[OT 6] STUDYING COURSE PLACEMENTS OPTIMIZATION PROBLEMS IN COLLEGE OF BUSINESS (COB) UUM

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ABSTRACT

This study about fundamental students enrolled at University Utara Malaysia (UUM). Foundation students are offered a variety of courses by the university. In this study we look based on 16 courses that College of Business (COB) offer. This research using quantitative methods for collecting information through the distribution of questionnaires to from fundamental students at UUM. This study involved 16 fundamental students at UUM at COB, selected as respondents. We have the accurate decision by using second quantitative method that called as AMPL. The programming of simple practical mathematical programming by using some algorithm in computer and printing for optimum solutions. This study aims to complete the placement of university students as an assignment problem by using mathematical programming method to solve the problem. The findings of the study will be used to increase knowledge on the issue of the appropriate placement courses for students and guidance to the university.

Keywords: *assignment problem, fundamental student, AMPL*

INTRODUCTION

Foundation programs are run by universities under purview of the Ministry of Higher Education. Foundation program is divided into several specific departments and takes between one to two years. Syllabus for basic program is more specific to the degree program, which is directed to the basic program. This study about fundamental students enrolled at University Utara Malaysia (UUM). Foundation students at UUM have a lot of courses available. In this study we look based on sixteen courses that College of Business (COB) offer. Based on the courses, we pick sixteen fundamental students for help us evaluate their choices ranking and analyze.

We have the accurate decision by using the mathematical method programming that called as AMPL. This programming using practical mathematical programming to seldom as simple as running some algorithmic method on a computer and printing to get the optimal solution. The programming consists of developing a model, an abstract system variables, objectives, and obstacles or constraints represented by the general form of the problem to be solved. Earlier, data that specify the problem should be collected in advance. Generating objective functions and constraints of the model and the data obtained. Solve problems with running the program, or resolver, to apply an algorithm that finds the optimal variable. Analyze the results. Refine models and data as necessary, and repeat the process.

AMPL interactive command environment that offers for setting up and solving a mathematical programming problem. The flexible interface allows multiple solvers to be available at once so users can switch between the liquidators and select the options that may be able to complete performance. Once the optimal solution is found, it will automatically be translated back to modeler's form so that users can view and analyze the last results.

Problem statement
The certain assignment problem in this study intended to solve the mathematical model a UUM fundamental student course placement problem. The assignment problem in this study is student to course placement. In this study, the n course have to assign each n student. The problem in this study is how to assign each course to each students. This problem we will using the mathematical model to get the accurate and reliable data answer. This problem always faced by the management in universities every year when students will enroll in universities.

Based on study problem that was done, so this objective of the study are as follows:
1. The goal of this research is want to assign each course to each fundamental students using the mathematical model.
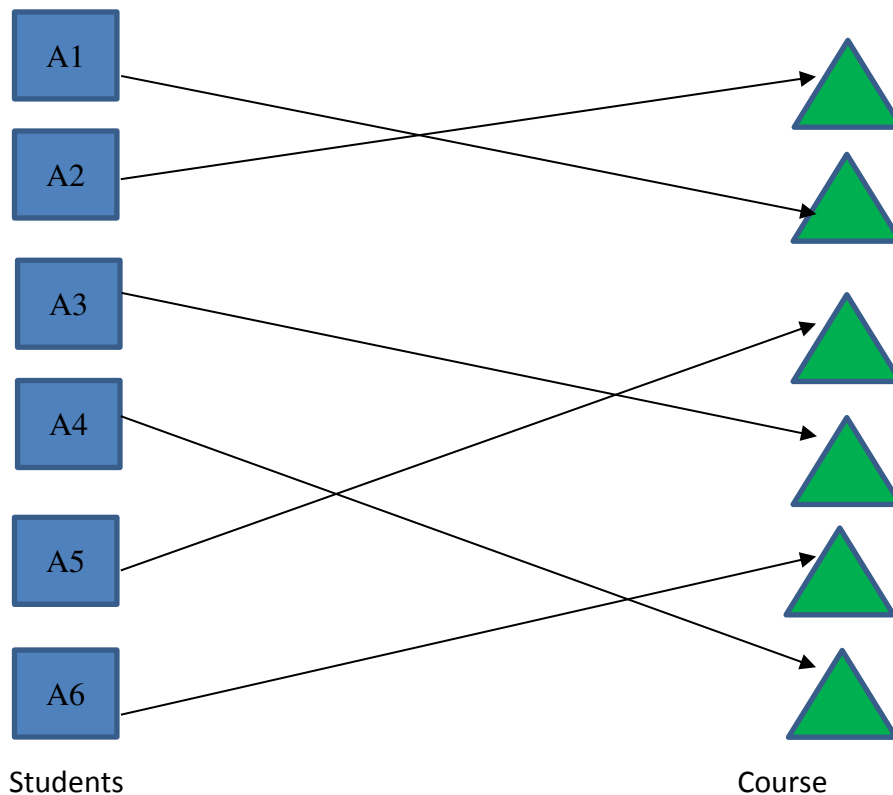

