# ArcadeTab: A Web-Based Tab Games and Drinks Billing Management System


## Abstract

The shift toward digital operations in the entertainment and gaming industry has brought forward the need for efficient and secure billing systems. This project seeks to address the challenges of manual billing within entertainment venues where customers often use multiple services such as gaming and refreshment purchases. The proposed system, ArcadeTab, is a web-based open tab and billing management solution that allows staff to register customers' ongoing sessions, record all services consumed and generate a final bill instantly upon checkout. By digitizing the process, the system aims to reduce human billing errors, minimize fraud, and improve customer experience through transparency and speed.


## Background

In recent years, there has been a significant global shift from cash-based to cashless transactions. This transformation has been driven by the rapid growth of digital payment technologies and changing consumer preferences for convenience, speed, and security. According to *Wisniewski et al. (2024)* in their study "Switching from Cash to Cashless Payments during the COVID-19 Pandemic and Beyond," the COVID-19 pandemic accelerated this trend across 22 European countries as consumers and businesses increasingly adopted digital payment solutions to minimize physical contact and improve efficiency.

This global movement toward cashless systems highlights the importance of digital billing and transaction tracking, especially in service-based industries. By adopting a digital "open tab" billing system, establishments such as Strike Arcade can align with these modern payment trends while ensuring transparency, accuracy, and improved customer experience.

In Kenya, the transition toward cashless payment systems has been accelerated by mobile money innovations such as M-Pesa and the increasing use of contactless transactions. Despite these advancements, cash remains dominant in many informal and entertainment sectors. Studies indicate that while a growing number of small and medium enterprises are adopting digital payment methods, manual billing and cash handling are still prevalent, leading to inefficiencies and potential revenue losses. Implementing a digital open-tab billing system would therefore align with Kenya's broader movement toward cashless operations while enhancing transparency and operational efficiency.

## Introduction

With the rise of digital transformation across all sectors, the entertainment and recreation industry has begun adopting modern technologies to streamline management and enhance service delivery. Traditionally, arcades and family entertainment centers relied on manual or paper-based systems for tracking customer sessions and purchases. However, this method is prone to human error, inefficiency, and potential revenue loss. As customer numbers and service variety increase, maintaining accuracy and accountability becomes more difficult.

## Problem Statement

Many entertainment venues still use manual billing systems to track gaming time, drinks, and other services. This practice often results in calculation errors, delays during checkout, and opportunities for manipulation or misreporting. Staff are burdened with repetitive record-keeping tasks, while management lacks access to real-time data for monitoring performance or preventing fraud. These challenges lead to decreased efficiency and overall customer dissatisfaction.

## Proposed Solution

ArcadeTab proposes a digitized solution through a web-based billing management system designed for entertainment venues. The platform enables staff to open digital tabs for customers, record every service used and calculate totals automatically based on a centralized pricing database. Using API integration, all entries are logged in real time, ensuring accuracy and transparency. At session completion, both staff and customers can verify the final bill before payment. This automation reduces human error, speeds up transactions, and improves management oversight through detailed analytics and reporting tools.

## Objectives

1. To develop a web-based system that automates billing for gaming and refreshment services.
2. To eliminate manual entry errors and improve transaction efficiency.
3. To provide real-time monitoring and reporting for management.
4. To enhance customer satisfaction through a faster and more transparent billing process.

## System Features

- Staff login and role-based access
- Customer/party registration module
- Digital tab creation and tracking
- Real-time service logging through API integration
- Automatic total calculation and bill generation
- Management dashboard with analytics
- Secure payment and tab closure functionality

## Tools and Technologies

Frontend: HTML5, CSS3, JavaScript
Backend: Python (Flask or Django)
Database: MySQL
API: RESTful API for data synchronization
Version Control: Git and GitHub

## Methodology

The project will follow a structured software development lifecycle (SDLC) approach. Requirements gathering will be followed by system design using UML diagrams. Implementation will involve developing the frontend and backend modules, integrating APIs, and testing for performance and

reliability. The system will then be deployed on a cloud-based environment for easy accessibility and scalability.

## Expected Outcomes

The successful implementation of ArcadeTab will lead to:
- Faster billing and reduced waiting times for customers.
- Elimination of human error in transaction calculations.
- Enhanced transparency and accountability in staff operations.
- Availability of analytics for business insights and decision-making.

## Conclusion

In an increasingly digital world, adopting automated billing systems is essential for entertainment centers that aim to improve service delivery and operational efficiency. ArcadeTab offers a reliable and scalable solution that digitizes the entire billing workflow, enhancing both customer experience and financial integrity. By reducing manual workload and ensuring real-time accuracy, the system represents a step forward in modern entertainment management.