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Interns: Mentoring and Counseling on the Software Development Process

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ABSTRACT The Digital Transformation Services Internship Program at PT Arkatama Multi Solusindo aims to provide opportunities for intern students to develop themselves through direct experience in real projects. With a comprehensive learning approach, interns are given the flexibility to choose positions according to their interests, such as *UI/UX designer*, *Web Developer*, and others. This program not only focuses on developing technical skills but also emphasises moral education and professional ethics. Intern students will be involved in prototyping and follow the development process from planning to implementation. The results of their work are documented through *logbooks* and final reports, building a valuable portfolio. The internship is carried out on-site according to health protocols at PT Arkatama Multi Solusindo, which focuses on digital transformation in various sectors. Services provided include application development, IT Training, and Digital Marketing Services.

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1. INTRODUCTION

The Digital Transformation Services Internship Program held by PT Arkatama Multi Solusindo has clear and comprehensive objectives. The internship program is designed to provide benefits as well as opportunities for intern students to develop themselves in various aspects (Cameron, 2022; Mulders, 2022; Suharsiwi et al., 2023). The main objective of this program is to transfer technology and knowledge (Holtmann, 2023; Wilkinson, 2023) from prospective employees who are ready to join Arkatama in the future (Habudin et al., 2023; Sari et al., 2022; Sudiantini et al., 2023), and build early connections for prospective business partners who plan to establish their own company (Mukaromah et al., 2022; Triono et al., 2023; Zahroh & Hartiningtyas, 2023)

This program provides a unique opportunity for intern students to be directly involved in real company projects (Andersson, 2018; Zhao, 2021), from the planning (Zhuansun, 2019), analysis (Vinogradova, 2019), design (Huang, 2019), to implementation stages (Yang, 2020). At each stage of the project (Lillis, 2020), students will be guided by mentors who have expertise appropriate to the area of the project being worked on. With adequate guidance (Ivanescu, 2020), intern students can

optimise their potential and gain valuable experience in the industrial world (Abdelrahman, 2020; Sinclair, 2020).

Internship program participants have the flexibility to choose a position that suits their interests and talents. Positions to choose from include *UI/UX designer* (Ghani et al., 2020), *Web Developer* (Lee, 2019), *Mobile Developer* (Liu, 2018; Sulisworo, 2016), *Software Tester* (Hadi, 2018), *Content Creator* (D'Amico et al., 2019; Lalitha, 2017), *Content Writer* (Mukherjee, 2019), and *Technical Writer* (Chung, 2018). This way, each student can focus on the areas they are most interested in and hone relevant technical skills.

During the internship, each participant will follow detailed documentation through an internship *logbook* and prepare a final internship report (Cicero, 2020; Raynaudo & Peralta, 2019). The results of the projects completed by the participants will become an essential part of their portfolio (Sápiras & Bayer, 2021; Yalman, 2014). This will be concrete evidence of the abilities and contributions they have made during the internship program (Kirby & Anwar, 2020; Slutskaya & Linoski, 2020).



Apart from mastering technical skills, the internship program at PT Arkatama Multi Solusindo also emphasises the importance of moral education and professional ethics (Fauza et al., 2022; Hasanah et al., 2022). This is very relevant in the world of business and industry, where good communication and a strong work ethic are critical factors for success. Internship students will be given this necessary provision so they are ready to face the world of work with comprehensive readiness.

With a combination of technical skill development, experience in real projects, and provision in aspects of morals and professional ethics, internship students at PT Arkatama Multi Solusindo will be ready to enter the real world of work. They will bring not only the necessary knowledge and skills (Darmayanti et al., 2022; Sekaryanti et al., 2022) but also a professional attitude that will help them achieve success in the world of industry and business.

In order to support the mastery of technical skills, moral education or professional ethics (R Maghfiroh et al., 2023; Sugianto et al., 2017), the internship program will be carried out *on-site* according to working hours and adequate health protocols at the PT Arkatama Multi Solusindo office, in the Joyoagung Greenland No. 1 housing complex. B4-B5 Tlogomas, Malang City. As a company illustration, PT Arkatama Multi Solusindo dedicates its efforts to helping accelerate digital transformation in Indonesia, especially in the education, government and micro, small and medium enterprises (MSMEs) sectors (Muhammad et al., 2023; Vidyastuti et al., 2018). Currently, PT Arkatama Multi Solusindo provides four digital services, namely application development according to user needs, hardware and *IT Infrastructure, IT Training for business, and Digital Marketing Services*.

