Design and Application Data-Based Employee Eat Barcode Scanner

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Abstract. The process of managing data and eating employees is underway now in the process of counting the number of employees who take servings still use conventional methods. Collection without using other tools so that in calculating the number of employees who take portions of food is very susceptible to errors, and making reports are still handwritten on paper so that it cannot present reports quickly and accurately. A system development process to produce software that facilitates the process of managing employee meal data. This application is to develop design software to manage employee data input using a barcode scanner and prepare reports for parties involved in management. This software development process uses the system development life cycle method that starts from the system analysis phase, system design, to the system implementation stage. The expected results of the development of this software can help officers involved in the process of managing employee data, such as the calculation of the number of employees taking food portions, and reporting by the system designed based on the results of the analysis of the running system, so that it can present the information needed more quickly, accurately, relevant and as expected.

1. Introduction

The development of technology at this time requires every company to be able to improve the quality of its performance to face the increasingly rapid global competition. The complex manual work system must begin to be transformed into a computerized system so it is expected to accelerate and simplify the process of delivering the required information accurately, timely, and relevant.

In the process of managing the data feeding employees at STT Mandala that runs today is still done conventionally where the collected coupons are calculated one by one so it takes a lot of time and energy, as well as a vulnerable error occurs when the calculation process. In addition to the reporting process also experienced obstacles, it takes a lot of time and energy in processing reports for data that are still handwritten so that the necessary reports can not be directly provided, and frequent violations that occur due to the presence of employees who do not bring coupons to eat Which resulted in the incompatibility of the number of employees who ate with the number of portions expired on that day.

Therefore, it takes a system that can process the data by making improvements in the process of data processing employees and the process associated with the activity on the data processing employee employees. Improvements will be made is to create a recording system using a computer-
based system, which is integrated with the employee absentee process as a validation process to
determine which employees are allowed to take the portion of the meal on that day.
Based on the above description we can identify the following issues:
1. Recording and processing employee feeding data and reporting are still using conventional way.
2. Information on employees who are allowed to take portions of food can not be obtained quickly and
   accurately.

2. Material and method
The method used in the development of this software is using the waterfall.[3] The waterfall which
includes several processes including:

2.1 Requirements Definition
This stage is the service, limitations, and objectives of the system created by consulting it with the
users of the system. It is defined in detail and displayed as a specification of the system.

2.2 System and Software Design
The phase system design process divides the system needs ie software and hardware. It builds the
whole system architecture. The software design includes the identification and elaboration of
abstracts of basic software systems and their connectedness.

2.3 Implementation and Unit Testing
This stage is the stage of software design to be realized as a set of programs or program units. Unit
testing includes verifying that each unit meets its specifications.

2.4 Integration and System Testing
Stage individual program units are combined and tested as a complete system to ensure that
software requirements are met. After testing, the software system is communicated to the
customer. The result should be perfect by the requirements already defined.

2.5 Operation and Maintenance
The final stage where normally this stage is the longest in the lifecycle. The system is installed and
used practically. Maintenance includes fixing unknown errors in previous stages, improving
system unit implementation and improving system services when new needs arise. [4]

The Waterfall Method according to Sommerville

![Diagram of Waterfall method with labels for each stage: Requirements Definition, System and Software Design, Implementation and Unit Testing, Integration and System Testing, Operation and Maintenance.](image)

**Figure 1. Waterfall method**
A barcode scanner is a device that optically scans a barcode and translates the data in the barcode from the barcode pattern into data that can be used by a computer or other device.[5] There are various forms of barcode scanners, their size, and their capabilities. The simplest scanners are called "wands". Because they are small, just move it and simple construction makes it the cheapest and most effective scanner. Other scanners use laser, CCD and image scanners.[6]

A laser scanner works with a laser that is passed to the barcode to be scanned (scanned). The detector in the scanner captures the light and dark lines that make up the barcode. CCD scanners work on the same principle, but there are no moving parts. Bright LED lights capture moving laser beams. The image scanner is the most complex, having a special detector that captures the barcode image and then encodes it back inside [7]

Table 1. Technology, Strengths, and Disadvantages of Barcode Scanners

| Technology | Strength | Weakness | Range |
|------------|----------|----------|-------|
| Wand       | Low cost | Tethered, limited to 1-D barcodes | Contact |
| Laser      | Scanning range | Cost, most limited to 1-D barcodes, some PDF417 | Short to Long |
| CCD        | Cost, reliability | Scanning range, 1-D or PDF417 | Short |
| Imaging    | Reads 2-D barcodes, some can capture images | Cost | Short |

