

# Information System Employee Attendance at PT. Sigma Cipta Caraka Web-Based Using Coloring and Sequential Search Methods

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## Abstract

At PT. Sigma employee attendance is still done manually by hand writing into a book by entering the hours of arrival and hours of leaving work. From the TDS unit, the process that was carried out manually was found to be a problem where attendance was not appropriate. Difficult to trace, and a high risk of data loss. On the other hand, employees who work with assignments to leave the office have not been accommodated so employees who are outside the office must return to the office to fill in attendance manually by writing a hand, so a computerized attendance system is needed and can be accessed by employees who are on duty outside the office. by connecting to the internet network, so that problems can be resolved properly. and for monitoring and reporting daily employee attendance can be directly seen and displayed. From the problems above, the writer uses the coloring method to monitor employee attendance and assisted by sequential search for the employee tracking process.

**Keywords:** coloring, sequential search, web, employee absence

## 1. Introduction

PT. Sigma Citpa Caraka is a subsidiary of Telkom which is a business partner of IBM. Where the company that was founded for approximately 5 years has many employees who have worked for this company. In the TDS unit, employees who work for attendance are still done manually and the personnel needs an application that can be accessed by employees on duty at the office or outside the office so that it can be recorded and documented which can be used to evaluate performance and for recitation. In this paper, using a coloring graph to monitor employees who are out of town with employees in the office. By using the coloring grab method where the colored nodes do not overlap between the employee nodes in the office and employees who are on duty outside the city [1]. From the application that will be developed, it is hoped that it can display a menu to assist personnel in seeing the presence of employee data as a calculation of salaries and also performance calculations. The application that will be developed uses the web because it can be accessed by employees who are on duty outside the city without having to come to the office to fill in their attendance. Where this research aims to solve the problem of employee absenteeism which is still being reproduced by the elderly and will be developed with a web-based application for employee attendance attendance. Which makes it easier for personnel to record employee attendance data.

## 2. Research Methodology

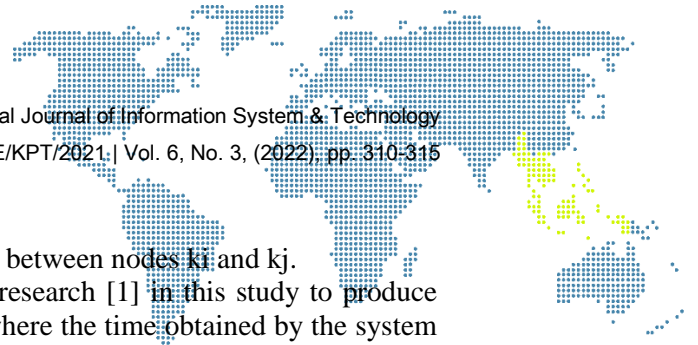
Graph coloring method is a mathematical method that has been used for a long time in various fields. where the graph itself is a set of pairs  $(k,m)$  where  $k$  represents the vertices and  $m$  is the set of connected edges in the table.

$$K = \{k_1, k_2, k_3, \dots, k_n\} \quad (1)$$

$$M = \{m_1, m_2, m_3, \dots, m_n\} \quad (2)$$

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$$M = \{(k_1, k_2), (k_2, k_3), (k_3, k_4), \dots, (k_{n-1}, k_n)\} \quad (3)[6]$$



Where  $M = (k_i, k_j)$  is the edge of the interconnection between nodes  $k_i$  and  $k_j$ .

There are also researchers who have conducted research [1] in this study to produce the amount of time for the instructor for one week where the time obtained by the system is  $8 \times 6 = 48$  hours. if the results of the overall time for instructors teaching the registrants reach 60 - 62 hours it will automatically close, [3] Sequential tracing will be tried in the e-BIP application used in processing population data, processing assistance from the government, and identifying residents. where this application will present data related to population data information used by the Garung village, [4] the pattern of instructions for arranging meeting schedules for each division and staff of PT. JAC uses a color graph model to anticipate the schedule in the space that will be used at the same time. this application results in a reduction in time to order and determine the meeting room schedule, from some of the research above the author makes a study with the title Employee Attendance Report PT. Sigma Cipta Caraka Web-Based Using Coloring and Sequential Search Methods.

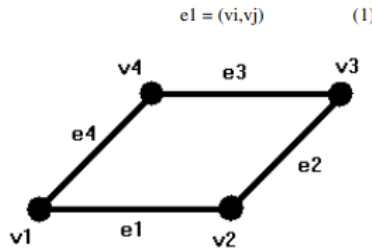
### 2.1. Research Object

In this study the object is PT. Sigma Cipta Caraka which focuses on the TDS unit where the author conducts research on employee attendance which is still used manually and will try to use applications using coloring and sequential search methods.