Figure 1
Network diagram for course placement

Research scope
The scope of the project that the research will be the new fundamental students as the respondents. The students were being offeres a variety of courses, but this study wanted to see their option under the business school offering sixteen courses. We make the decision using the mathematical programming that called as AMPL. Using this method we will have the accurate decision for the each student.

Significant of the study
Assignment problem is a transportation problem with the goal is to reduce cost and time in preparing some work by several people and maximize the efficient result, sales and others. When the problem involves the provision of facilities for different n different tasks, it is often referred to as the assignment problem. Many useful of assignment problem in solving the problem such as assignment of job placement, assignment a sales to the sales territories, assignment the suitable subject to each teachers, etc. The objective or intended this study want to using the mathematical model to solving the course placement among the fundamental students to look the accurate decision based on the mathematical model programming.

LITERATURE REVIEW

This chapter reviews literatures in the context of this study. In this section, discussion will be based on the objective study that for solving the course placement of a fundamental student.Education is growing with advanced lead to increasing number of students enrolled in universities. The progress of the growing technology in this time, the management find the easiest method to enable workers to handle the intake of students in the most simple and efficient. This study very simple because significant this study is important to help the management assign the students courses based on the choices. The study also wants to assign the best result that only one person will have one course. This section, we review the literature of several books that give their views and opinions about how it is work by one students and one course.

Assignment to place highly skilled workers with a job that fits their skills and ability level is a difficult task, because it requires assessment and judgment must thorough by the management with responsible and experienced. A wrong decision can cause loss of workers due to the level of understanding, they acquire the qualification does not match with what they get. Although interest matching quality is clear, deal with a hundreds of jobs and a source of dynamic market generated total rainfall of pressure to make decisions quickly. They using novel solution to bridge the gap between the need to match the high quality and the need for timeliness. By using mathematical programming, we can tackle this problem successfully overcome the complex constraints faced in the field and achieve nearly optimum assignment taking into account all sources and the ranking in the pool (Simon, 2012).

Assignment problem is one of the problems that occur in the context of linear programming. Apart from the importance of the theory, frequent appearances in field of distributed control and allocation the facilities, in which the size of the problem and the cost for computing and global information can be too high, causing the need for local solutions that dynamically assign different attractive tasks, while maximizing the benefits of the assignment (Hylland & Zeckhauser, 1979).

Considered this issue version is designed to reduce (i) costs give someone for activities, and (ii) the cost of moving a person from one job to other. The latter was regarded as a sequence dependent. The author integer multi-commodity network flow model and develop specific areas and bound algorithm for finding a solution. Instead of solving linear leniency program, the idea is to solve a set of sub problems shortest route and branches on work together assigned to do job with variety of machine Aronson (1986).

METHODOLOGY

The primary objective of this study was to solve the following primary research questions in using mathematically model for solving the course placement of a fundamental student at UUM. What option have been made by fundamental students?

The target population in this study is students in UUM. Students was selected by random sampling. The respondent in this study was only fundamental students at UUM. Only 16 students was selected based on 16 courses was offer in this study, but only purpose for this study because UUM have more than 16 courses offered for undergraduate students. The courses only focusing in College of Business (COB) because the research only wants to look more closely for 16 students result. A questionnaire was designed for easy understanding and the simple question. It is a tool designed specifically to collect information for analysis that can answer the research questions in the selection of 16 courses were offered the questionnaire survey.

Implementation began with a questionnaire on demographic aspects related questions from students for only want to know the background without making any analysis for that information. Next, the main question that will be given to students are 16 courses that offer for they make choices. Response number in this study is the highest about 3 students choice that courses are no 1 is Bachelor of Business Administration and courses no 5 is Bachelor of Accountancy. Second highest about 2 student choose this course is no 15 is Bachelor of Islamic Finance and Banking. The third course only 1 students choose each courses in different choices. Lastly, in 5 courses no one among students choose for their first choice.

