CP212 Assignment 5 – Winter 2021

Marks: 100 - Does not use the standard rubric.

Weight: Approx. 10% of final grade (Worth more, I expect more)

Due Date: Friday, April 9 before 11:45pm

If you have problems meeting the due date, please discuss your situation with me. Laziness or procrastination is not a good reason.

Summary

For your final assignment, you will create a major Excel application using VBA that utilizes (almost) everything you have learned in the course.

Later in this document you will see several examples of applications that are possible to choose as your final assignment project.

Your final project will be an application written in Excel VBA which reads information from a database, processes is it in Excel, and exports a chart into a Word document.

Your completed assignment will consist of:

1. A Word document called **overview.docx** which explains what your application does and why you chose it.
2. A second Word document called **manual.docx** with instructions and screenshots.
3. A third Word document report called whatever you wish to store the results or output of your application such as a chart.
4. An Excel file called **a5_*username*.xlsm** that contains all your code where the project runs from.
5. An Access file or text file which contains the data that your application generates and/or uses. All users should TRY to be using an Access database but I realize there may be some technical problems that might make this impossible. Remember, all students whether Windows or Mac users can read data from an Access file using ADOBD even if Microsoft Access is not loaded on to your computer. These files do not need to have specific names, that will be up to you.
6. A fourth Word document called ***username*_letter.docx** which will be a letter to future students that you write which contains information about what you wish you knew about CP212 before you took the course.

Finishing Details

Please make sure you zip all your files into a single zip file, and then upload the zip file into MyLearningSpace into the A5 Dropbox.

Name the zip file **a5_*username*.zip** where *username* is your network *username*.

Marking Scheme

Application Overview: 5 marks

- A word document called **overview.docx** which explains what your application does and why you chose it. *Minimum 2 full paragraphs.*

Manual: 5 marks

- A word document called **manual.docx** which acts as a user manual for your application, including how to use it as well as **screenshots**.
  Minimum length: Whatever it takes.

Word Report document: 5 marks

  - The output generated by your program, ie. Grade report or high scores etc.

UI/UX/Aesthetics: 10

- These marks represent how nice the program looks as well as how easy it is to use.
  - Make sure you use simple shapes, colours, and fonts.
  - Make your application easy to understand.

Application: 70

- These marks represent your actual code and application.
  - Does it run correctly?
  - Does it solve the problem it was meant to?
  - Does it have all the required parts and functionality?
  - Are the comments appropriate? Did you use modular programming? Are the variables, subs, functions, and userform objects named appropriately?

Letter to Future: 5

- A letter to future students that you write which contains information about what you wish you knew about CP212 before you took the course.

Total Marks: 100

Objectives

- Create and develop a complete application that **reads information from a database**, produces a **chart using Excel**, and creates **a report in Word**.
  - If it makes sense for your application to write to the database, do that.
- Read and/or write to **.csv file** if appropriate.
- Write an **application overview** and **documentation** in separate Word documents. If you make a game, provide **instructions** on how to play the game as part of the overview.
- Develop your application using **modular programming**, **error handling** and the **effective programming techniques** discussed throughout the course.
- **Reflect** on your experience in CP212 and write a letter to future students.

Description

There is a great deal of flexibility in this assignment so have fun with it.

Listed below are several options for you to choose from.

Create a useful application that does all the following:

- read information from a database
- read and/or write a .CSV file if appropriate
- create a chart in **Excel** using data taken from a database,
- include the chart and an explanation of the data in a **Word** report

Choose 1 of the following:

1. **Student Grading Application**

An application for storing student grades. See the Student Grading Application document overview.

Tips:

1. See the separate document explaining the Student Grading Application.

2. **Other Ideas:** Discuss them with me first. Must be able to use Word, Access or other database, and Excel. Other types of applications similar to 1. above could include an invoice system, or something used by Human Resources or a volunteer/asset tracking system for a non-profit organization; Stock price simulator/analyzer; Statistical data analysis application; Karnaugh Map Simplifier (logic gates - PC120 stuff); Data Analytics app with dashboard;

Alternatively, if you don't like the options above you may try:

~~3. BMI Calculator, Chart, and Weight loss/Food tracking App:~~
Not available Winter 2021.

4. **Crazy 'Cryption**

Write an application that will export each worksheet of your application as an encrypted text file with the **.crzy file** extension. In Chapter 7 of the text, the end of chapter exercises 22 and 24 explain different **cipher text** or **encryption** techniques. Use either method to create encrypted files and a way to decrypt them. The database requirement could be fulfilled by storing the date and number of characters or bytes that have been encrypted, with data plotted in Excel being the amount of data encrypted by date for a range of dates, pulled from the database. This information and chart can then be exported in a Word report. See me if you are interested and have any questions.

- You may also attempt to implement MD5 "checksum" hashing algorithms if you are interested.

5. **Game in Excel**

Some simple games created in Excel can be a hide-and-seek game based on a grid map.

Using a two-dimensional array it is possible to create a 16x16 (or larger) map that a player can travel through. One famous example includes **Hunt The Wumpus**, and is often used as an assignment in **Artificial Intelligence** courses where the student must write a program that can travel a maze to find and kill the Wumpus. The Wumpus has a horrible stench that can be smelled when you are within 1 square around the Wumpus (think Minesweeper). If the player lands in the same square as the Wumpus, he dies. The player must also avoid bottomless pits (the player can feel air breezing past when he is near a bottomless pit, the Wumpus is too large to fall through the pit). The player has a stun gun/bow & arrow that she can use to stun the Wumpus and win the game. You could create a game where the player can try and win or write an AI program that can win the game and keep track of how many times it can win (a simulator). Typically, the Wumpus lives in a dark cave so the player cannot see the rooms and so is travelling blindly.

For the Wumpus game, you do not have to randomly generate a new map each time, although that is a good challenge to take on, especially for those interested in computer game design. See the references section below for some help.

6. Additional (especially for CS majors, but others may attempt): Sudoku game and solver, KenKen game and solver, Reversi, Go, Warri/Mancala, Conway's Game Of Life simulator, Karnaugh Map solver, **but not** Minesweeper.

Note: Even if you create a game or other project, it still has to follow all the requirements.

Games can have names and scores written to the database with dates & times, so a chart of score over time can be made in Excel. For the Sudoku Solver, finding a way to store the puzzles in a database might be one way, but perhaps a date/time and the name of the puzzle, and length of time it takes to solve the puzzle can be stored in the database and then plotted in a chart.

The Word Report

A typical report in Word would report the results of your application in some way. All reports must contain some text explaining what your application did or the results, as well as a **chart** from Excel. Typical examples would include:

- a histogram of student final grades, as well as grade stats such as min, max, average, mode, median, and std. Dev. If not a histogram, then another chart is required.
- game statistics, possibly for multiple players (number of games played, high score, average score per game)
- results of multiple runs of a simulator

Essentially, the report is the output of your application, regardless of the type of application you develop.

A Letter to the Future

Write a letter to the future! Think about what you have learned in the course and what you think students coming into the course might want to know. You can include things that you would have wanted to know when you started the course.

Write this letter in a separate Word document called **a5_username_letter.docx** and include it in the Dropbox with your other files inside the same zip file.

Zip all your files together into 1 zip file and upload it to the Dropbox in MyLearningSpace before the due date.

References

1. Wumpus at Wikipedia
2. Encryption at Wikipedia
3. BMI Calculation and sample BMI Table or you may see one in your doctor's office