SOFTWARE PROJECT MANAGEMENT

Software engineering is an engineering branch associated with the development of software products using well-defined scientific principles, methods, and procedures. The outcome of software engineering is an efficient and reliable software product.

Software Development Paradigm

- Requirement gathering
- Software design
- Programming

Software Design Paradigm

Design
Maintenance
Programming

Programming Paradigm

Coding
Testing
Integration

SOFTWARE DEVELOPMENT LIFE CYCLE

It is a well-defined sequence of stages in software engineering used to develop an intended software product.

SDLC Activities

SDLC provides a series of steps to be followed to design and develop a software product efficiently. SDLC framework includes the following steps:

COMMUNICATION - Approach the service provider and negotiate the terms.

REQUIREMENT GATHERING – Discussing with stakeholders and bring as much information on their requirements as **#Functional & Non-Functional Requirements**

FEASIBILITY STUDY – The team comes up with a rough plan for the product and thinks in all possible manners if there is any possibility of the software being no more useful.

SYSTEM ANALYSIS – Select the best suitable model, budget, and deadline, impact of the project on the organization.

SOFTWARE DESIGN – From the gathered information The output of this step comes in the form of logical and physical designs. Engineers produce meta-data and data dictionaries, logical diagrams, data-flow diagrams, and in some cases pseudo codes.

CODING - This step is also known as the programming phase. Software design implementation starts with writing program code in a suitable programming language and developing error-free executable programs efficiently.

TESTING – Testing the software

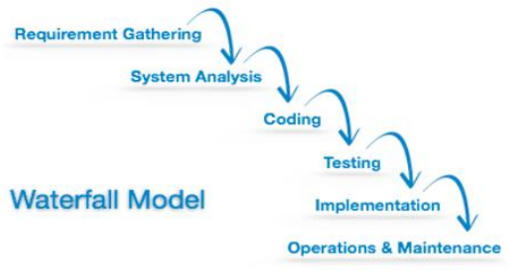
Unit Testing -> Integration Testing -> System Testing -> User Acceptance testing

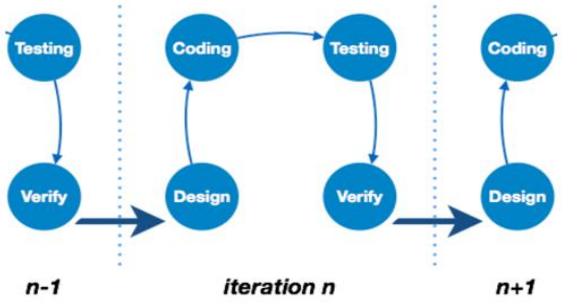
INTEGRATING - Software may need to be integrated with the libraries, databases, and other programs (s).

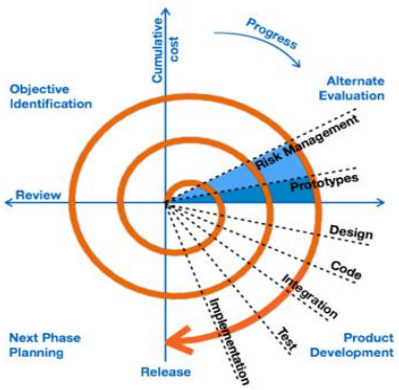
IMPLEMENTATION - This means installing the software on user machines.

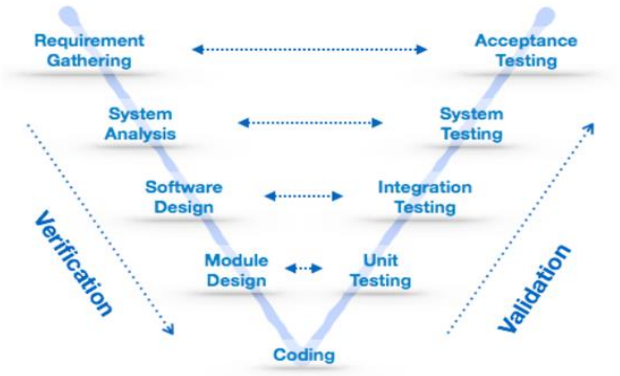
OPERATION AND MAINTENANCE – Maintenance is important when the product faces an open world it must handle all types of user input whether valid or invalid inputs. So, updating and maintaining are more important.