### 2.2. Data Collection Method

To obtain data and information, the researcher used several methods. Among others:

- a) Observation  
The first step that the author did was to observe the system running on the process of inputting employee attendance at PT Sigma Cipta Caraka in the TDS unit.
- b) Interview  
After making direct observations, the researchers then conducted in-depth interviews with the TDS staff in the HRD section where the employee data collection was carried out.
- c) Literature review  
The researcher did this to find references related to this research topic and to find out the various previous studies that had been done. The literature includes books, journals and websites that can facilitate researchers in completing this research.
- d) Coloring  
The coloring model used in [6] is a model that can determine the minimum total color that can be directed at nodes or edges on a graph, then nodes or edges that have relations are given the same color where later nodes are data from employees at PT. Sigma Cipta Caraka. Calculations that can be performed using a similar method of calculating [6] graphs are set pairs  $(V,E)$ , where:  
 $V$  : a collection of vertices and not  
like a set that has no value =  $\{v_1, v_2, v_3, \dots, v_n\}$   
 $E$  : the set of edges of the graph that  
unite the combined vertices on the graph =  $\{e_1, e_2, \dots, e_n\}$   
if an edge  $e_1$  connects a pair of  
vertex  $v_i$  and  $v_j$ , then simply intertwined described can be seen.



**Figure 1.** Simple Graph Shapes [6]

The steps in the method c=coloring graph

- 1) The picture of the bonds in the picture above must represent the name of the instructor.
  - 2) Defines the edges of pairs of nodes that use similar resources, meaning that 2 instructors cannot teach at the same time.
  - 3) coloring the graph, the last step that must be made is to color the bonds in the graph with the smallest color, so that there are no attached ties and have the same color [5].
- e) Sequential Search

Sequential search is a way of searching data where the search starts from the prefix and suffix related to the word to be searched [5]. but from the advantages it definitely has disadvantages if the search process to be carried out has data that is at the end then the process will be longer and more time will be used. The process for solving sequential search is the simplest pattern of search instructions. sequential search is also known by another name straight search. The main point is, the solving procedure which compares each element sequentially from the first to the end with a tiered process. if in the process the data has not been found then the search is still running and vice versa if the data has been found then the process will stop.

With coloring, you can map employees who are on duty outside the city and are in the office. Where from the color will represent the node of the node.

### 2.3. Data Collection

The data in this study were obtained from PT. Sigma Cipta Caraka, TDS unit in the process of reporting employee attendance.

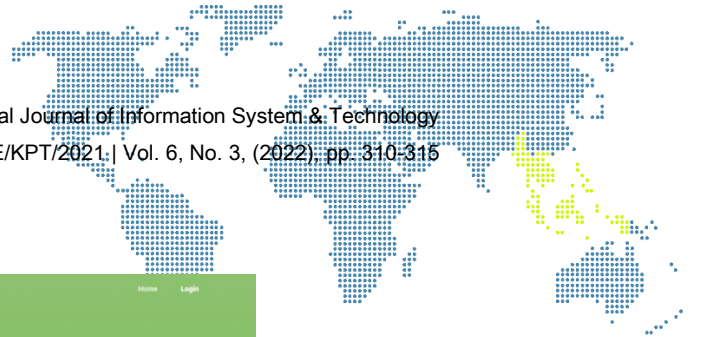
### 2.4. System Testing

System testing is carried out to determine the level of user success for the applications developed in this research. application testing to find out for employee coloring and the application of the sequential search method to the application

## 3. Results And Discussion

### 3.1. Implementation

In this stage, the author implements the developed application where the application developed is based on a web base, which uses the CI framework and the PHP and SQL programming languages for the database. Web-based employee attendance report application using coloring graph and sequential search methods for application development and display can be seen in the following figure:



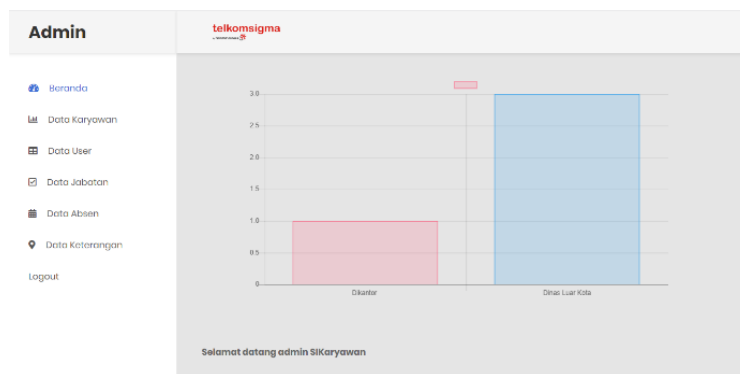
a) Index Pages



**Figure 2.** Index Pages

The index page is the initial page that will be displayed when users and admins access the application.

b) Admin Homepage



**Figure 3.** Admin Homepage

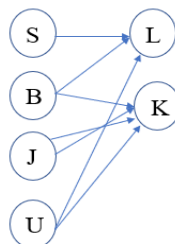
On this page the admin is presented with several menus that can be accessed including the employee data menu, job data, information data etc.

