Purchase Order Information System using Feature Driven Development Methodology

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Purchase Order Information System using Feature Driven Development Methodology

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ABSTRACT

This research conducted in one of manufacture company in Indonesia, in conducting it's business the firm has no purchase order system to support it's business process. The company still rely on traditional way in processing their purchase orders. By using this method the company can't covers all of the process in the company. This research aim is to generate a purchase order information system which can maximized the the company performance especially in purchase order processing, which is the most important aspect in the company. The development of this information system will use Feature Driven Development methodology the reason is because the Feature Driven Development methodology can provide advantages such as adaptiveness, customer satisfaction and reduction of development risks.

Key words : purchase order, information system, feature driven development.

1. INTRODUCTION

Purchase order Information System is an application that is used to buy goods from supplier that customer needs, the importance of good management in company purchase order is essential [1] [2]. The objective of this system creation is to simplified work process and to avoid problems in the traditional purchase order making [3], and identify whether they belong to the same system [4].

Software Development Methodology is a complex [5] framework in software engineering that is used to plan, arrange, and control software development [6] [7]. Bad software development knowledge can cause many faults [8] [9] [10]. Software Development is considered successful if the project can be completed within the time, budget and satisfied

customers at the same. The common problem in software development is always associated with changing requirements or change in technologies [11] [12] [13]. Agile is a software development methodology designed to outcome this problem, Agile methodology provides flexibility in handling changing requirements while enhancing speed development [11] [13]. In Agile development the requirements are broken into smaller parts, each part should be estimable, negotiable, small and able to be tested. Iterations are part of agile methodology iteration is a short time frames that usually last from one to four weeks. Feature Driven Development is one of the models in agile methodology, FDD consists of five processes which is: develop an overall model, build a features list, plan by feature, design by feature and build by feature [15]. Nowadays the environment of business is very dynamic and uncertain [30]. Companies are required to adapt quickly to the situation, as well as software development. This development brought drastic changes [31]. In the traditional waterfall model software SDLC, the whole project is divided into a number of stages: user requirements gathering, design and documentation, development, testing and deployment [16]. By this approach each stage must be completed in order to continue to another stage. The main weakness of this approach is that the errors often not discovered until the application is deployed. Agile Methodology is designed to outcome this weakness. Feature Driven Development each iteration is meant to be short and includes all of the waterfall steps. This guarantee that errors or bugs can be discovered in early stages of development.

2. LITERATURE REVIEW

2.1 Information System
Information System is a combination of hardware, software and people to collect data and generate accurate information when needed [17]. Components of informations system :

- Hardware, Consists of computer equipment used to perform activities such as input, processing, storage and output operated by human.
- Software, Consists of computer program contains set of instructions that tells a computer what to do or specific activity
- Data, data is an organized collection of facts. Example of data in organization are customer data, supplier data, employee data, payment data etc.
- Network, Network is a group of connected computers, network is used to transfer data from a computer to another.

Management Information System is a processing from data into information. MIS is contained in every systems that process or provides information for business [18]. The main purpose of MIS is to provide enough information for decision makers to support decision making process.

2.2 Traditional SDLC in Software Development
SDLC is the abbreviation of Software Development Life Cycle, SDLC is mostly used in software development industry [19] [20]. Because of this SDLC has been studied by many researchers and practitioners around the world, the most popular SDLC model followed in the industry is waterfall model. Five phases in waterfall model consists of analysis, design, implementation, testing and maintenance.

2.3 Agile Software Development
Agile is an iterative and incremental based software development, where the user requirements are broken into smaller stories and are changeable according to client needs. Each process in Agile can be revisited over and over again to improve the software's quality [21] [22] [23]. Agile process requires less planning; the aim of Agile is to develop software by using client's feedback to produces high quality software [24].

There are 5 phases in Agile SDLC processes:
- Vision and project approval, agile starts with the vision phase by analyzing the user requirements or problems to produce solutions at the proposed system model.
- Exploration, the aim of this process is to reduce uncertainty in user requirements by meeting stakeholders continuously as a form of brainstorming.
- Iteration planning is a process where the software development planning is separated and scheduled.
- ADCT or Analysis, Design, Coding and Testing, is a process where the software is produced and its functionality is tested.
- Release phase, is a process where the software is released for implementation [21] [25].

