Homework Assignment

Build small infra using OOP concepts for managing the autonomous tractors at the farm.

Every farm can have multiple tractors attached to specific farm. Not all tractors must work at the same time, so the number of assigned tractors can be bigger that the working at the same moment. Every Tractor can be attached to a different Implement (Mower, Sprayer, Driller). Each Implement is used for different actions in different time of year.

1. Design the farm object as below:
   1. Variable - Number of tractors assigned to the farm.
   2. Variable – Type of the farm (Apples, Citrus, Grapes)
   3. Variable – Location In map (x, y, width, height).
   4. Variable – Name of the farm
   5. Function – Get all working tractors at the farm now (See Tractor Object description for help).
   6. Function – Generate unique farm ID based on the name and location on map.
   7. Function – Return the correct type of Implement depending on the time of the year (summer – “Sprayer filled with water”, fall – “Mower”, winter – “Driller”, spring – “Sprayer filled with pesticides”)
   8. Function – list all tractors with their statuses – tractor type, tractor status, tractor implement, percentage of the done work by tractor.
2. Design the Tractor object as below:
   1. Variable – Tractor unique ID (Autogenerated).
   2. Variable – Tractor type (“John Deere” or “New Holland”)
   3. Variable – Fuel Status (in %)
   4. Variable – Type of the Implement attached (Mower, Sprayer, Driller, None)
   5. Variable – Status of the Tractor (“Working”, “Stopped”, “On”, “Off”)
   6. Function – Run – The tractor will start running and spending the fuel 1% per 1 second. At the time, tractor reaches 10% it should stop automatically and print warning message.
   7. Function – Stop – The tractor status should be changed to “Stopped.”
   8. Function – Attach Implement – Attach Implement to the tractor
   9. Function – Change Implement – Change current Implement instance with another one.
3. Design the Implement object as below:
   1. Variable – Implement unique ID (Autogenerated)
   2. Function – only if type of the Implement is Sprayer, return the type of the filling (water or pesticides).
4. Build main class that will receive the name of the farm and the season (winter, fall, summer, spring) as an input and will do steps below:
   1. Ask for the number of the dedicated tractors (should be more than 3).
   2. Assign new tractors to the farm.
   3. Take first 3 tractors and attach to them implements depending by the season.
   4. Make the assigned tractors run.
   5. Wait for the message from one of the tractors that it reached 10% of the fuel.
   6. Take the next unused tractor and assign the implement from the tractor that has shortage in fuel, then run the tractor.
   7. Keep working until all tractors are off with shortage of fuel.
   8. When all tractors are short of fuel – turn all tractors off.