

1. Difference between waterfall model and spiral model.

A	Waterfall model	Spiral model
1.	Waterfall model is simple and easy.	Spiral model is a lot more complex.
2.	Waterfall method works in sequential method.	It works in evolutionary method.
3.	In waterfall method errors or risks are identified after completion of stages.	Here, errors or risks are identified earlier.
4.	It is adopted by customers.	It is adopted by developer.
5.	It is used for small project.	It is for large projects.
6.	Here, requirements and early stage planning is necessary.	Here, requirements and early stage planning is necessary if required.
7.	Flexibility to change is difficult.	Flexibility to change is not difficult.
8.	High risk.	Low amount of risk.
9.	It is inexpensive.	It is very expensive.
10.	Here, customer involvement is minimum.	Customer involvement is high.

2. Explain spiral modeling and prototyping with advantage and disadvantage.

## A) Spiral Model:

- Spiral model is one of the most important software development life cycle models, which provides support for risk handling.
- In diagrammatic representation, it looks like spiral with many loops.
- Exact number of loops of the spiral is unknown and can vary from project to project.
- Each loop of spiral is called phase of software development process.

Each phase of spiral model is divided into four quadrants.

### 1. Identify alternative solutions:

Requirements are gathered from customers and objects are identified and analyzed at start of every phase. Then alternative solutions possible for phase are proposed in this quadrant.

### 2. Identify and resolve risk:

During second quadrant, all possible solutions are evaluated to select the best possible solution. At the end of this quadrant, the prototype is built for best possible solution.

### 3. Develop next version of product:

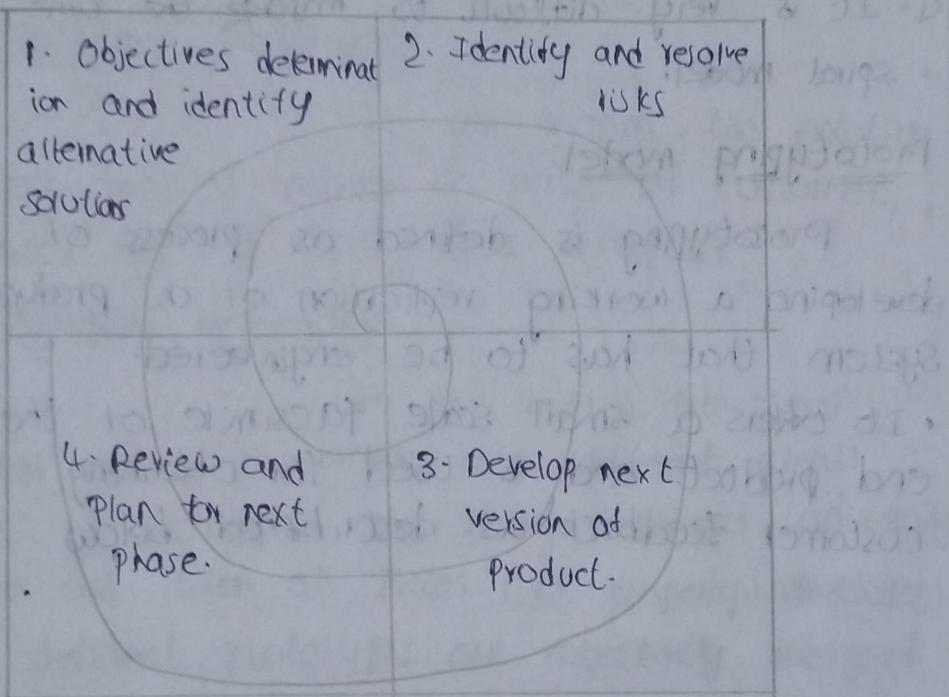
DURING 3<sup>rd</sup> quadrant the identified features are developed and verified through testing. At end of this

quadrant, the prototype is built for best possible so next version is available.

