COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCIS 211: WEB TECHNOLOGIES

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2021

LECTURER: MR MUKHALELA B

**DURATION: 5 HOURS**

INSTRUCTIONS

Answer ALL questions**.**

The marks allocated to **each** question are shown at the end of the section.

Credit will be awarded for logical, systematic and neat presentations.

Vusumuzi-Agri-Projects (VAP) - Aquaculture unit proposed to up its competitiveness on the local fish farming market by harnessing a Web-Technologies based system that will assist the unit to do the following, as shown in Prototype of the Application;
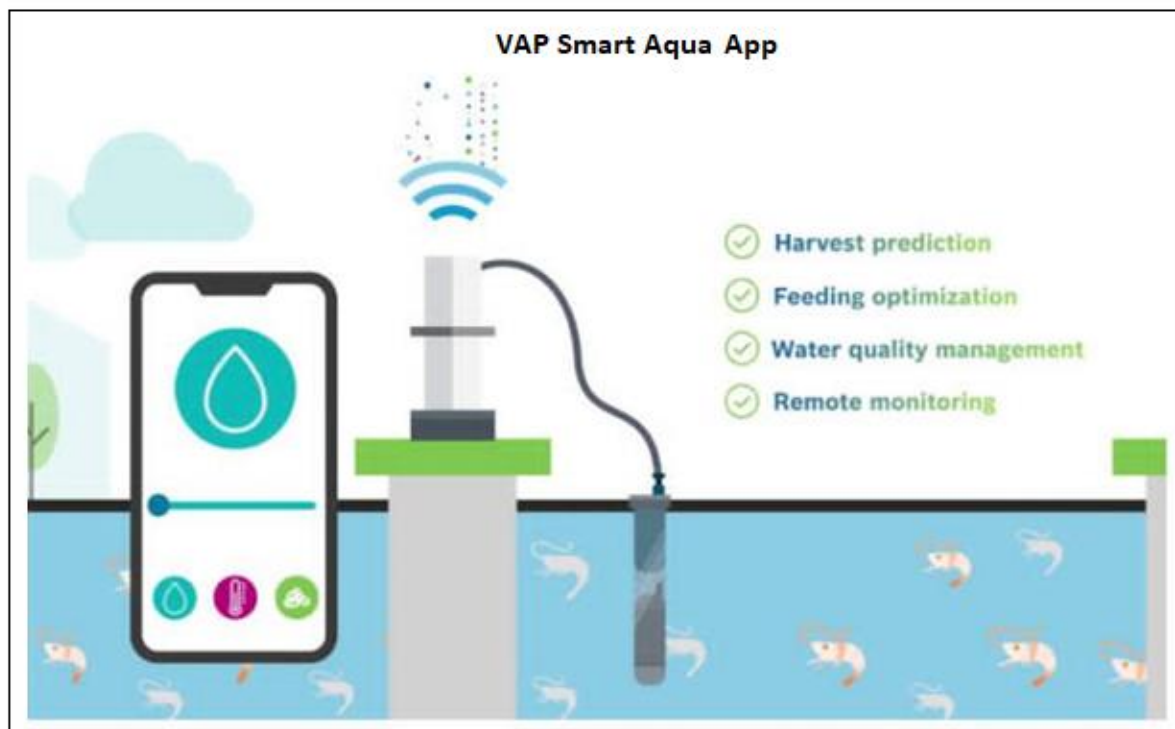
As a team member of the IS team at VAP, you have been asked to lead the implementation of WCF, UWP and MDF based solution as a new set of application. The theme of this solution will be **Smart Aquaculture (Aquaculture means farming of water-based life for food – Aqua = Water; Culture = Grow)**. Much like any modern farming (both plant and animal), the health of the organism being reared needs monitoring so as to ensure a good yield. Your context here is in the area of fish farm sensing.

You are to lead your Web Technologist team to develop:

1. An **SQL Database** (MDF File) – 33.33%
2. A **WCF** web service – 33.33%
3. A **UWP** Windows 10 application – 33.33%
4. (Optional) An **Mbed USB** application – Bonus credit to be awarded

Your database should contain data for:

- **Aqua Data** – 10% (5% for correct columns 5% for correct data types)
    - Temperature (Degrees Celsius)
    - Dissolved Oxygen (Parts Per Million – ppm
    - Ambient light levels (Lux – Latin for light)
    - Conductivity (microSiemens per centimetre)
- **User Data** – 10% (5% for correct columns, 5% for correct data type)
    - Username
    - Password (as a hash with SHA3)
    - Permission Classifier

Your **WCF** should have functions for:

- **Getting Aqua Data** - 8%
- **Changing Aqua Data** - 8%
- **Validating Users** - 8%
- **Hashing Validation** requests - 8%
- **Ability to register a User** - 8%

Your **UWP** should have functions in two pages (Be creative in your application to align with the theme)

- Main Page – 15%
  - Login and enable second page.
- Aqua Page – 25%
  - Display data in database and allow user to change data.
  - (Optional) Run USB communication to Mbed device.

Your OPTIONAL **Mbed** program would be exactly the one you developed during lecture labs, to toggle LEDs based on commands from **USB**. The context in **UWP** would be set green, amber, red LEDs based on the thresholds on **ONE** of the Aqua Datasets.

End of examination.