3. RESEARCH METHODOLOGY

Six main roles who in charge toward project are project manager, chief architect, development manager, chief programmer, class owner, and domain experts. Project manager is the highest person in application development with the FDD methodology. Almost all aspects are managed by project manager ranging from financial to design. Project manager are also communicators between developers and clients. The chief architect is responsible for leading the modeling team and describing the overall system design. The Development Manager task is to oversee daily development activities on a regular basis, identifying risks, solving problems. The Development Manager acts as a coordinator in the team to produce the appropriate application. The programmer is responsible for identifying the class and choosing people to lead it. Chief Programmer also intensively coordinates programmers. Class owners are a combination of developers who work in small teams under the supervision of the Chief Programmer who are tasked with designing, coding, testing and documenting new features needed by the application that needs to be done. The domain expert is a combination of client, sponsor, business analyst who has knowledge in business to explain to the developers what activities are needed by the system being worked on.

The methodology used in this research is Feature Driven Development. Feature Driven Methodology is one of the agile methodology in software developing which focuses on feature, the FDD main objective is to plan and develop software by feature in timely manner [26] [27]. Overall there are five (5) main processes in FDD that can be seen on figure 1:
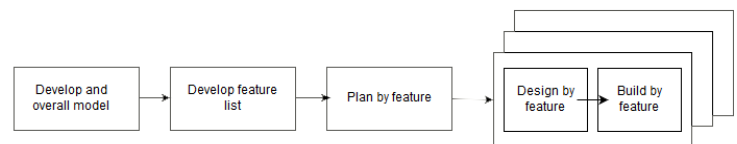
Figure 1: Feature Driven Development Process [26]

1. Develop an Overall Model
   The first process in FDD methodology is to develop a detailed model of the system; the aim of this process is to generate the scope of the software. The results of this process are Class Diagrams that describes the classes needed in the domain, how they are connected and the operations and attributes that have been identified, sequence diagram and note why the model has been chosen and its alternatives.
2. Develop Feature List
   The second process is to identify and develop feature list that is used as criteria for the next process based on the client request. The results of this process are list of main features and main feature activities.
3. Plan by Feature
   The third process is the team leaded by the chief of programmers must design and prepare the planning documentation for each module that the teams have identified from the feature list. Each module must have estimation of completion. The results of this process are

features set with estimated completion (months and years), key features with estimated completion (months and years) and class list and developer responsible for each class.

4. Design by Feature

The fourth process is to schedule a number of features for development assigned by the Chief Programmer, design inspection is also performed in this process. The results of this process are paper or memo describing the design package, referenced requirements (if any), sequence Diagram (if any), alternative designs (if any), model objects that are added or renewed.

5. Build by Feature

The fifth process is to develop and implement the features that are selected; the team must develop the system by module one after another. Each code is tested to check if it meets the requirement or not [26] [27]. The results of this process are completion of features creation by the feature team [28] [26] [24] [29].