#### 4. Review and plan for next phase:

IN 4<sup>th</sup> quadrant

customers evaluate the so far developed version of software. In the end, planning for next phase is started.



#### Advantages of spiral model

1. It is the best development model for risk handling.
2. It is useful for large and complex project.
3. It is easy to modify changes in requirements.
4. Customer can see development of product at early phase of software development.

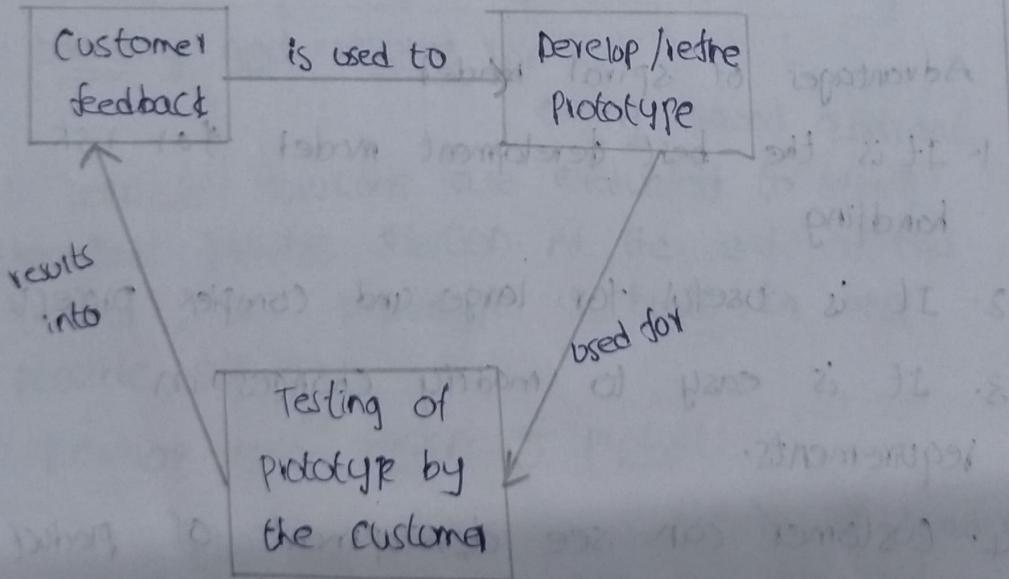
### Disadvantages:

1. It is very complex
2. It is very expensive
3. It is too much dependent on risk analysis.  
Without experts it is probably going to be a failure.
4. It is very difficult to manage the time in spiral model.

### Prototyping model:

Prototyping is defined as process of developing a working replication of a product or system that has to be engineered.

- It offers a small scale facsimile of the end product and is used for obtaining customer feedback as described below



There are four types of model available.

#### A) Rapid Throwaway Prototyping:

In this method, a developed prototype need not necessarily be part of ultimately accepted prototype. Customer feedback helps in preventing unnecessary design faults and hence final prototype developed is of better quality.

#### B) Evolutionary Prototyping:

In this method, the prototype developed initially refined on basis of customer feedback till it finally gets accepted.

#### C) Incremental Prototyping:

In this method, the final expected product is broken into different small pieces of prototypes and being developed individually. In the end, when all pieces are properly developed then different prototypes are collectively merged into a single final product.

#### D) Extreme Prototyping:

This method is mainly used for web development. This prototype method makes project cycling and delivery robust and fast.

#### Advantages:

- The customers get to see partial product early in life cycle.
- Missing functionalities can be easily figured out.

- New requirements can be easily accommodated as there is scope for refinement.
- Flexibility in design.

### Disadvantages:

- Costly in time as well as money
- There may be too much variation in requirements each time prototype is evaluated by customer.
- Poor documentation due to continuously changing customer requirements.
- Developers in a hurry to build prototypes may end up with sub optimal solutions.

