**Project Proposal**

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COS2005: Python Programming

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**Project Title:** RRTF Scheduling System

**Objective:**

Collaborate with Rum River Tree Farm & Nursery to design and implement a system that automates the creation of itineraries and routes for drivers delivering landscape products.

**Business Benefits:**

* Saves countless hours currently dedicated to manual itinerary creation
* Establishes accountability amongst drivers
* Removes need for handwritten paper itineraries
* Adaptable when schedule conditions change
* Incorporates more variables to increase schedule precision
* Increases transparency between drivers and management

**Project Goals:**

* Import order information from current system
* Determine equipment needs for orders
* Generate map showing all orders by utilizing Google Maps API
* Generate schedule based on the following variables:
  + Installation time
  + Location proximities
  + Equipment requirements
* Generate schedule route
* Generate final work hours calculation which includes:
  + Load time
  + Drive time
  + Unload time
  + Installation time
* Designate driver
* Generate printable, optimized itineraries

**Business Needs Statement:**

Rum River Tree Farm & Nursery is a private company located in Oak Grove, Minnesota, which opened in 1964. They focus on cultivating Christmas trees and nursery stock for wholesale and retail distribution and provide services for delivering and installing their products during the summer. They own more than 1000 acres of land around Minnesota and employ 25-40 employees throughout the year. They sell more than 100,000 Christmas trees during the winter and supplement their income with landscape services in the Christmas tree offseason. Their delivery and installation schedules for nursery and landscape items utilize an archaic paper and Microsoft Excel-based approach, containing multiple shortcomings that restrict the company's future growth.

The current system is initiated by a customer placing an order over the phone or in person. The order is documented on a computer, whereby an invoice is created that reflects details about the customer and their order. If the customer requests a delivery, the purchase and shipping address is placed in an Excel spreadsheet and is grouped by geographic region of the state by Rum River Tree Farm's receptionist. In addition, the receptionist identifies if a skid steer and class A vehicle are required to handle the order items. The addresses are plugged into Google Maps to determine close proximities. When a sufficient number of orders exist within close proximity, they are assigned a route and date to be completed. Additionally, orders are prioritized by nearness to Rum River Tree Farm's location; however, they also consider the date the order was placed. Monthly driver schedules are put in a word document, and on the day of their delivery, the receptionist hands drivers a schedule that displays their destinations, the number of items to deliver and install, and the approximate time each stop will take.

Rum River Tree Farm's current paper and Microsoft Excel-based method for creating a driver's schedule has multiple shortcomings restricting the company's future growth. The introduction of an automated system would increase productivity by reducing time spent coordinating a schedule manually, providing a more efficient route for drivers, and improving communication between operational users. The new system will collect invoices and create daily itineraries using predetermined criteria, and it will produce a plan that maximizes a driver's time by calculating the approximate length of their day and providing an efficient route. The new system will enable the company to allocate its resources toward more relevant business tasks and facilitate continued company growth.

**Pseudo Code:**

1. Import products
2. Import invoices
3. Do invoice products require class A vehicle and/or skid steer? (Automatic detection with override option).
4. Calculate work hours
5. Display invoices on map
   1. Work hours
   2. Color coded for class A vehicle and/or skid steer requirement
6. User selects invoices for schedule with interactive map
   1. Display drive time and total work hours as invoices are selected
7. Designate driver and vehicle
8. Generate printable final schedule and map
9. Must have ability to edit/delete schedules
10. Smartphone application for drivers
11. Automated recommended schedule

**To Do:**

1. Create Variables widget
2. Create Settings widget
3. Separate widgets from temp windows
4. Create main module with main window/sidePanel
5. Put widgets into modules
6. Incorporate map into order widgets
7. Make sidePanel buttons work
8. Integrate database into modules (use variables in statements)
9. Develop Drivers module
10. Develop Vehicles module
11. Develop Variables module
12. Develop interactive Order map
13. Notes
14. Home is view-only
15. Schedules is view-only
16. Drivers is editable
17. Vehicles is editable
18. Order table is view-only
19. Order map is view-only/interactive
20. Variables is editable

Notes:

1. Don't do bottomPanel yet
2. Don't integrate RRTF data yet

Other:

1. Import addresses from database
2. Reformat addresses to coordinates
3. Place markers on interactive map
4. Generate everytime or store?

**Other Notes:**

* cornerButtonEnabled on tables
* sortingEnabled on tables
* NoEditTriggers
* Create two seperate widgets in Orders table
* Put create button on home screen
* lookup how to integrate database table in pyqt
* Can you try not to edit ui generated file and just pass arguments?
* Seperate UI modules from functionality modules

**Interface Breakdown:**

Sales representatives and drivers will have the ability to interface with the system. The activity and sequence diagram below break down the anticipated areas of interaction.

Note: All diagrams are representative of design phase anticipations

**Activity Diagram:**

Diagram, schematic

Description automatically generated

**Sequence Diagram:**

Diagram, table

Description automatically generated

**Class Diagram:**

Diagram

Description automatically generated

Credit: All diagrams created by Tobechukwu Okafor and Jack Bowman