Optimization of Employee Assignment in Content Management System Making With Hungarian Method

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Abstract. Organization or management institution of website creation service is difficult to choose and assign the employee to design and build a web which is needed by end user because of the trainedness of the same relative employees. The method for assignment in operational research is Hungarian method can be used by the leadership to determine and divide the duties of employees in terms of some assessment criteria are: Creating a responsive website design using Adobe Photoshop, Create icons or assets needed by using Adobe Photoshop or Adobe Illustrator, Creating web pages using HTML5 and CSS3 in accordance with W3C standards verifiable with W3.org validators, Creating responsive website designs using grid systems and CSS3 Creating animations using CSS3 and Javascript Creating interactive websites using Javascript and Jquery, Install and configure WordPress as a Content Management System based, use, create and modify themes to change the standard WordPress view, Use, create and modify plugins to add features from WordPress. With the above criteria and using the Hungarian method then the leadership will be able to assign employees in accordance with the ability or skill of each.

Keywords: Hungarian, Web Design, Website Manager.

1 Introduction

Stock trading is an economic activity that requires high accuracy in its application. In stock trading, there are many methods used to obtain the maximum benefit. From many methods used sometimes there are methods that do not provide maximum benefit and sometimes even disadvantages. Stock trading is related to the condition of the country where the company's stock are. For example Astra Agro Lestari (AALI) is in Indonesia, in the event of a crisis in Indonesia, it will potentially lead to stock price of Astra Agro Lestari will be down drastically. To see the movement of a stock is going through a time up trend or down trend then used the name technical indicator. Technical indicators related to the stock movement chart. The main component of the formation of the stock movement chart consists of 5 component of price is open, high, low, close, and volume of transactions.

The Development of technology with the presence of the internet, no doubt has provided many facilities for the organization in conveying information to the public [1] [2]. This is because there are certain communities, which makes the internet not just used as a lifestyle *(lifestyle)* alone but more than that has become the primary needs (primary needs) that must be met like other basic needs. This phenomenon is certainly not without cause. From the

internet itself does offer efficiency and effectiveness (relatively cheap, fast, global reach, shorten the time and distance).

The website manager is an organization responsible for technical issues of the development of internet technology in terms of information publication, tasked with reviewing various technologies focus on the evolution of the internet and ensuring the process is running.

Websites are often also called Web, can be interpreted a collection of pages that display various kinds of information such as text data, still images or moving, animation, sound, video or a combination of all, whether it is static or dynamic or the definition of a website is a collection of various web pages, integrated into a domain or subdomain on the Internet [3].

There are several factors that make the above happen, and usually these things are often felt by a team of developers. There are still quite difficult to avoid, namely: Not fit *business requirements* and expectations of each individual, either from the owner or from the development team; iteration process of application development is not running and technical problems are *clean code* and *code reinvention problem*. Failure to recycle code that has ever been created [4].

Preferably the number of assigned jobs should be equivalent to the number of people assigned, in order to form the basis of the assignment of problems where if fewer number of people achieved the work performed are considered optimal and considered the best way of producing good efficiency because the labor used less thus improves profitability. Not all cases are balanced situations where the number of people is the same amount of work. Sometimes when there is no parity between the two then the case is considered unbalanced. To influence the work of balancing the dummy the work / person is considered before proceeding on the assignment issue.

2 Research Methods

The assignment problem is a special type of transportation problem which is also a matter of resource allocation. In this study there is work to be done in the company and the problem is how to assign workers to this work optimally different companies are involved. Depending on the potential of the company, who is capable of completing tasks in different times [5]. Then, the objective function is to assign different jobs to different companies is to find an optimal assignment that will minimize the total time required to complete all the work by the company, detailed algorithms for maximization and minimization problems as in the Hungarian method algorithm in solving the problem [6] [7] [8].