3. Write a short note on reverse engineering.

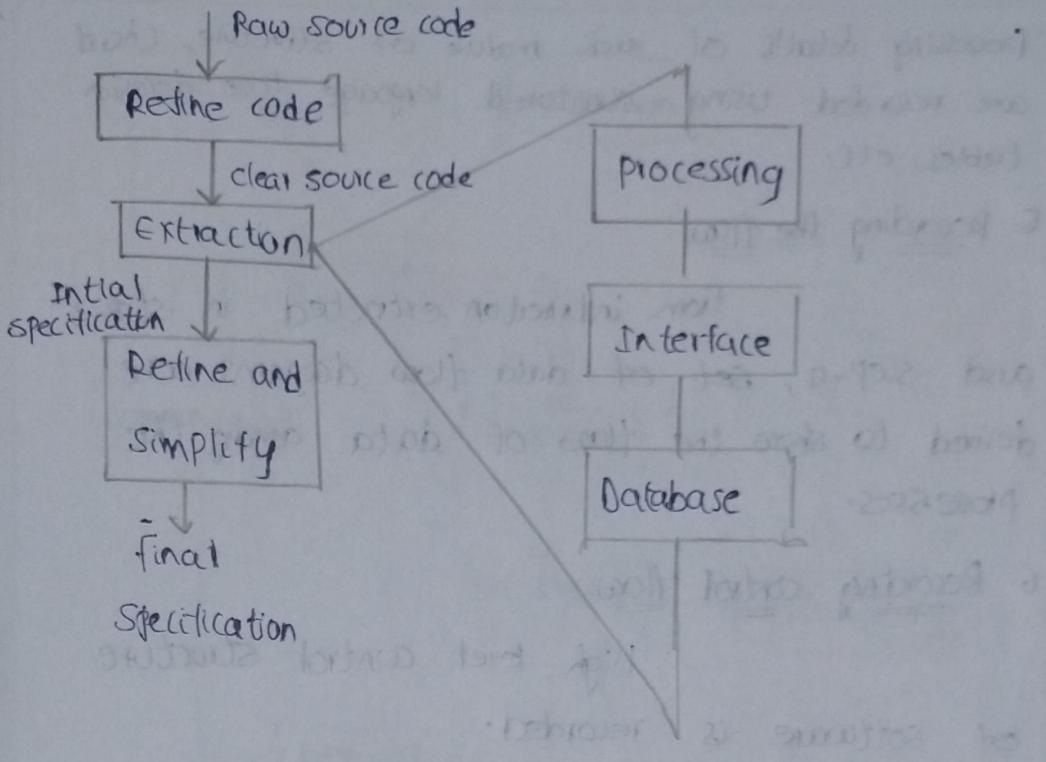
A. Reverse engineering is a process of recovering design, requirement specifications and functions of product from an analysis of its code.

It builds a program database and generates information from this.

The purpose of this is to facilitate the maintenance work by improving the understandability of a system and to produce the necessary documents for a legacy system.

### Reverse Engineering Goals:

- Cope with complexity
- Facilitate reuse
- Detect side effects
- Recover lost information.



### Steps of Software reverse engineering:

1. Collection information: This step focuses on collecting all possible information.
2. Examining information: The information collected in step 1 is studied so as to get familiar with the system.
3. Extracting the structure: This step concerns with identifying program structure in form of structure chart where each node corresponds to some routine.
4. Recording the functionality: During this step

processing details of each module of structure, chart are recorded using structured language like decision tables, etc.

#### 5. Recording the flow:

from information extracted in step-3 and step-4, set of data flow diagrams are derived to show the flow of data among the processes.

#### 6. Recording control flow:

high level control structure of software is recorded.

#### 7. Review extracted design:

design document extracted is reviewed several times to ensure consistency and correctness. It also ensures that design represents the program.

