**University of British Columbia, Vancouver**
Department of Computer Science

# CPSC 304 Project Cover Page

Milestone #1

Date: September 29th, 2025

Group Number: 31

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above.  (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

2.
   a) The domain of our project is in the sustainable agriculture/farm management space. Basically, the system we are going to build is aiming to help farms keep organized records about the crops they grow and the certifications their farm has (organic, non-GMO, etc.). Most of this data is seasonal and changes over time (e.g., irrigation may be different on a daily basis), and a lot of it ends up being used for auditing purposes. Therefore, we must provide a centralized platform where farmers can review their yearly crop records.

   b) Our database focuses on storing the core records a farm needs to operate sustainably and also pass audits. A large portion of farmers still keep records on paper, which is time consuming and can lead to more inaccuracies. We are aiming to build a software tool that will enable farmers to have all data in one central place, such that they no longer have to worry about their data being scattered and inaccessible at times.

   Some examples of it being used include:
- Audit preparation
- Pest and Disease Control
- Drought response
- Crop yield prediction
- Crop rotation and soil health monitoring

   Here are some aspects of the domain we are modeling:
- **Farmer** and **Farm** lets us handle one farmer owning multiple farms
- **Field** lets us see variations in yield due to geological location
- **Crop** lets us handle production information
- **Soil_Condition** lets us see/handle seasonal dependent trends for the environment
- **Irrigation_Record** lets us see watering frequency and amount used each time
- **Pesticide** helps us to monitor how much application is good/bad for individual crops
- **Health_Condition** linked to livestock animals helps us keep track of animal health
- **Certification** helps us to keep track of what certifications are valid and what needs renewal, etc

3.
   a) Users can record and update farm data such as crops, soil tests, irrigation/water use, pesticide applications, crop yields, and certifications all in one central location. They can run reports by season, see soil condition trends, and get data that is already audit-ready per-crop or -field on any given farm they "own". The system is also going to be designed

to flag issues such as upcoming certification expiries, pesticides that conflict with current regulations, missing harvest data, and more. Our system will also allow for quick filters by farm, season, and crop, allowing users to access their data on demand.


7. No AI was used in this assignment.

**Entities**
- **Farmer** (**Farmer_ID**, Name, Contact_Info)

- **Farm** (**Farm_ID**, Name, Location, _Farmer_ID_ )

- **Field** (**Field_ID**, _Farm_ID_, Name, Area)

- **Crop** (**Crop_ID**, _Field_ID_, Season, Name, Planting_Date, Harvest_Date)

- **Soil_Condition** (**SoilCond_ID**, _Field_ID_, Sample_Date, pH, Moisture)

- **Irrigation_Record** (**Irrig_ID**, _Field_ID_, Event_Date, Volume)

- **Pesticide** (**Pest_ID**, Name)

- **Certification** (**Cert_ID**, _Farm_ID_, Name, Awarded_Date, Expiry_Date)

- WEAK ENTITY: **Crop_Yield** (_**Crop_ID**_, Total_Yield)

Bold = Primary Key

Italicized + underline = foreign key


**Relationships**
1. Farmer -> Farm **Owns**

    - One to many

    - Total participation on Farm

2. Farm -> Field **Contains**

    - One to many

    - Total participation on Field

3. Field -> Crop **Grows**

    - One to many (a field can change crops over seasons)

4. Field -> Soil_Condition **Has soil records**

    - One to many

    - Total participation on Soil_Condition

5. Field -> Irrigation_Record **Has irrigation records**

    - One to many

    - Total participation on Irrigation_Record

6. Farm -> Certification **Receives**

    - Many to many

7. Crop <-> Pesticide  **Treats**

   - Many to many

8. Crop -> Crop_Yield **Produces**

   - One to one

9. IsA Crop -> Fruit, Vegetable, Grain

Entity-Relationship Diagram — Farm Management System

**Entities and attributes:**

- **Farmer**: Farmer ID (key), Name, Contact info
- **Farm**: Farm ID, Name, Location, Farmer ID
- **Field**: Field ID (key), Farm ID, Area
- **Crop**: Crop ID, Field ID, Season, Name, Planting Date, Harvest Date
  - IsA: Fruit, Vegetable, Grain
- **Soil Condition**: Soil Cond ID, Field ID, Sample Date, pH, Moisture
- **Irrigation Record**: Irrig ID (key), Field ID, Event Date, Volume
- **Pesticide**: Pest ID (key), Name
- **Certification**: Cert ID (key), Farm ID, Name, Awarded Date, Expiry Date
- **Crop Yield**: Crop ID (key), Total Yield

**Relationships:**

- Owns (Farmer – Farm)
- Contains (Farm – Field)
- Grows (Field – Crop)
- Has soil Records (Field – Soil Condition)
- Has Irrigation Records (Field – Irrigation Record)
- Treats (Pesticide – Crop)
- Receives (Certification)
- Produces (Crop – Crop Yield)