One of PT Arkatama Multi Solusindo's business lines that is proliferating is application/software development services according to user needs. PT Arkatama already has clients in the education, government, telecommunications, travel, health and cosmetics sectors. Apart from that, we have a new business line, namely *digital marketing services* (E Safitri et al., 2023; Widodo et al., 2023). This business line focuses on digital marketing services by providing training and digital marketing services to increase online product sales.

2. METHOD

In order to provide valuable experience to internship program participants, PT. Arkatama Multi Solusindo prioritises providing comprehensive material regarding the software development process. Each participant will be given an in-depth understanding of the steps, starting from planning (Ilham, 2019), needs analysis, design, and development to the software implementation stage (Susanto, 2017). Through the presentation of this material, participants will get a comprehensive

overview of how software is developed in a natural business environment.

While participating in the internship program at PT. Arkatama Multi Solusindo, participants will get extensive and varied provisions (Mózo, 2017; Zayyadi & Subaidi, 2017). This includes mastery of technical skills relevant to the position chosen by each participant. In an environment focused on technology and software development, participants will be given in-depth training to improve their competencies in areas such as *UI/UX design, web development, mobile development, software testing, and so on*.

However, more than just mastering technical skills, PT. Arkatama Multi Solusindo also places importance on moral education and professional ethics (Aprilyani & Qosim Khoiri Anwar, 2021; Herdiana et al., 2021). Participants will be equipped with a solid understanding of how to act professionally, maintain work ethics, and communicate well in a natural work environment. This professional ethics is a crucial aspect that will help participants establish good relationships with colleagues, clients and all parties involved in the work process.

By combining the provision of material on software development and education on technical skills and professional ethics, PT. Arkatama Multi Solusindo provides comprehensive preparation for internship participants in facing the challenges of the natural world of work. Participants not only have in-depth knowledge of software business processes (Bakri, 2017; Visnu, 2020) but also have the necessary technical skills. In addition, they have been trained to interact professionally (Adimayanti & Siyamti, 2020; Maulita, 2022; Yulianto & Arumsari, 2016), communicate effectively, and adapt to the company's work culture.

Program providing materials and supplies to internship participants at PT. Arkatama Multi Solusindo is a real effort to form professional candidates who are ready to face challenges in the information technology industry (Nofiani & Julianto, 2018; Nugraha & Suletra, 2017). With a comprehensive understanding of the software development process and mastery of technical skills and professional ethics, participants are directed to become individuals who are able to contribute optimally in a dynamic and competitive work environment.

3. RESULTS AND DISCUSSION

The Software Development Life Cycle basically relies on several stages that developers must go through. The following image shows a general software development cycle.

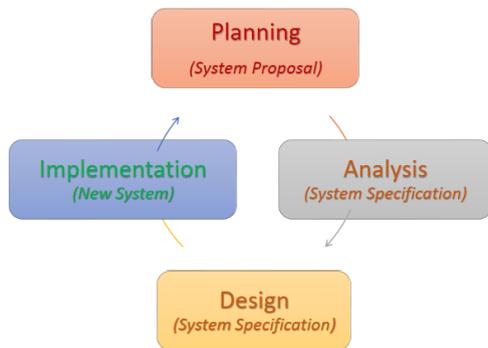


Figure 1 Software Development Life Cycle

The Software Development Life Cycle (SDLC), also known as the Software Development Life Cycle, is a series of steps and processes used in software development, from initial conception to delivery of a ready-to-use product. SDLC provides a structured framework for managing software development projects effectively, controlling risks, and ensuring the quality of the resulting product.