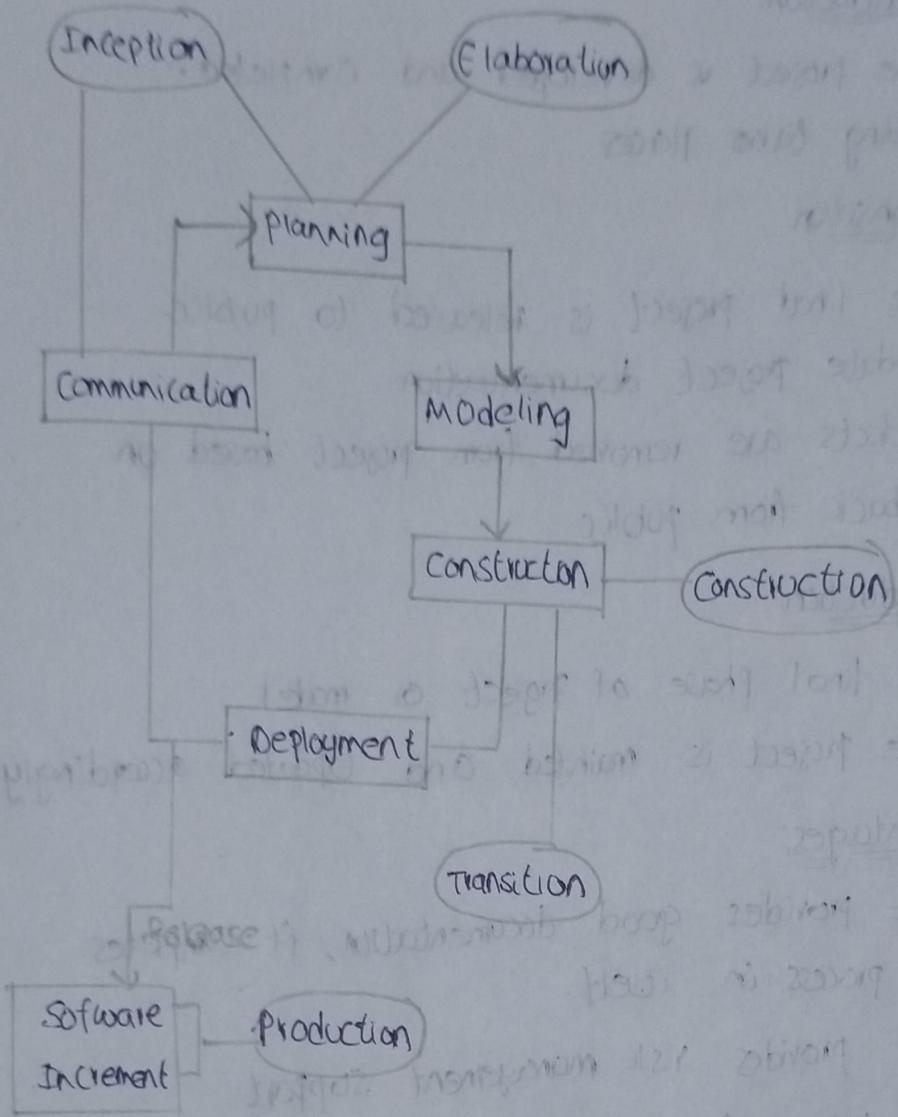
#### 8. Generate documentation:

Finally, the complete documentation along with SRS, history, overview etc are recorded for future use.

#### 4. write note on unified process model along with advantages and disadvantages.

A. Unified process is a software development process for object-oriented models.

It is created by using UML.



### Phase of Unified process:

1. Inception: communication and planning are main ones. The project is checked against milestone criteria and if it couldn't pass these criteria then the project can be either cancelled or redesigned.

### Elaboration:

Planning and modeling are the main ones. A detailed evaluation and development plan is carried out and diminishes the risks.

### 3. Construction:

- The project is developed and completed.
- Coding takes places

### 4. Transition:

- The final project is released to public.
- Update project documentation.
- Defects are removed from project based on feedback from public.

### 5 Production:

- The final phase of project or model.
- The project is maintained and updated accordingly.

### Advantages:

1. It provides good documentation, it completes the process in itself.
2. It provides risk management support.
3. It reuses the components, and hence total time duration is less.
4. Good online support is available for training.