The research method used to facilitate and obtain optimal results hence required the flow from the beginning to the end are sorted in detail, can be seen in the picture diagram below:
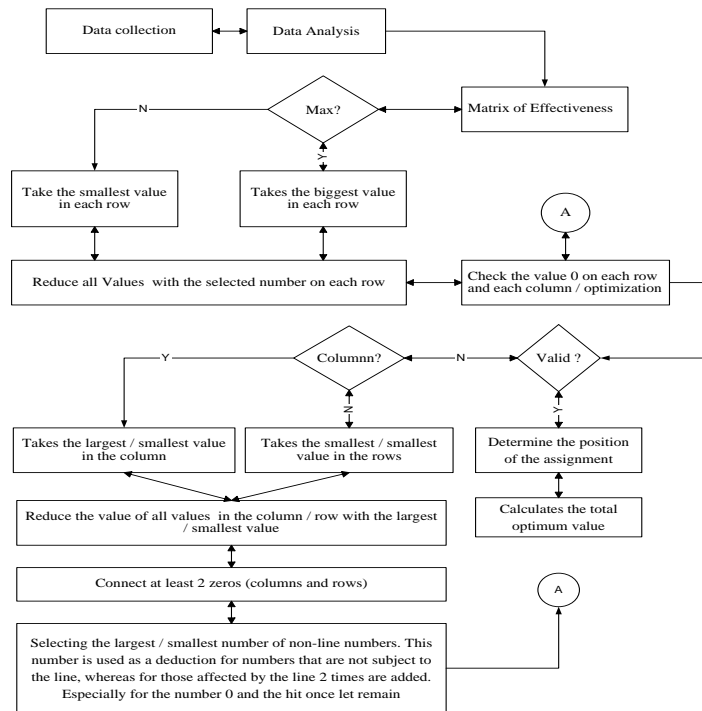
Figure 1. Diagram of Research

The method of data collection used in this research is begins with data collection [9]. The data used is secondary data that is data that has been recorded and processed. In addition, support data obtained from interviews and observations.

This research uses quantitative analysis that is analyzing the test result data of each employee on web design test and completion time according to Content Management System criterion using Hungarian method to maximize the right employee, in this case got 9 (nine) Highest score employee and assign task of each Employee in accordance with the specified criteria field .

Table 1. Establishment of Employee Values for the mastery of Web Design

No.	Areas of ability / Employee	A	B	C	D	E	F	G	H
1	Create responsive website design using Adobe Photoshop CS6 / CC.	74	80	79	80	80	81	80	79
2	Create icons or assets needed by using Adobe Photoshop CS6 / CC or Adobe Illustrator CS6 / CC.	83	82	79	78	79	79	79	81
3	Create a web page using HTML5 and CSS3 in accordance with W3C standards verifiable through the w3.org validator.	80	83	79	79	81	80	80	80

4	Creating a responsive website page design using the grid system and CSS3.	80	77	79	80	79	80	79	80
5	Create animations using CSS3 and Javascript.	80	78	78	79	80	80	82	78
6	Create interactive websites using Javascript and JQuery.	82	79	79	83	79	80	81	80
7	Install and configure WordPress as a Content Management System base.	79	76	83	77	80	79	78	79
8	Use, create and modify themes to change the standard WordPress view.	80	80	80	80	80	80	80	81
9	Using, creating and modifying plugins to add features from WordPress.	80	83	82	82	80	79	79	80
	Average Employee Value	79.78	79.78	79.78	79.78	79.78	79.78	79.78	79.78

Quantity gained is the Employee Value for each of the criteria obtained for Employees there are 9 (nine) Employees with the highest score and criteria for web design there are 9 criteria. After the data is represented in the form of an assignment table, it is directly resolved by Hungarian method.

3.Results and Discussion

The issue of assignment relates to the wishes of the firm in obtaining an optimal assignment or assignment (assignment), in the sense that the assignment is related to the profits then how the allocation of tasks or assignments can provide maximum benefit, cost [10].

Solving the problem of assignment is usually done by using Hungarian method which in 1916 was developed by a Hungarian mathematician named D König [6]. In general steps solving the problem of normal assignment are:

1. Identification and simplification of the problem in the form of table assignment

Table 2. Employee effectiveness matrix

Field of ability / Employee	A	B	C	D	E	F	G	H
1	74	80	79	80	80	81	80	79
2	83	82	79	78	79	79	79	81
3	80	83	79	79	81	80	80	80
4	80	77	79	80	79	80	79	80
5	80	78	78	79	80	80	82	78
6	82	79	79	83	79	80	81	80
7	79	76	83	77	80	79	78	79
8	80	80	80	80	80	80	80	81
9	80	83	82	82	80	79	79	80

2. For the case of maximization, find the highest value for each row then the highest value is subtracted by all the values in the row.

Table 3. Matrix Result Reduction of each row with largest number

7	1	2	1	1	0	1	2
0	1	4	5	4	4	4	2
3	0	4	4	2	3	3	3
0	3	1	0	1	0	1	0
2	4	4	3	2	2	0	4
1	4	4	0	4	3	2	3
4	7	0	6	3	4	5	4
1	1	1	1	1	1	1	0
3	0	1	1	3	4	4	3

3. Make sure all rows and columns already have a zero value. If there are still columns that do not have a zero value, then look for the smallest value in that column for subsequent use to reduce all the values that exist in the column.