Stages in SDLC

General stages in SDLC include:

a. Conception (Conception):

This stage is the beginning of the software development process. At this stage, the idea or need for developing software is identified. This involves an initial analysis of the problem to be solved or the opportunity to be exploited.

b. Planning (Planning)

At this stage, the overall project plan is drawn up. This includes establishing project objectives, estimating costs and resources, scheduling, identifying risks, and determining the team involved.

c. Analysis

At this stage, functional and non-functional requirements are identified and analysed. The development team works closely with stakeholders to understand the requirements of the software to be developed.

d. Design

The design stage includes designing the overall software structure. This involves system architecture design, user interface design, database design, and design of the components that will be used in the software.

e. Implementation

At this stage, the actual software code is written, and the designed components are integrated. Developers translate designs into code that a computer can execute.

f. Testing

After implementation, the software is thoroughly tested to ensure that all functions work correctly and that any problems or bugs are found and fixed.

g. Delivery (Deployment)

Once the software is deemed ready, the final product is delivered to end users or implemented in a production environment.

h. Maintenance

After delivery, the software still requires care and maintenance. This may include bug fixes, feature enhancements, or updates to maintain compliance with changing environments or business needs.

These stages often form a linear sequence. However, there are also iterative-based or incremental SDLC approaches, such as Agile and Scrum, where the stages iterate over short cycles to allow for quicker adaptation to changing needs or emerging problems during development.

SDLC Model

Several different Software Development Life Cycle (SDLC) models can be used in software development, each with its unique approach and methodology.

Here is a brief explanation of some standard SDLC models:

a. Waterfall Model

This model is a linear and sequential SDLC model. The development stages occur sequentially, starting from analysis to implementation, without returning to the previous stage. Once one stage is complete, the next stage begins. Suitable for projects with stable and precise requirements.

b. Iterative Models

This model involves iterative development of the software, with each iteration adding new features or expanding existing functionality. Each iteration involves complete SDLC stages but with an emphasis on fast iteration and shorter feedback cycles.

c. Prototyping Models

The SDLC prototyping model is an approach that involves creating an initial prototype of the software before full development begins. A prototype is a rough representation of the software to be developed, usually with a focus on critical features or user interface.

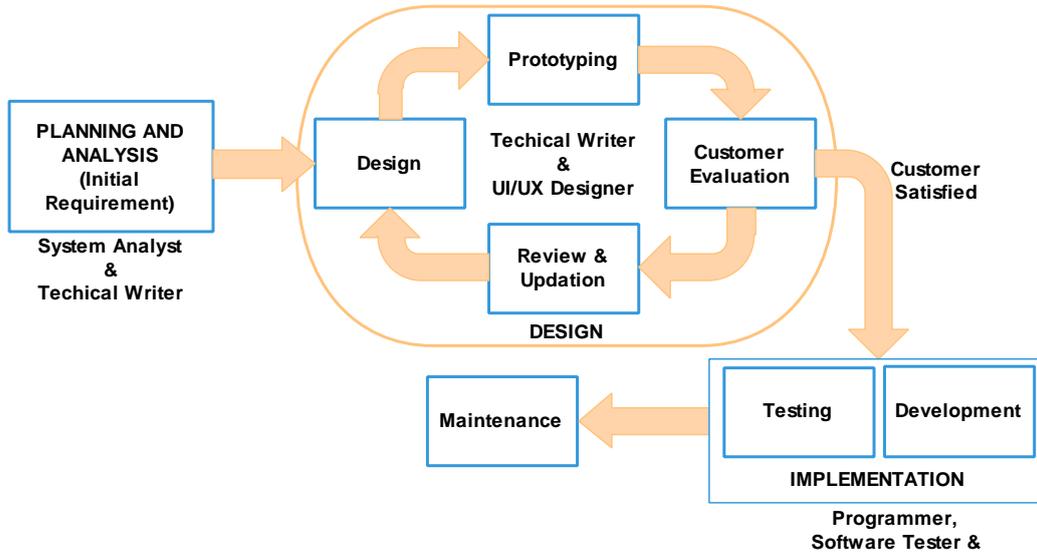
d. Incremental Model

Similar to the iterative model, this model focuses on gradual development with features added at each stage. However, the difference is that each stage produces "increments" that can be used or improved if necessary.

e. *Agile Model (Agile SDLC)*

This approach emphasises flexibility, adaptability, and teamwork. Projects are broken down into short development cycles called “sprints”. Teams

Each SDLC model has its advantages and disadvantages, and the choice of the suitable model must be tailored to the project needs, available resources, and work environment.