### Disadvantages:

1. Team of expert professional is required, as process is complex.
2. Complex and not properly organized process.
3. More dependency on risk management.
4. Hard to integrate again and again.

1. What are various agile principles followed during software development.
- A. • Highest priority is to satisfy customer through early and continuous delivery of valuable software.
- Working software should be delivered from couple of weeks to couple of months in shorter time cycle.
  - Business people and developer work together throughout the project.
  - Build the project around motivated developer and give him liberty so job can be completed on time.
  - Working software is primary measure of progress.
  - Communication between developer team is face to face conversation.
  - Importance is given to technical excellence and good design which enhances agility.
  - The design should be simple try and reduce work done which is not essential.
  - The best architecture, requirement and design comes out or emerges from self organizing team.
  - Agile process must promote sustainable development.
  - At regular time, the developer team focusses on becoming effective.

2. What are key trades that must be present among people in agile team?

A. The key trades are competence, common, focus, collaboration, decision making ability and respect  
↳ fuzzy problem and mutual trust

#### Competence:

Competence means talent and specific skills possessed by members of agile team or skills that must be thought to all people of agile team.

#### collaboration:

Collaboration between software team, customers and various stakeholders which are necessary for building computer software.

#### Common focus:

All the members of agile team should focus on common goal. It is to develop a software as per requirement of customer.

#### Decision making ability:

All members of agile team must be allowed the freedom that are required for effective software development.

#### Mutual trust and respect:

It should exist among all the members of agile team that are necessary for building effective software.

## self organization

Agile team organize itself in order to complete the work according to local environment. Team organizes itself so that work schedule is maintained.

## Fuzzy problem solving ability:

The problems are not clear, are confusing and they need to deal with ambiguity. The problem they are solving today, may not be problem which is needs to be solved tomorrow.

### 3. Describe XP process.

- A The key XP activity are
1. Planning
  2. Design
  3. Coding
  4. Testing
  5. Release

#### 1. Planning:

Planning includes business context for software like cost, major features and functionality as per requirement given by customer. Each feature is called as story.

It is assigned a value which is used to indicate or priority indicating some values.

The XP team orders stories that needs to developed in following ways

- (i) The story with highest priority will be implemented first.
- (ii) Depending upon date, schedule the story needs to be implemented as development work proceeds customer can add stories, change value of existing value stories.

## 2. Design:

A design should be simple for a story, encouraging use of CRC cards. If a difficult design problem is encountered, XP recommends creation of operational prototype of portion of design also called spike solution.

## 3. Coding:

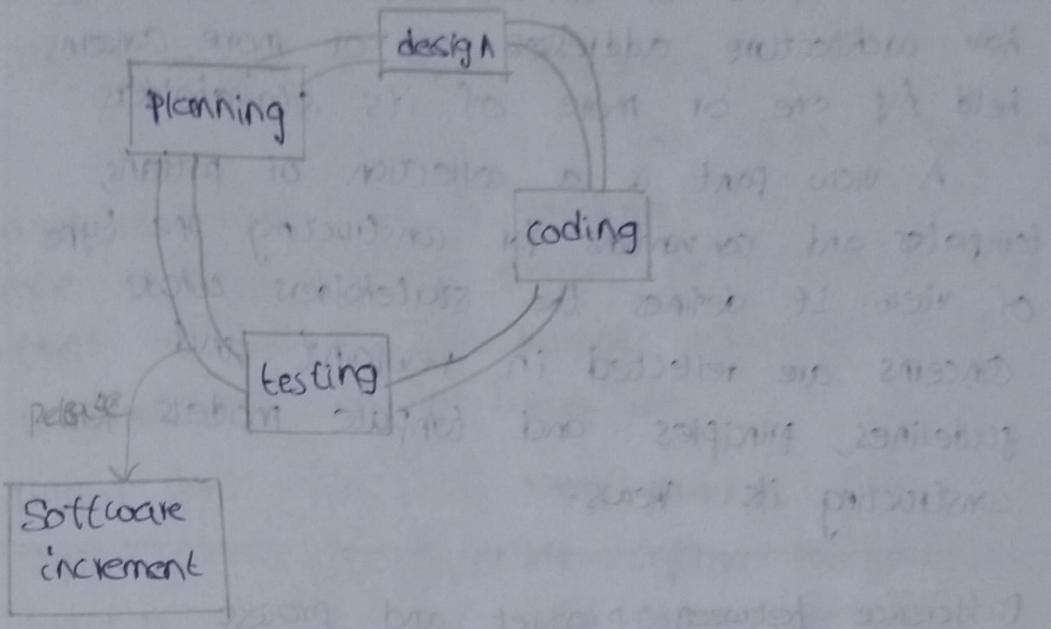
The team does not move code directly but first it develops a series of unit test that are used to test the stories which had been implemented.