DATA ANALYSIS

Mathematical model of the problem
The analysed the problem is expressed in terms of multicriteria, integer, combinatorial mathematical pogramming.
Parameter of the model:
Δij : The cost associated with assigned the course to each students.
βij : Assigned the course
$\c{s}i$: Amount for students
$\acute{C}j$: Amount for the course

Minimize total cost

$$\sum i\alpha\theta \sum j\alpha\gamma , \Delta ij . \beta ij$$

Subject :

$$\sum j\alpha\gamma \; \beta ij = \c{s}i \quad (1)$$

$$\sum i\alpha\theta \; \beta ij = \acute{C}j \quad (2)$$

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The objective function
minimize Total_cost :
  sum {i **in** ORIG, j **in** DEST} cost[i,j] * Trans [i,j];

subject to Supply {i **in** ORIG}:
  sum {j **in** DEST} Trans[i,j] = supply[i];

subject to Demand {j **in** DEST}:
  sum {i **in** ORIG} Trans[i,j] = demand[j

Table 1
The number of courses based on students choices

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
A1	5	4	13	3	7	6	2	1	12	10	11	14	8	9	15	16
A2	1	5	4	3	16	15	8	11	14	9	10	2	6	7	12	13
A3	7	16	9	11	15	6	14	5	10	13	8	3	1	12	4	2
A4	11	6	3	10	4	13	14	15	12	5	16	1	2	8	7	9
A5	10	14	11	12	3	4	13	5	7	6	16	15	9	8	1	2
A6	6	5	11	4	1	3	10	2	12	9	14	16	13	15	7	8
A7	8	7	15	6	1	2	14	3	4	5	13	16	9	12	10	11
A8	5	14	7	15	3	13	8	16	12	4	6	10	2	11	1	9
A9	1	3	14	2	13	16	4	15	5	12	6	9	11	8	10	7
A10	4	1	5	2	3	15	9	6	16	8	7	12	10	13	11	14
A11	11	3	12	4	10	14	1	16	2	9	13	8	6	15	5	7
A12	7	16	8	13	5	6	3	12	4	14	9	15	2	11	10	1
A13	10	9	7	14	1	2	6	3	4	5	8	12	16	13	11	15
A14	1	15	3	16	4	14	5	11	13	2	12	7	10	8	6	9
A15	3	14	13	1	12	2	11	6	4	10	5	9	8	15	16	7
A16	5	2	1	4	8	3	7	16	9	6	10	14	12	15	11	13

In this table shows the students represent capital A and courses with capital C. The list of course are below:
C1: Bachelor of Business Administration
C2: Bachelor of Entrepreneurship
C3: Bachelor of Human Resource Management
C4: Bachelor of Marketing
C5: Bachelor of Accountancy
C6: Bachelor of Accountancy (Information System)
C7: Bachelor of Risk Management and Insurance
C8: Bachelor of Finance

C9: Bachelor of Science in Economics
C10: Bachelor of Banking
C11: Bachelor of Agribusiness Management Science
C12: Bachelor of Technology Management
C13: Bachelor of Operations Management
C14: Bachelor of Business Administration
C15: Bachelor of Islamic Finance and Banking
C16: Bachelor of Muamalat Administration

Table 2
Result of assignment problem

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
A1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
A2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
A3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
A4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
A5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
A6	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
A7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
A8	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
A9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A11	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
A12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
A13	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
A14	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
A15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
A16	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

In this table show the result of assignment each students. For example, students number 1 (A1) as a result have course number 8 (C8) Bachelor of Finance as a result.

DISCUSSION

16 students were chosen at random to help achieve the objectives of this study. Through 16 students can be seen all choose the courses they will earn on average only yourself because this study only want to see the selection of courses that will be created based on the 16 courses on offer. Results also show that all students acquire the respective

courses. Even so, there are three courses with a lot of competition in the course offered still have an appropriate course and results should be in accordance with the choice of the student.

CONCLUSION AND RECOMMENDATION

Student placement problem is a problem that often occurs to the university management. Every university has a method that is used in the course to solve this problem student placement. In this study, only focuses on the fundamental UUM students who can serve as a guide and method are used to solve the problem of placement of students in this study were AMPL. Use AMPL method gives accurate results and is easy to be understood and analyzed by the user and also those who do not use it. This method can be applied in various situations similar to this. This study want to solve real-life problems at UUM for course placement problems by using a mathematical model programming provides a reliable result and systematic solution compared with other model programming. Model assignment problem can solve using scientific for the placement of students for various courses give better results. Management can have the benefit from the proposed approach for the placement of students in order to ensure optimum results. Therefore, we recommend that the model had a task to be adopted by UUM for student placement

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