MODELS










Time
Efforts
Resources
Big Bang
Software

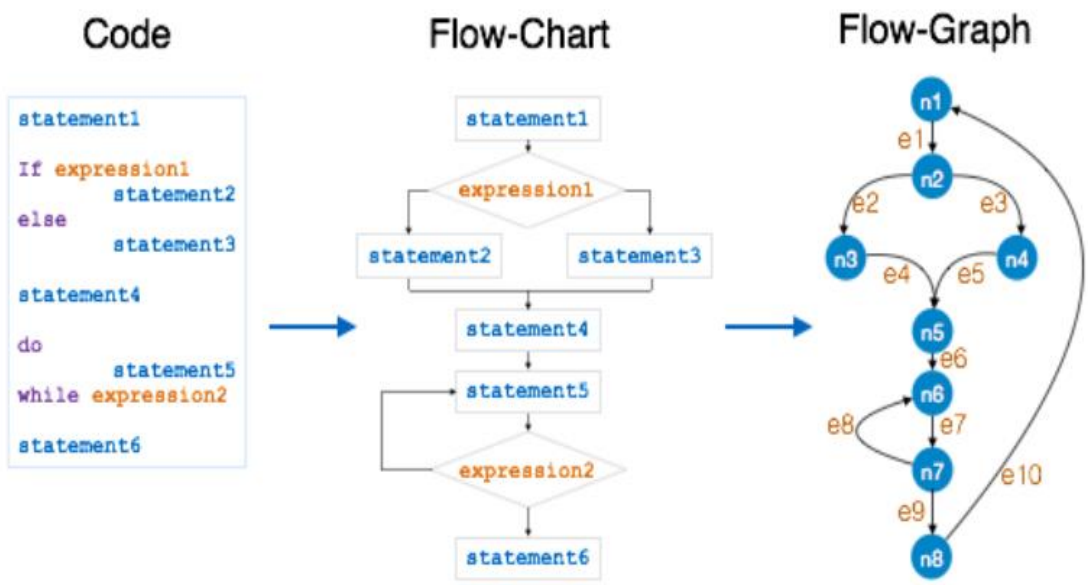
SOFTWARE DESIGN COMPLEXITY

Cyclomatic Complexity Measures:

McCabe, in 1976, proposed the Cyclomatic Complexity Measure to quantify the complexity of a given software. It is graph driven model that is based on decision-making constructs of programs such as if-else, do-while, repeat-until, switch-case, and goto statements.

PROCEDURE:

- From the code draw the Control flow-chart.
- From the code draw the Control flow-graph.
- Count the no. of edges and nodes.
- Calculate Cyclomatic Complexity of the program. // **V(G) =** e – n + 2 * p => **e – n +2** //
- Find the independent Data flow path for both TRUE and FALSE conditions.



e = 10

n = 8

Cyclomatic Complexity = 10 - 8 + 2 = 4

SOFTWARE TESTING

Software Validation -ensures the product under development is as per the user requirements.

Software Verification -ensures the product being developed is according to design specifications.

Target of the test are-

Error - Occurs by the programmer while coding.

Faults – Occurs when Error Exists. (commonly known as **BUG**) .

Failure – failure is said to be the inability of the system to perform the desired task. occurs when fault exists in the system.

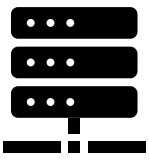
MANUAL TESTING

Test cases are written by humans, Skilled persons are required to perform testing.

AUTOMATED TESTING

This testing is a testing procedure done with aid of automated testing tools.

SELENIUM, APPIUM, KATALON STUDIO, CUCUMBER, etc…



Black-box testing

It is also called 'Behavioral' testing. The tester in this case, has a set of input values and respective desired results. On providing input, if the output matches with the desired results, the program is tested 'ok', and problematic otherwise.

White-box testing

It is conducted to test the program and its implementation, in order to improve code efficiency or structure. It is also known as 'Structural' testing.

Control-flow testing
Data-flow testing

LEVELS OF TESTING

Unit Testing

Integration Testing

System Testing

Acceptance Testing

Regression Testing