4. IMPLEMENTATION
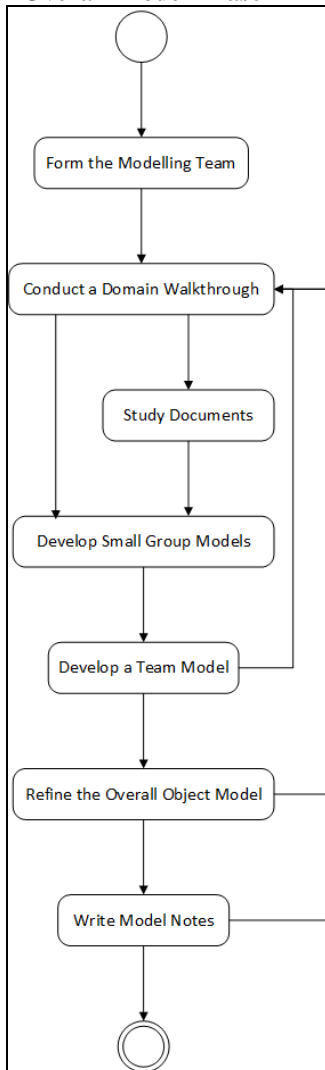
4.1. Develop an Overall Model Phase

Figure 2: Develop an Overall Model Process

This phase is also known as domain modeling, the main objective of this phase is to map the process and the connection between the actors and systems are represented by UML Diagrams. With the UML Diagrams we can predict the modules needed in the software as seen on figure 3.
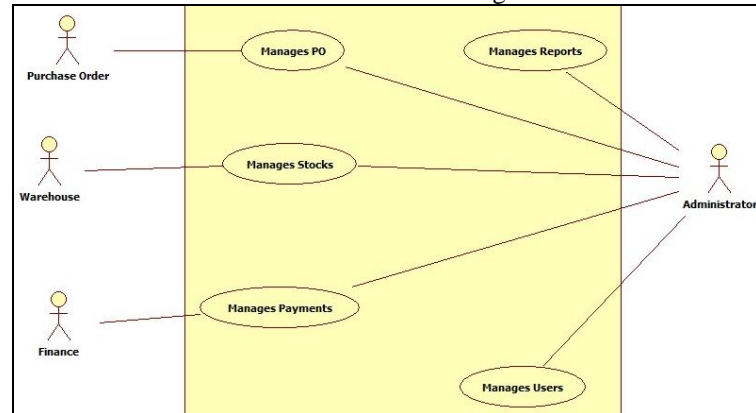

Figure 3: Use Case Diagram of Purchase Order Information System

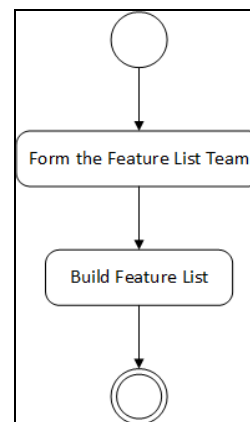### 4.2. Develop Feature List

Figure 4: Develop Feature List Processes

The second phase starts with building a detailed, prioritized feature list as seen on table 1. Feature list team is formed to build the feature list as seen on figure 4. Team member must already know the project scope to build the feature list as seen on table 1. Each feature should be small and compact enough to be completed about two weeks, if a feature takes more than two weeks then the feature should be decomposed into smaller features. The short iterations or sprint in the feature provides up-to-date builds to the customer.

Table 1: Feature List

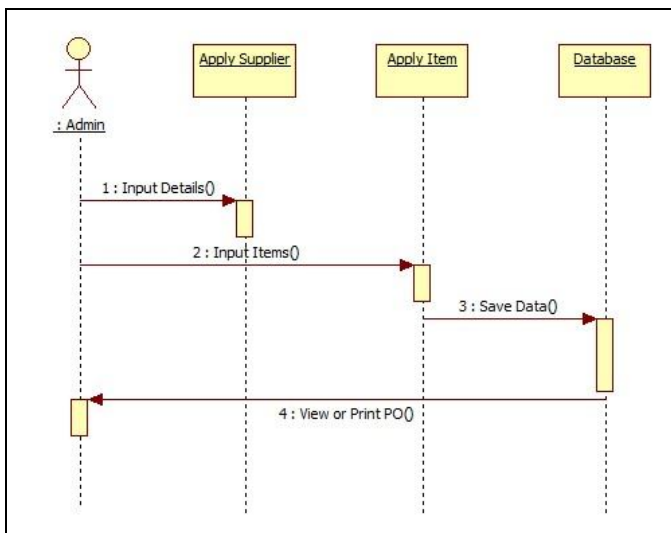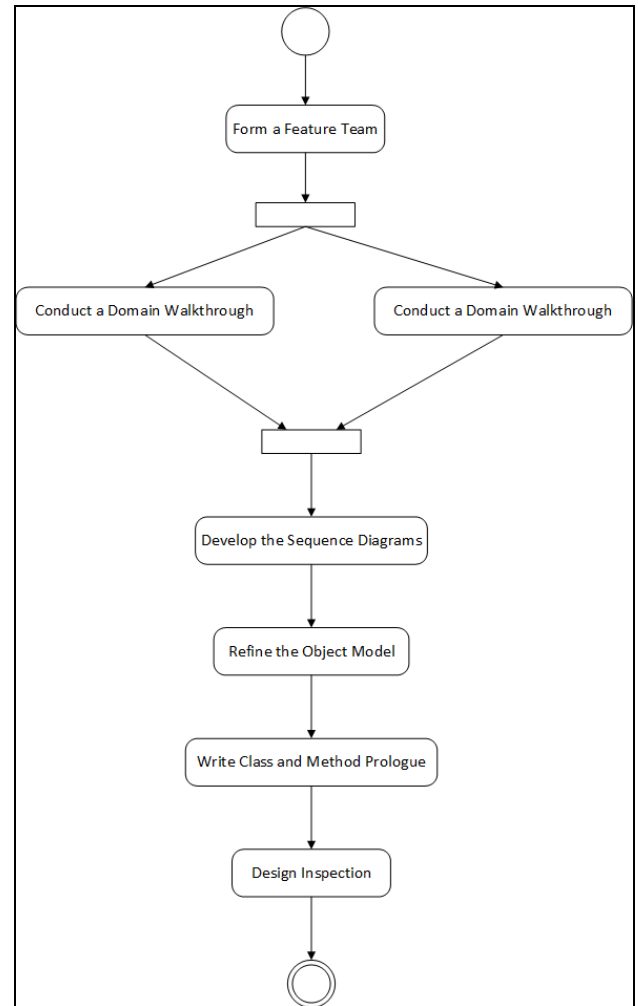| No.	Features
1	Generates a purchase order
2	Add items
3	Add supplier
4	Edit Items