Table 4. The result of examination of value 0 on the columns and rows

7	1	2	1	1	0	1	2
0	1	4	5	4	4	4	2
3	0	4	4	2	3	3	3
0	3	1	0	1	0	1	0
2	4	4	3	2	2	0	4
1	4	4	0	4	3	2	3
4	7	0	6	3	4	5	4
1	1	1	1	1	1	1	0
3	0	1	1	3	4	4	3

→

7	1	2	1	(1-4) = 3	0	1	2
0	1	4	5	(4-4) = 0	4	4	2
3	0	4	4	(2-4) = 2	3	3	3
0	3	1	0	(1-4) = 3	0	1	0
2	4	4	3	(2-4) = 2	2	0	4
1	4	4	0	(4-4) = 0	3	2	3
4	7	0	6	(3-4) = 1	4	5	4
1	1	1	1	(1-4) = 3	1	1	0
3	0	1	1	(3-4) = 1	4	4	3

4. After all rows and columns have a zero value, the next step is to confirm or check whether in the assignment table, zero value has been found, as many sources are also reflected by the number of rows. This step implies that each Employee can only be assigned to a single job [11].
5. If not, then the next step is to draw a line that connects at least two zeros in the assignment table.

Table 5. Matrix connecting 2 numbers 0 (rows / columns)

7	1	**2**	1	3	0	**1**	2
0	1	4	5	0	4	4	2
3	0	**4**	4	2	3	**3**	3
0	3	1	0	3	0	1	0
2	4	**4**	3	2	2	0	4
1	4	4	0	0	3	2	3
4	7	0	6	1	4	**5**	4
1	1	**1**	1	3	1	**1**	0
3	0	**1**	1	1	4	**4**	3

6. Next, note the values that have not been exposed to the line. Select the smallest value, then use it to subtract other values that have not been exposed to the line, and use to add the values that are exposed to the line twice.

Table 6. Determining the position of the assignment.

7	1	1	1	3	0	0	2
0	2	4	6	0	5	4	3
3	0	3	4	2	3	2	3
0	4	0	0	4	0	1	0
2	4	3	3	2	2	0	4
2	5	4	0	0	4	2	4
4	7	0	6	1	4	4	4
1	1	0	1	3	1	0	0
3	0	0	1	1	4	3	3

7. From the result of step 6, whether now has been found the value of zero amount or as much of the resource is also reflected by the number of lines.
8. If it is, then the assignment problem has been optimal, and if not yet it needs to be repeated step 5 of the completion of the above.

Table 7. Calculates the total optimum value.

A	B	C	D	E	F	G	H
					81	80	
83				79			
	83						
80		79	80		80		80
						82	
			83	79			
		83					
		80				80	81
	83	82					

Table 8. Result

Employees	Field	Value	Details
A	2	83	Make icon or the assets necessary to use Adobe Photoshop CS6 / CC or Adobe Illustrator CS6 / CC.
B	3	83	Creating a website page using HTML5 and CSS3 in accordance with W3C standards that can be verified through w3.org's validator.
C	7	83	Install and configure WordPress as a Content Management System base.
D	4	80	Create interactive websites using Javascript and JQuery.
E	6	79	Using, creating and modifying themes to change the standard WordPress view.
F	1	81	Creating responsive website design using Adobe Photoshop CS6 / CC.
G	5	82	Create animations using CSS3 and Javascript.
H	8	81	Creating a responsive website page design using the grid system and CSS3.
Total Value		72.44444	

4.Conclusion

The assignment system of division of labor in website creation services with allocation of tasks, namely: Creating icons or assets needed by using Adobe Photoshop CS6 / CC or Adobe Illustrator CS6 / CC; Creating web pages using HTML5 and CSS3 in accordance with W3C standards verifiable through the w3.org validator; Installing and configuring WordPress as a Content Management System base; Create interactive websites using Javascript and Jquery; Using, creating and modifying themes to change the standard Wordpress look; Creating responsive website design using Adobe Photoshop CS6 / CC; Creating animations using CSS3 and Javascript; Creating a responsive website page design using the grid system and CSS3, should be assigned the right Employee is one employee must be able to do at least 3 tasks. Assignment of Employees using Hungarian method is still rely on the data value of practice that the assessment is different for each assessor, so that can not be made the main benchmark.

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