

System Design Document

Joy’s Toys

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CSC-289 Programming Capstone Project

Guilford Technical Community College

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# Introduction

Joy’s Toys has been providing analog and manipulative toys to the surrounding communities for over 70 years. With no future heirs to pass the business down to, Joy’s Toys wishes to modernize the business into the 21st century by incorporating the following:

* Website with eCommerce capabilities
* Front-end register application
* Inventory database
* Upgraded hardware & network infrastructure

This modernization of the business systems will propel Joy’s Toys into a more competitive environment and position the toy shop for potential future acquisition.

## Purpose of Document

The SDD documents and outlines the system and architectural changes to be implemented at Joy’s Toys, with the purpose of modernizing the infrastructure. The SDD provides a clear path for current and future growth of Joy’s Toys.

The proposed solution for Joy’s Toys will add functionality that does not exist in the current setup. This solution provides key points to relieve existing pain points within the organization.

## Acronyms and Abbreviations

The following acronyms and abbreviations will apply to this document:

|  |  |
| --- | --- |
| GUI | Graphical User Interface |
| SDD  VB  DB  eCommerce  SQL  RAM  SSD  SSID | System Design Document  Visual Basic  Database  Allows for selling products on website  Structured Query Language  Random Access Memory  Solid State Drive  Service Set Identifier (Wi-Fi broadcast) |

# SWOT Analysis

Table 1: SWOT Analysis

Graphical user interface, text, application

Description automatically generated

# Database Design

For Joy’s Toys we have selected to host the database in the cloud as a MySQL relational database. This will provide Joy’s Toys with the peace of mind of knowing that inclement weather and power outages will not affect their ability to provide quality service to customers. By hosting the database in the cloud, this will ensure that the website continues to provide accurate inventory information in the event of a power or internet outage at Joy’s Toys physical location.

The primary database table is called CUSTOMERS. This table will contain any individual who has purchased a product from Joy’s Toys. If that customer is also a vendor or employee, the CUSTOMERS table will link that individual with their record on the VENDORS and EMPLOYEES tables respectively.

Three more tables are designed to focus on the products and orders for Joy’s Toys. The ORDERS, ORDER\_CONTENTS, and INVENTORY tables are designed to keep track of what products are currently in-stock, who is buying them, when, and how many.

The INVENTORY table will also be used to populate the shopping section of the website, including the product’s description and image.

Table 2a: Database Design (UML/ERD from draw.io)

Graphical user interface, diagram

Description automatically generated

Table 2b: Database Design (UML/ERD from PHPMyAdmin)

Graphical user interface, application

Description automatically generated

# Application/Website Detailed Design

A new Visual Basic application with GUI interface to replace the spiral-bound notebook at the front desk. This application will provide a user interface for the store employees to more quickly and easily facilitate customer transactions. The new VB application will also make inventory management easier and more accurate.

This new application (Table 3) initially opens to a Main page. That page allows the user to choose one of three options: Order New Inventory, Customer Order, or View Requests. Order New Inventory takes the user to a page displaying a list of items currently in Joy’s Toys inventory. The user can select an inventory item, desired reorder quantity, and place the order. The new order is immediately added to the available inventory. The second option, Customer Order, takes the user to a page displaying an inventory list. The user can select from the list, select an order quantity, and complete the checkout process. This will be the primary means of processing a customer’s order when they are physically in the store. The third and final option available on the Main page is View Requests. This page displays a printable list of requests made by customers on the Joy’s Toys website.

Table 3: UML Application User Diagram

Diagram

Description automatically generated

Table 4a: Application Screenshots – Main

Timeline

Description automatically generated with medium confidence

Table 4b: Application Screenshots – View Requests

Graphical user interface, table

Description automatically generated with medium confidence

Table 4c: Application Screenshots – Order New Inventory

Table

Description automatically generated

Table 4d: Application Screenshots – Customer Order

A picture containing graphical user interface

Description automatically generated

Table 5a: Website Screenshots – Home

Graphical user interface, text, application

Description automatically generated

Table 5b: Website Screenshots – Toy Store

Graphical user interface, application

Description automatically generated

Table 5c: Website Screenshots – Request Form

Graphical user interface, application

Description automatically generated

Table 5d: Website Screenshots – About Us

Graphical user interface, application

Description automatically generated

Table 5e: Website Screenshots – Location & Hours

Graphical user interface, application

Description automatically generated

The new Joy’s Toys website features several tabs that provide information about the store. The initial page, Home, is a landing page for customers. This page contains minimal information which might distract the site visitor from browsing other pages on the website. The second tab page is Toy Store. This page displays a list of Joy’s Toys entire inventory with an option to Add to Cart. The third tab page of the site is Request Form. This page provides the site visitor with the option to request a specific toy not currently found in Joy’s Toys Toy Store tab page. The fourth tab page is the About Us section, providing a history of Joy’s Toys. The fifth and final tab page is Location & Hours. Here, site visitors will find the physical address, phone number, and hours of operation for Joy’s Toys.

# External Interface Design

## Interface Architecture

Most of Joy’s Toys’ new services will be hosted offsite (Table 6 & Table 7) from Joy’s Toy store location. This is to provide a more solid infrastructure for customers who wish to visit and purchase products from the website. By hosting the website and database offsite, this ensures that customers will be able to continue doing business with Joy’s Toys in the event of an electrical or internet outage at Joy’s Toys storefront location.

