Database Management

Project Assignment

This semester, our database management project will incorporate a practical approach to building a functional, practical database application for crime data sets that are freely and openly available from the U.S. federal government. This guide serves as the overview for assignment completion. Each component will be graded as either satisfactory or unsatisfactory. Both content and English will be assessed.

Components of the Project

Federal/State/Regional Data Sets

Project Overview

Data Dictionary

Graphical User Interface Concepts

Code and Development Environment

Queries and Relevant Structured Query Language

User Interface

Quality Management -- Assurance, Control, Integration, and Testing

Platforms and Mobility

Appendix (tables, code, etc.).

References

Components of Management and Governance

Students are responsible for:

1. Selection of group name
2. Selection of group leader/commander
3. Selection of team leader for each function listed in the ‘Components of the Project’ section.
4. Crafting the database.
5. Developing the database.
6. Integrating the database hardware, software, platforms, etc.
7. Quality assurance and quality testing
8. Project Documentation
9. Completion schedule (with dates, milestones, and deliverables)
10. Governance charter
11. Any other pertinent materials
12. Submission of the final documentation during week 14
13. Submission of the approved project document to selected publisher
14. Presentation and defense of the database project to an open audience

Assignment Requirements Overview

This project integrates concepts learned during the CS 472 course. Students will:

1. Obtain current data from the U.S. federal government. The instructor will identify which data source will be used during week 8 of the course.
2. Select, download, and install an acceptable open-source database management system package for PC or Mac environments.
3. Normalize the database through the third normal form (3NF).
4. Incorporate some amount of database security (the more, the better).
5. Craft the appropriate entity-relationship models based upon 3NF outcomes.
6. Craft database designs – conceptual, logical, and physical.
7. Craft appropriate database documentation for submission during week 14.
8. Develop graphical user interface (GUI) whereby users may query the database for national, regional, or state inquiries (or any combination thereof).
9. Incorporate error handling and fault tolerance as necessary.
10. Demonstrate their final deliverable to an audience.
11. Performance requirements will be presented during week 8.
12. Functional requirements will be presented during week 8.
13. Submit all database software during week 14.
14. Submit project documentation during week 14.

Database Requirements

Database requirements will be discussed separately during class.

Project Document

The project document will be submitted to the professor during week 14. A document template will be provided within Blackboard. Students will complete the project using the assigned template. The document will contain the following sections:

Foreword

Contents

List of Tables

List of Figures

List of Abbreviations

Disclaimer

Acknowledgement

Chapter 1 - Project Overview

Introduction

Background

Problems and Issues

Purpose

Relevant Literature

Overview of Data Sets

Goals and Objectives

Scope and Limitations

Synopsis of Methodology

Framework

Significance

Chapter 2 – Data Dictionary and Domain Assumptions

Terminology - Definitions (alphabetical)

Data Structures -- Itemized delineation of alphanumeric, Boolean, and Numeric data structures and types

Objects – Itemized, alphabetical listing and explanation of all used objects

Classes– Itemized, alphabetical listing and explanation of all classes

Methods– Itemized, alphabetical listing and explanation of all methods

Abstraction and Polymorphism – Discussion of application within project

Synopsis of Program Code Components - Itemize and delineate purposes

Tables – Itemized, alphabetical delineation of names, purposes, key fields, attributes, etc.

Relationships – Itemized, alphabetical delineation of relationships and relevant cardinalities

Assumptions – Delineation of all assumptions within project

Processes – Delineation of all processes within the project

Chapter 3 – Design

Design Method

Normalization – Delineate all normalization phases and relevant activities through 3NF

Database Design

Entity-Relationship Diagrams (ERDs)

Process Diagrams

Table Designs

Fault Tolerance and Exceptions

Chapter 4 – Program Code

Introductory discussion for database code (1-3 pages).

Code -- Main Body

Code -- Delineation of Procedures, Functions, Routines, etc. (documentation of all code components explaining purpose, calling origin, parameters passed and their respective explanations, outputs, exceptions, complementary modules, and so forth).

Structure Charts – Both main and sub-routines

Chapter 5 – User Interface

Overview of graphical user interface (GUI) and textual interface (if relevant)

National – Delineation of screens and input/output

State - Delineation of screens and input/output

Regional – Delineation of screens and input/output

Functionality – Discussion of functionality for each of the above views

Errors and Exceptions – Discussion of error-handling and appropriate GUIs

Chapter 6 – Systems Integration

Hardware Considerations

Software Considerations

Platform Considerations

Mobility/Portability Considerations

User considerations

Conformance and Performance

Integration Testing

Chapter 7 - Quality Assurance and Quality Testing

Quality Management Overview

Delineation of Test Cases – Structured Query Language (SQL) test cases; screen captures; etc. Explain all!

Performance Issues

Chapter 8 – Project Chronological Timeline

Timeline -- Delineate monthly and weekly

Goals, Objectives and Milestones

Resources -- Resource allocation per time

Tasks -- Functions and responsibilities through time

Notes

Appendix (tables, code, governance documents, etc.)

References

Presentation and Publication

Presentation will occur at the end of the semester. After review, feedback, and approval from the professor, the final document will be submitted for publication. Discussion of publishing will occur during class.

ResearchGate

The course will incorporate ResearchGate. Projects will be made available via ResearchGate for both periodic deliverables and final documents. Students will make document drafts available and solicit academic community feedback weekly. Further details will be discussed during class.