Gambar 3. Proses Pengembangan Software di PT Arkatama Multi Solusindo

work together continuously to produce software that can be delivered quickly and frequently.

f. *Scrum Model*

One of the well-known Agile frameworks is Scrum. It involves forming an organised team, short sprint periods, and regular meetings to evaluate progress and plan next.

They were assisting and counselling apprentices at PT. Arkatama Multi Solusindo's Intern Onboarding event was held at the beginning before the interns started their internship period. Following are several moments of events held in February 2022.

g. *Kanban Model*

This is a more flexible approach to workflow management. Work is represented as cards that move through stages on a board, which helps teams understand and manage workflow visually.



Figure 2. Software Development Process Assistance and Counseling for Internal Onboarding at PT Arkatama Multi Solusindo Malang

h. *V-Model (Validation and Verification Model)*

It is an extension of the Waterfall model, where each development stage has a corresponding validation or testing stage. This emphasises the importance of thorough validation and verification at every stage of development.

i. *Spiral Model*

This model combines elements of the iterative model and the waterfall model. Each iteration involves a development cycle that includes planning, analysis, development, and testing, and each of these cycles forms a “spiral coil” that represents the next iteration.

PT. Arkatama Multi Solusindo applies the SDLC Prototyping model because it best suits the Company's system and framework. At each stage in this Prototyping model, each software development division can easily coordinate and communicate so as to minimise misunderstandings when the software is being developed.

The image above shows the software development process implemented at PT. Arkatama Multi Solusindo.

Planning and Analysis

At the Planning and Analysis stage, the most important roles are the System Analyst and Technical Writer divisions. The two divisions will coordinate to carry out tasks in the form of *Requirement Gathering*. The *Business Requirements* process in *Requirement Gathering* is critical in software development. In it, important statements will be formulated regarding what the system can do. Apart from that, this process will focus more on what the system must do and not how it can do it.

There are two types of requirements, namely:

1. *Functional Requirements*
 - a. Contains requirements regarding the overall software function
 - b. Modeling is carried out using Unified Modeling Language (UML) and describes feature explanations in the form of problem statements
 - 1) Diagrams (Use-Case Diagrams, Activity Diagrams)
 - 2) Problem Statements (Must search for inventory, must perform these calculations, Must produce a specific report)

2. *Non-Functional Requirements*

Some examples are:

- a. Operational – Physical/technical environment
- b. Performance – Speed and reliability
- c. Security – Who can use the system
- d. Cultural & Political – Company policies, legal issues

Design

At the Design stage, the divisions responsible are the Technical Writer and UI-UX Designer. The Technical Writer division will coordinate and explain to the UI-UX designer division the requirements for the system that were described in the previous stage. That way, there will be no misunderstandings in expressing system requirements in the interface or user experience.

Some program designs focused on this stage include:

- a. User Interface Design
- b. Sequence Diagrams
- c. Class Diagrams
- d. Deployment Diagrams

So, at this stage, a prototype will also be produced, which represents what the finished system will look like.

Implementation

Several divisions responsible for the implementation stage are Programmer, Software Tester and Technical Writer. These three divisions will collaborate and work together to turn the results of the previous stage into a system/software that is ready to use.

Programmers have the task of producing program code (Software Construction) that is in accordance with existing UI-UX requirements and designs. Each module that the programmer has completed will be submitted to the Software Tester to check its function and operation so as to minimise errors (bugs) in the system. At this stage, the system documentation process is also carried out in the form of Software Documentation carried out by the Programmer and User Documentation carried out by the Technical Writer.

4. CONCLUSION

Implementing software development that relies on a disciplined model by each division can support a measurable and neat software development process and avoid significant mistakes in the future. With the socialisation of this software development model, it is hoped that apprentices who have just joined PT Arkatama Multi Solusindo can quickly adapt to the environment and work rhythm in the company.

This research on Community Service activities was created with the hope that it can contribute to the development of science and technology and provide the broadest possible benefits for the community and government in order to make the PGRI Wiranegara University campus the leading partner of the government and community.

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