The laser beam is deflected periodically by a rotating polygon mirror (PG).[8] When this turning beam reaches a barcode symbol, it will be scattered. The intensity of the scattering depends on the dark or light lines of the bar (bar). The main direction of the scatter is opposite to the laser beam. [9]

Figure 2. The working principle of a barcode scanner
(Pandapotan, 2008)
This beam of light is transferred to the light detector through a transparent mirror and lens. Changes in intensity are converted in the form of electrical signals and processed by the microprocessor. [10]

In this case, the barcode reader works by directing a beam of light across the bar code and measuring the amount of light reflected back. Then, the scanner converts light energy into electrical energy, which is then converted into data by a decoder and forwarded to the computer. [11]

3. Results and discussion

3.1. Problem Analysis

Problem analysis will not happen by itself, but there must be a cause. As the basis of identifying the cause of the problem then explained about the flow map or document flow diagram as well as procedures for managing employee data feeding that is running. For more details can be seen from the procedures for managing employee data feeding that is running, as follows:

- Employees who will eat beforehand should take the meal coupons that have been provided for the employee in the lobby.
- The lobby operator checks whether the employee's coupon is available (registered) or not.
- If the employee's meal coupon is available, the employee may take a portion of the meal in the canteen, if not available, then the employee is not allowed to take a portion of the meal (the next process is not explained here).
- The meal coupons are then passed to the cafeteria operator to be exchanged for one serving.
- After the break time, the cafeteria operator calculates how many meal coupons are collected and the catering operator calculates how the portion of the meal is exhausted for subsequent reports to be submitted to the HCD section.
- The report of the number of employees who eat the day is then submitted to the HCD section for further processing (the next process is not explained here).

From the procedure of data processing process employee employees who walk on, still found some problems as follows:

- The process of calculating employees who take the portion of food is still not able to produce reports quickly because the calculation is done by counting one by one coupon to eat that collected.
- The validation process of employees who eat is not available, for example, the process of validation of employees who do not come to work and come only to take the portion of the meal.
- Error reporting is still not going well, for example for employee reporting that takes the portion of the meal not at the time specified by the company.

3.2 Report the results of the analysis

Procedures for the process of data management of the proposed employee meal, that is as follows:

- Employees first perform attendance by scanning the employee identity card (name tag) on the scanner.
- Furthermore, the system checks whether the data and the time the employee entered is appropriate or not, if the data and time accordingly then the entry process is successful, if the data is not appropriate or the time is not appropriate (late) then the entry fails and employees are considered absent and not allowed Take a portion of the meal.
- After the break time, employees scan the name tag on the scanner to take the portion of the meal.
- Furthermore, the system checks whether the schedule of employees who will take the portion of the meal is appropriate or not with the specified meal schedule data. If appropriate then the employee can take the portion of the meal. If the data is not appropriate, the employee is
allowed to take a portion of the meal, but the system will record the violations that have been committed by the employee.

- After the break time, the cafeteria attendee only prints the employee data feeding report that day without having to calculate how many employees are eating, because when employees scan the name tag on the scanner, the system automatically records the number of employees who have taken the portion of the meal.
- Likewise, catering operators make a recapitulation of the number of eating portions that run out by calculating how the portion of food that has been exhausted.
- Employee data feed reports that have been printed by canteen operators and which have been recapped by catering operators submitted to the HCD section for validation, whether the number of employees who take the same portion of the meal with the number of portions of eating out. (The next process is not explained).

For the technical design stage, required to run this employee data feeding software application can be viewed as follows.

### Table 2. Design technology

| Hardware | Software |
|----------|----------|
| Intel Dual Core 2.0GHz CPU, 2GB DDR3 RAM, 768 Mb VGA, 320GB hard drive, Optical DVD-RW. VGA Monitor Standard USB Keyboard. Optic USB Mouse Barcode Scanner desktop type or an Omni-directional that supports barcode reading with code 128. Inkjet/laser printer. UPS 2000 VA | Operating System Windows XP, Windows 7, or Windows Java Runtime Environment (JRE) at least version 8 Microsoft Visual C ++ 2005 Redistributable and / or Microsoft Visual C ++ 2008 Redistributable. XAMPP is at least version 1.8.1. |

### 4. Conclusions

After testing this software, there are several recommendations for further research, which are as follows:

- The system implementation stage of this software is only up to the testing of the program and should proceed to the testing phase of the system so that the software can be used and completed by what is required by the company.
- Employee attendance software designed in this discussion only processes the information needed for employee data management software employees, so for the next expected to process information about absenteeism as a whole.

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