LEAN PRODUCTION IN SOFTWARE ENGINEERING

Name: Stephen Akaeze
Date: 12/ 15/2017

Overview

Lean production methods are product development approaches that minimize resource waste without affecting productivity. The Lean production and methods emphasize on pre-calculated organizational structure for the most effective and scalable manufacturing processes. It was initially observed in use in the Asian manufacturing companies, such as Toyota. In comparison to their American competitors, Toyota and other Lean-practicing automotive companies pioneered design approaches that were constantly reevaluated and resulted in more favorable product development cycles.

Benefits of Lean Production Methods

1) **Resource Optimization**: The Lean Production Methods advocate of a comprehensive and cross-functional collaboration product definition. This involves strategically defining products requirement and transparently assigning both human and non-human resources. It prevents any future vagueness that might result during the actual product development.
2) **Efficient and Organized Teams:** Lean teams prioritize communication to prevent any assumption. Some projects can be compartmentalized by inter-team members have to constantly communicate so that every close-knit works in unison.

3) **Less Project Delays:** Lean advocates for structured and transparent development cycles which are different from the just-do-it approaches. Most times, the just-do-it approaches create endless loops of cross-team problems resulting in more time and resources spent on fixing problems that could have been avoided.
4) **Less Product Recalls:** Extensive product definition and efficient product life cycles will result in less dysfunctional products that might result in recalls or potential law suits.

Similarities between auto manufacturing and software engineering

1) Customer /Client expectations: It has become a global expectation that most automotive car brands must release a new car version. For example, there is a Toyota Camry 2015, Toyota Camry 2016, Toyota Camry 2017 etc. This yearly expectation puts great expectations on automotive companies. Similarly, every year there are faster processors, memory cards and improved software platforms which demand constant release from Software Engineers. For example, every year there is a newer phone version and improved android operating system leading the end users to expect more functionalities and increased speed.
2) Limited resources: Like most production companies, every project has limited resources (time, parts, finance etc.) leading to the development of method such as Lean to reduce resource wastage without compromising productivity. Similarly, most Software Engineers have scarce resources such as time, processor speed and available memory space. This results the development of design cycle approaches such as agile to optimize all available resources.

3) Product reusability: In both Software and Automotive industries, products are often designed for reusability. This involves building products that can easily be customized to serve several purposes. This usually also supported with sufficient documentation for future third party users.

How Software Engineering can be improved using Lean Methodology Techniques

1) **Leadership:** Lean Methodology emphasizes on the importance of good leadership. Software Engineering will benefit from an effective leadership in the various ways
    a. Exceptional product definition and resource allocation.
    b. Exemplary team management and future software roadmap management.
2) **Teamwork**: Lean Methodology emphasizes on the importance of great teamwork. Software Engineering will benefit from great teamwork in the various ways
    a. Good cross functional collaboration ensures that Software Engineering development cycles are seamless and cover all potential exceptions and risks.
    b. Good team communication ensures that each team work as a unit and prevent potential Software release deadlines and dates.
    c. Good teamwork ensures that all projects and code are properly reviewed and support is provided to better and more reliable software.
3) **Communication:** Lean methodology emphasizes on the importance of quality communication. Software Engineering will benefit from great teamwork in the various ways:

    a. Good software collaboration tools such as GIT represent Lean methodology's approach to ensure that teams perform optimally as a unit.

4) **Simultaneous Development:** Lean methodology emphasizes on the importance of simultaneous development. Software Engineering will benefit from great simultaneous software development in the various ways.
    a. It ensures that wholesome and profitable software is always created.

The following aspects of CSCI E-97 follow the Lean Production Methodology

- Software Design product requirement to structured problem solving approaches.
- Peer reviews and peer communication for better and improved products.
- Code reuse for product versatility and utility.
- Structured product development sprint cycles for faster and better coordinated product development.