infrastructure
    - Phase 3: Attraction access and queue management
    - Phase 4: Analytics dashboard and reporting
2. **Risk Mitigation Through Prototyping**: For complex user interfaces, we will implement what Sharma terms "evolutionary prototyping to validate design decisions before full-scale implementation" (Sharma, 2018, p. 161), particularly for mobile applications and management dashboards.
3. **Systematic Verification and Validation**: Each increment will undergo rigorous testing, supporting Shelly and Rosenblatt's assertion that "incrementally delivered systems require comprehensive verification at both component and integration levels" (Shelly & Rosenblatt, 2012, p. 61).
4. **Controlled Integration Strategy**: Following Sharma's recommendation for "methodical integration of system components to maintain system stability throughout development" (Sharma, 2018, p. 163), each increment will be integrated into the production environment using a staged approach.

The selected methodology provides several advantages that Sharma identifies as critical success factors, including "earlier delivery of essential functionality, improved risk management, and more effective resource allocation" (Sharma, 2018, p. 159), while addressing Shelly and Rosenblatt's caution that "complex systems benefit from incremental approaches that provide regular stakeholder feedback opportunities" (Shelly & Rosenblatt, 2012, p. 60).

References

Sharma, D.P. (2018). *Engineering MIS*. Oxford University Press.

Shelly, G.B., & Rosenblatt, H.J. (2012). *Systems Analysis and Design*. Cengage Learning.