CHULA ENGINEERING Foundation toward Innovation | SENIOR PROJECT XD

รายงานความก้าวหน้า โครงงานทางวิศวกรรม (ข้ามสาขาวิชา) ครั้งที่ 1

1) **รหัสหัวข้อโครงงาน** SP 3

2) **ชื่อโครงงาน**

(ภาษาไทย) อัลกอริทึมสำหรับการแก้ปัญหาการส่งเอกสาร

(ภาษาอังกฤษ) Algorithm for solving messenger service problem

3) **รายชื่อสมาชิกกลุ่ม :**

3.1. นาย ปรัชญา เอี่ยมทรงศักดิ์ ลายมือชื่อ (ปรัชญา เอี่ยมทรงศักดิ์)

3.2. นาย ภคภูมิ ปธานราษฎร์ ลายมือชื่อ (.....)

3.3. นาย วสุวัชร สถิตธรรมจิตร ลายมือชื่อ (วสุวัชร)

4) **รายชื่ออาจารย์ที่ปรึกษา** (ไม่ต้องลงลายมือชื่อ)

4.1 ผศ.ดร.มาโนช โลหเตปานนท์ 4.2 ผศ.ดร.อรรถสิทธิ์ สุรฤกษ์

5) **วัตถุประสงค์ของโครงงาน**

The objective of this project is to find and analyze algorithms for the messenger service problem. The messenger service is a service which users have requests to send documents, and service providers (deliverymen) pick the documents from users at the pickup points and deliver them to the delivery points. This problem can be classified as a pickup and delivery problem. At first, we wanted to develop a mobile application for the service above, but before we develop the application, we first have to find the best ways to do it. Given, the requests from users (the pickup points, the delivery points, time window, etc.), we want to generate jobs (the tours of vehicles) for the service providers (deliverymen) with the lowest costs and still satisfy the constraints. Our objective is to find the algorithms that generate the best jobs.

6) **ขอบเขตการดำเนินงาน**

The scope of this project includes studying research papers from the past, researching and developing our own algorithms for the problem, simulating and running test cases. We will not intend to develop an actual mobile application in this project.

About the problem, we are trying to find the best ways to generate jobs for service providers (deliverymen); each job consists of request(s) from user(s) who want to send documents, given costs of traveling between places, time windows that users appoint to receive the documents, coordinates of places. We want to generate the jobs with the lowest costs.

7) แผนการดำเนินงานโครงงาน

First, we have studied research papers about the subject. Next, we will try to get clearer requirements and constraints. After that, we will try to formulate our problems and come up with the algorithms to solve them. Finally, we will simulate the situations and test them on computers to get the conclusion.

About the things I have done so far, I have studied some of research papers about the subject. There are many researchers who used exact methods (eg. Branch and price and cut, etc.) and heuristic methods (eg. Ant System, Particle Swarm, Genetic Algorithms, etc.) to solve different variations of vehicle routing problems (VRP) and Pickup and Delivery Problems (PDP). I also studied about Google Map API and Google's ORtools in case my group want to run simulations or a tests. Google Maps API can calculate times and distances between places, convert names of places to geocodes, etc. Google's ORtools can help us calculate optimization problems, routing problems (VRP, TSP) and graph problems (min-cost, max-flow). I think these tools are suitable for our project and maybe we can use them later.