## CPS Farm to Facility Model

### Python Setup

The first step of being able to work the model is to get python 3and in IDE for your computer.

I believe the best way to utilize this model is through the Spyder IDE. Why? Well, this IDE allows us to explore variables in the computer, like R studio. This similarity makes it great for the development of a process model. Other IDEs like Google colab and Jupiter notebook are great for creating notebook reports.

### Anaconda Download

We will run python throughout anaconda. This is a python distribution platform. It allows us to access multiple programs such as Spyder to use python with.

Download and Install anaconda: <https://www.anaconda.com/products/distribution>

Once downloaded open the anaconda navigator and make sure Spyder is installed. Once you are in you can start using the Spyder IDE

### Model Important files

Important files will be in italics and bolded

#### MainModel3z

* This file is the main model file. It contains the main loop function that runs the process model.
* It is split into multiple section
* The first section is running the data collection data frames from ***Dictionariez.py***
* The second section is the iteration module, in this module everything that occurs in the model is a linear flow of event as in a process.
  + PRCC Sensitivity analysis. Optional section for changing inputs when the PRCC sensitivity analysis is running. Option of ON and OFF can be changed in the ***SCInputz.py*** file
* Data frame Setup and Cont Scenarios
  + This first section creates the main model data frame (the field). The arguments for this specific data frame are in the ***InFunz.py*** file
  + Calendar

    Description automatically generated with medium confidence
  + Screenshot of the main data frame. This data frame will be the one updated as the model progresses. Other data frames mentioned earlier will collect data from this data frame to create other outputs such as contamination progression.
* The next step is to add the background contamination by using the *F\_systematic\_C* function from ***ContScen.py***
* The same is done to contaminate the field. Same function is use but the clustering parameters will change based on the contamination scenario
* Subsequently you keep going down the document and encounter all the steps that define the process.
  + Microbial die-off is calculated as two sections
  + From Contamination event to PH Sampling
  + And from PH Sampling to Harvest.
* The processes continue. Each function generally takes in a data frame and returns a modified data frame or a list of data frames.

#### Funz

* One of the most important files of the document
* Is home to most functions used for this model
* Not all functions are used in the model, the functions that are used in the model are those solely stablished in the ***MainModel3z.py*** file
* Some functions here were created to try things out. I kept them in there because they are still useful functions in case, we want to develop something new in the future.

#### Dictionariez

* This module contains the basics from the creation of the data collection data frames
* First is contains the name of the columns
* Second it has functions that create dataframes and collect data from these dataframes.

#### ContScen

* These documents contain functions to contaminate the main data frame in different ways. The main function used here is the F\_systematic\_C. the advantage of this function is that is a able to create multiple sized clusters throughout the field. For the analysis this was the only contamination function used.
* All other functions here work, but they were not used in the analysis.

#### InFunz

* This file serves on purpose, to store the function F\_InDF that creates the main dataframe that will de modified through the model.

#### Inputz

* This file contains most of the stationary inputs that the model needs.
  + Contamination Scenario Inputs
  + Some other functions that need to be in this file for the creation of other intermediate inputz
  + For example, the function that defines the chlorine levels throughout the wash.

#### SCInputz

* This file contains fixed inputs for the model
* Sampling plan characteristics
* Iteration number
* Field size
* Weight
* Etc.