## 4. Testing:

The unit test that are created always encourages a regression testing strategy by customer it shouldn't effect the existing software product or code which has already been developed.

## 5. Release:

Release is software developed to customer as and when stories are implemented in the form of software increment.



4) Difference between Stakeholders and view points.

A. Anyone having any type of relationship in the project is known as stakeholder.

Software project Stakeholder refers to a person group or company that is directly or indirectly involved in the project and who may affect or get affected by outcome of project.

Ex: Business manager, product manager, marketing people internal and external customer, product engineer, software engineer.

Each stakeholder has different views of testing. In other words stakeholders are a list of people who are responsible for requirement gathering.

## view points:

A view is a representation of one or more structural aspects of an architecture that illustrates how architecture addresses one or more concerns held by one or more of its stakeholders.

A view point is a collection of patterns, templates and conventions for constructing one type of view. It defines the stakeholders whose concerns are reflected in viewpoint and guidelines, principles and template models for constructing its views.

## 5. Difference between product and process

A.	product	process
1.	Product is final production of project	1. Process is set of sequence steps, that have to be followed to create project
2.	It focus on final result	2. It is focussed on each step and its quality
3.	The firm guidelines are followed.	3. The process consistently follows guidelines.
4.	It tends to be short-term	4. It tends to be long term.
5.	Main goal is to complete work successfully	5 Main goal is to make quality better.
6.	It is created based on needs of customers	6. It serves as model for producing various goods in similar way
7.	Its patents are though offer a greater level of protection	7. Process Patent provider, the inventor only limited protection.

6. Write a note on crystal feature development, Dynamic system development, Adaptive software development

### A. Crystal methods in Agile Development:

The crystal method is an agile framework that is considered a light weight or agile methodology that focuses on individuals and their interactions. The methods are colour coded to significant risk to human life.

Crystal family consists of many variants like Crystal Clear, Crystal Yellow, Crystal Red, Crystal Sapphire, Crystal Red, Crystal Orange Web and Crystal Diamond.

#### 1. Crystal clear:

The team consists of only 1-6 members that is suitable for short projects.

#### 2. Crystal yellow:

It consists of 7-20 members where feedback is taken from real users.

#### 3. Crystal red/orange:

It has a team size of 21-40 members where the team is split according to their functional skills.

#### 4. Crystal orange web:

It has also a team size of 21-40 members where the projects have a continually evolving code base that is being used in public.

5. Crystal Red: The software development is led by 40-80 members where teams can be formed according to requirements.

#### 6. Crystal Maroon:

It involves large-sized projects where team size is 80-200 members.

#### 7. Crystal sapphire and diamond:

This variant is used in large projects where there is a potential risk to human life.   
Dynamic systems Development method [DSDM]

It is a degree Agile code development approach that provides a framework for building and maintaining systems.

#### Life cycle:

##### 1. Feasibility study:

It establishes essential business necessities and constraints related to the applying to be designed then assesses whether or not the application could be a variable candidate for DSQM method.

