Summary of lecture One and Two

Hierarchy positions in software companies

1. *Chief Technical Officer(CTO)*
    - he owns shares in the company.
    - he has a huge background in the software industry.
    - making a direct discussion with CTO to specify the new Projects to work on and specify the technologies that suit these projects and tell him the total budget and timeline of the project.

2. *Project Architect*
    - present a plan to the CTO including Design Documentation that contains all features of the project and the best technologies for it.
    - Write system requirements specification(SRS) with senior engineers to describe what software will do and how it will be expected to perform.
    - Write customer requirement specification(CRS) with the client to understand more about the wanted product.

3. *Senior Engineer*
    - Receive the design documentation from the architect and build a functional system that converts all features in the design to abstract functions.
4. *Junior Engineer*
    - Implement all functions that locate in a functional system.

Methodologies of process

- *Waterfall*
  - Dividing the projects into sequential parts like (Design - Documentation - coding - Testing - Documentation … - user manual) then product in the market now!
  - If the project is not successful then the cycle is repeated again.
  - Most Embedded projects support waterfall.

- *Agile*
  - Dividing the projects into different components.
  - Specifying the task for each component to specify the dependency between components.
  - Building the dependency tree.
  - Dividing the projects into parallel processes based on the dependency tree.
  - It’s hard to fail but easy to incur a huge loss for the company.

DEV-OPS

- Evaluate the development process in the company with respect to employees and clients and how to develop it.
- Evaluate the tools of developers and follow up with them to collect data about the time they need for some task to search, implement, document, and so on.

DEV-SEC-OPS

- Evaluate the security process of some stacks to detect all parts that may be security warnable.
- Responsible for the container. (Docker)
- Docker is a container in which a project is uploaded to it to make sure that the product will have a fixed execution time on any platform. (generalization)

DEV-SEC-AI-OPS

- Responsible for following software that is used to check if there is some feature that may be processed in an automated way.
- Responsible for creating AI that track developer to collect data about their work like how many sentences they have written and efficiency of code and other statistics like that.

Normalized Difference Vegetation Index(NDVI)

- a simple graphical indicator that can be used to analyze remote sensing measurements, assessing whether or not the target being observed contains live green vegetation.

- NDVI = (NIR - R) / (NIR + R)

- It has multiple formats
    - Colorized NDVI:-
        - Remove channel G from the RGB image and insert a new channel NDVI instead.
        - Used as an indicator to express vegetation of plants in the image.

    - NDVI Black/white:-
        - Image, in this case, has just one channel.
        - Used as an indicator to specify the place of plants in the image.

- The intuition of NDVI is based on the relation between red color and near-infrared color. (red edge)

- The more plant reflects NIR, the more it has high vegetation.

- The more plant absorbs NIR, the more it has low vegetation.

- NDVI value locates in the range from [-1:1]

- If NDVI is near to one, it has high vegetation.

- Else if NDVI is greater than zero, it has low vegetation.

- NDVI less than zero expresses water.