**3.2. Testing**

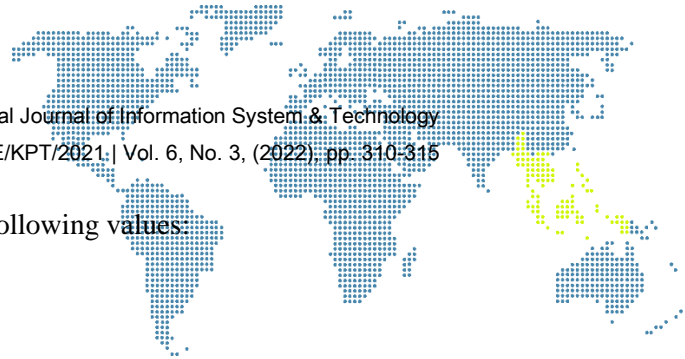
From the test results using the graph coloring method into the data system grouped based on or identification as follows:

- a) There are employees who work outside the city with a letter from the office;
- b) Number of employees in the office;
- c) If there are employees who are out of town, their attendance will still be counted and the same as employees who work in the office.

In the guidelines can be used into the technique of coloring properties, which are used for employee attendance for the process in the above case the explanation can be seen:



**Figure 3.** Proses coloring graph



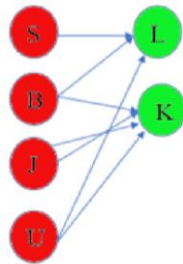
In the coloring graph above, it is a process with the following values:

- S = Sarah mutia
- B = Bagas b
- J = Julfikar
- U = kindness

From the process of getting affiliation between the employee's name and the position the employee is currently working on.

- S = 1 (red)      L = 3 (green)
- B = 2 (red)      K = 4 (green)
- J = 1 (red)
- U = 2 (red)

From the results of the implementation of the coloring graph method, it can be seen in the image of the coloring result



**Figure 4.** Coloring result

So it can be converted into a table as follows:

**Table 1.** Data Sample

	outside the office	the office
Sarah Mutia	1	0
Bagas B	1	1
Julfikar	1	0
Budi	1	1

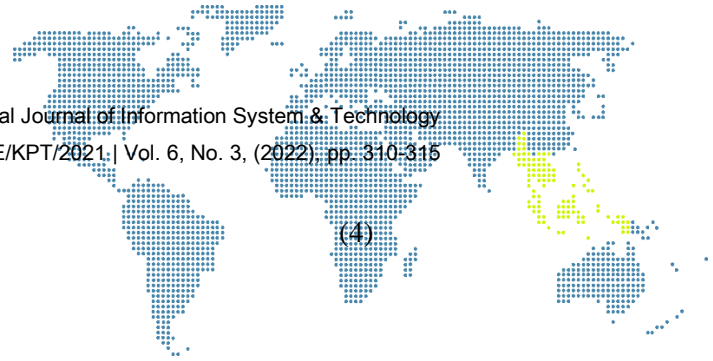
In the conversion table, the conversion of graph to graph coloring that has been related between coloring and location is currently working where (1) indicates presence and (0) indicates absent. Furthermore, testing the sequential search method which can be seen from the following table:

**Table 2.** Sequential Search Testing Speed

Proses	Data	Sequential Search	
		Memory Capacity (byte)	Total Time (ms)
1	Sarah Mutia	5	6
2	Bagas B	4.7	6.4
3	Julfikar	10	5
4	Budi	4.6	6.1
Total		24.3	23.5

For the average speed of the data search process using the sequential search method with the formula:

- Average speed = TP
- Total Data = r
- Total Amount of time = S



$$TP = \frac{S}{r}$$
$$TP = \frac{23.5}{4} = 5.876\text{ms}$$

And for the memory capacity used on average:

Average Memory capacity = TM

Total Data = r

Total Amount of time = M

$$TM = \frac{M}{r}$$
$$TM = \frac{24.3}{4} = 6.075\text{b}$$
(5)

From the test results for each data search using the sequential search method requires an average time of 5.876ms by using memory for searching of 6.075b.

#### 4. Conclusion

The conclusions resulting from this research are this research produces a web-based employee attendance application that can be used by PT. Sigma Cipta Caraka to assist personnel in recapitulating and monitoring employee attendance. The application has been tested using the sequential search method where the average value for searching data is 5.876ms using memory for searching is 6.075b.

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