4.3. Plan by Feature
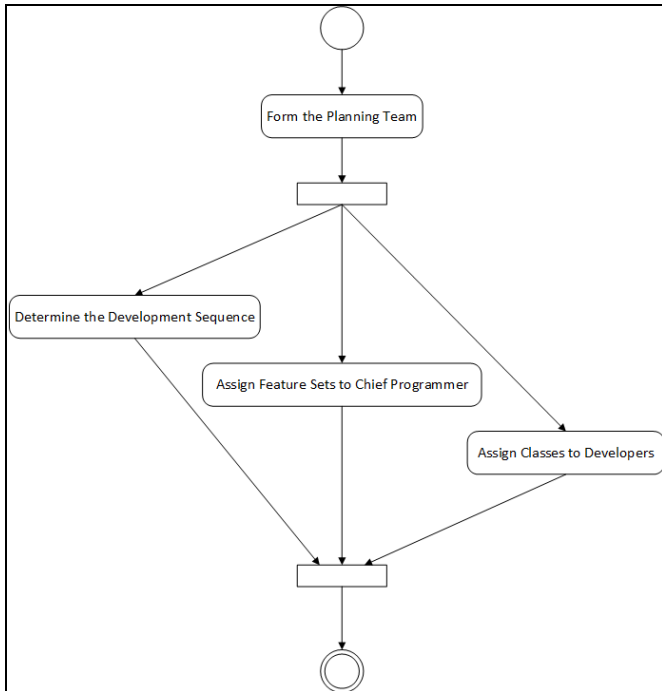
Figure 5: Plan by Feature

The third phase is to plan the overall development; this plan lists all the features based on the priority and their dependencies. The planning team is formed and assigns due date for the activities based on dependencies, work load and complexity of the development. The next step is the team starts to assigned classes to the programmers. All of the activities in this phase is documented using the gantt chart, the gantt chart helps the team to see the overall progress of the development as seen on the figure 5.

4.4. Design by Feature

**Figure 7:** Sequence Diagram of PO making Process

Figure 6: Design by Feature

The fourth phase is preparation design features that are selected to develop, the sequence diagram is used to picture the feature and how it works as seen on the figure 7. User Interface design is also conducted in this phase which can be seen on figure 8. The development schedule and design inspection is also conducted.

Figure 8: System Interface for PO

4.5. Build by Feature
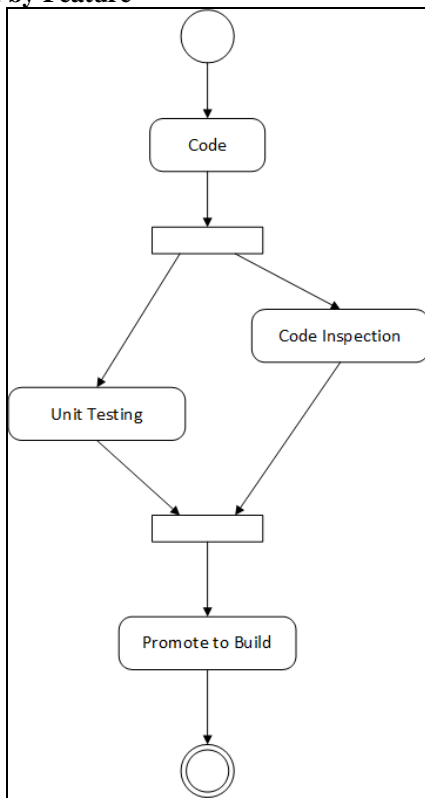
Figure 9: Build by Feature Processes

The fifth phase is where the technical action is conducted, after a thorough check on the designs the team starts the development by each module. Code inspection and unit testing are conducted in this phase to check whether it meets all of the user requirements as seen on the figure 9.

5. CONCLUSION

Information system is a cruical technology in every business with this technology, company could increase its efficiency and maximize it performance. By implementing purchase order information system, firm can handle all the following issues, process data more accurate and faster, generate real time reports, computerized all transactions, provide accurate information.

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