The hosting facilities used for the website and the database will be two different facilities, for Disaster Recovery purposes. Each facility will provide nightly backup services to ensure Joy’s Toys data is not lost due to inclement weather or various other forms of network interruption.

Table 6: UML System Diagram

Diagram

Description automatically generated

Table 7: Infrastructure Architecture

A picture containing graphical user interface

Description automatically generated

# Network and Physical Architecture Design Overview

## Background Information

Joy’s Toys currently does have existing Cat-5 infrastructure in the walls, as well as existing high-speed internet access. However, this infrastructure is not being utilized to its full capacity.

Since Joy’s Toys is a small business with only a few employees, two new PCs at the front desk and a new gigabit Wi-Fi router are the only new hardware requirements to bring Joy’s Toys into the 21st century and provide a manageable infrastructure.

The Wi-Fi router will be configured with a password-protected SSID for employee use only, as well as a password-protected Guest Wi-Fi that visits to the store can log into. The password for the Guest Wi-Fi will be posted on the wall behind the counter.

Employees of Joy’s Toys will be required to sign an Acceptable Use Policy document that outlines acceptable use of Joy’s Toys network infrastructure. This document is designed to hold employees accountable for any and all activity they do while on Joy’s Toys network. This includes, but is not limited to:

* Websites visited using company computers
* Websites visited using company Wi-Fi
* Inventory adjustments made to database
* Accuracy and legitimacy of customer orders

## System Evolution Description

The following is a list of new hardware and software being implemented at Joy’s Toys:

Table 8: New Hardware, Software, & Services

|  |  |  |
| --- | --- | --- |
| Hardware | Software | Services |
| (2) PCs   * Front Desk | Visual Basic GUI Application   * Inventory Management * Sales Management | Web Hosting   * New Website |
| Router (Wi-Fi) |  | Hosted MySQL Database   * New Database |

Table 9: Hardware Specifications

|  |  |  |
| --- | --- | --- |
| PC Hardware | Input Peripherals | Output Peripherals |
| (2) PCs   * Intel Core i5 * 16GB RAM * 256GB SSD * Windows 10 Pro | (2) Keyboards   * Dell – Wireless   (2) Mouses   * Dell - Wireless | (4) Monitors   * (2) monitors for each new PC * 23.8” LED |

# Training Plan

## Training Summary

The staff of Joy’s Toys will undergo a series of training classes to review the new changes provided by Titans Network Design, Inc. Joy Johnson has requested that these training sessions take place during the business day because two of her staff attend night classes at the local college. Day 1 of training is a walk-thru with only Joy Johnson. Day 1 will take place on a Monday because the store is closed on Mondays. Because of the limited staff, training will take place in an ad hoc fashion throughout the day, based on staff availability.

VB Application:

* Front Desk
  + Register (ringing up customers)
  + Inventory management (reorder items)
  + Review of requests

Website Management:

* eCommerce
  + Online checkout process
* Web Account
  + Inventory management

Network Management:

* Wi-Fi router
* New PCs

**Training Schedule:**

Day 1 (Monday, while store is closed):

* 10:00am – TBD (with Joy Johnson):
  + Network design (new PCs & new Wi-Fi router)
  + Review entire desktop system
  + Walk-thru of website and review functionality
  + Address any last minute concerns or questions from the owner

Day 2 (Tuesday):

* 8:00am – 7:00pm
  + Network design (new PCs & new Wi-Fi router)
  + Review entire desktop system
  + Walk-thru of website and review functionality

Day 3 (Wednesday):

* 9:00am – 5:00pm
  + Network design (new PCs & new Wi-Fi router)
  + Review entire desktop system
  + Walk-thru of website and review functionality

Day 4 (Thursday):

* 10:00am – 2:00pm (outside of these hours, Joy’s Toys’ account rep/trainer will be available by phone, email, and/or Zoom for additional training and/or questions)
  + Network design (new PCs & new Wi-Fi router)
  + Review entire desktop system
  + Walk-thru of website and review functionality

Day 5 (Friday):

* Joy’s Toys account rep will be available by phone, email, and/or Zoom for additional training and/or questions

Day 6 (Saturday):

* Joy’s Toys account rep will be available by phone, email, and/or Zoom for additional training and/or questions

Day 7 and beyond:

* Joy’s Toys customer service rep will be available by phone, email, and/or Zoom for additional training and/or questions

Ongoing Maintenance:

* Titans Network Design, Inc will continue to monitor Joy’s Toys network performance
* Network patches will be deployed remotely, when possible
  + If onsite maintenance is required by the system, this will be scheduled in advance with Joy’s Toys staff (except when urgency is vital)
* If network maintenance requires additional training (because of changes), Titans Network Design, Inc will schedule in advance with Joy’s Toys staff and facilitated by our training coordination team

Requested Changes:

* Changes to the system requested by Joy’s Toys will go to our Help Desk. An internal ticket will be created and Titans Network Design, Inc will prioritize those changes based on the following three categories:
  + Must-Haves (these are changes that are vital to Joy’s Toys’ business operations)
  + Satisfiers (these are changes that are important to Joy’s Toys, but not vital to business operations)
  + Delighters (these are changes that are not vital to business operations, but are changes that Joy’s Toys would like to see implemented
* These requested changes will be deployed remotely, when possible
  + If onsite changes are required by the system, Titans Network Design, Inc will schedule onsite maintenance in advance
    - Except for situations where the change is a Must-Have; those upgrades will take the highest priority

# References

Draw.io UML/ERD Design Documents, 3 May 2023, [www.app.diagrams.net](http://www.app.diagrams.net)

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