##### 2. Business Study:

It establishes the use and knowledge facilities that may permit the applying to supply business value additionally it is the essential application design.

### 3. functional modern design:

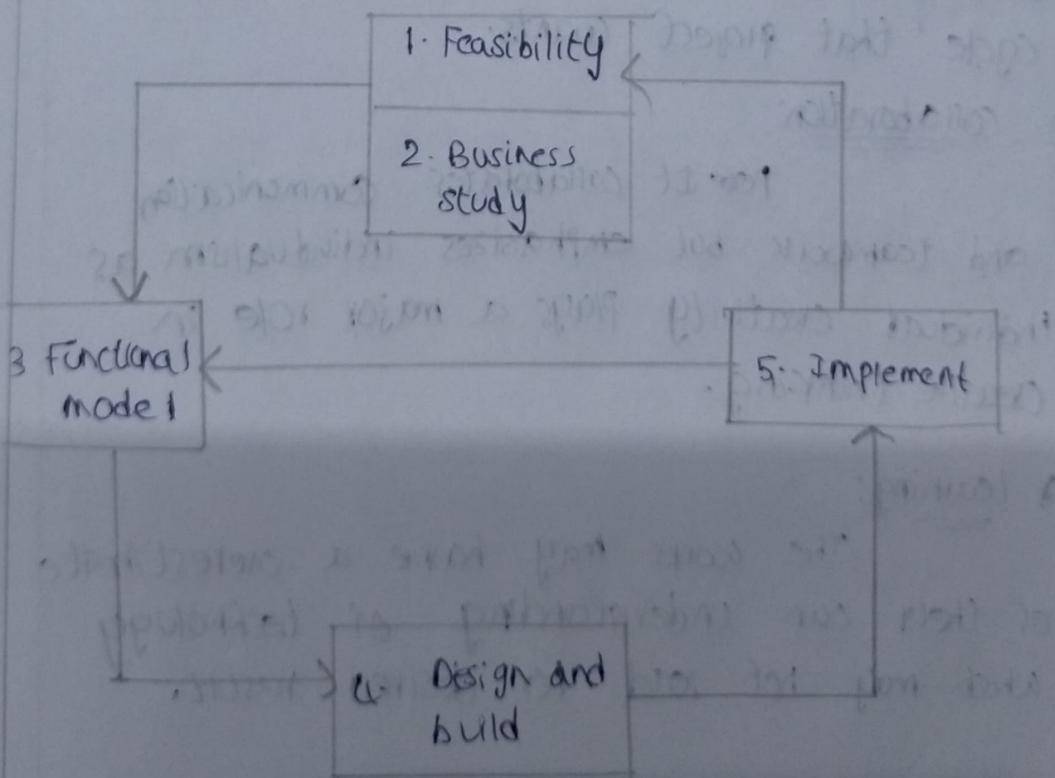
It produces a collection of progressive prototypes that demonstrates practicality for client.

### 4. Design and build iteration:

It revisits the prototypes designed throughout model iteration to make sure that everyone has been designed during a manner that may alter it to support supply operational business place for finish users.

### 5. Implementation:

It places the request code increment into the operational surroundings. It may be noted that increment might not 100% complete or changes are also requested because increment is placed into place.



## Adaptive software development (ASD)

ASD is a method to build complex software and system. ASD focuses on human collaboration and self organization.

ASD life cycle incorporates three phases, namely

1. Speculation
2. Collaboration
3. Learning.

### 1. Speculation:

During this phase project is initiated and planning is conducted. The project plan user project initiation information like project requirements, user needs, customer mission statement etc, to define set of release cycle that project wants.

### 2. Collaboration:

It collaborates communication and teamwork but emphasizes individualism as individual creativity plays a major role in creative thinking.

### 3. Learning:

The works may have a overestimate of their own understanding of technology which may not lead to desired result.

It is of three ways:

- 1- focus groups
- 2- project postmortem.
- 3 Technical reviews.

