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Subject : Enterprise Application Development.

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Q What is an Enterprise architectural framework? what are its different types? Describe TOGAF and Zachman framework in details.

⇒ Enterprise architecture (EA) is the practice of analyzing, designing, planning and implementing enterprise analysis to successfully execute on business strategies. EA helps business structure IT projects and policies to achieve desired business results and to stay on top of industry trends & disruptions using architecture principles & ~~parties~~ practises a process also known as enterprise architectural planning (EAP).

The different types of Enterprise architectural framework are:

(i) The Open Group Architectural framework (TOGAF)
(ii) The Zachmen framework for Enterprise Architecture.
(iii) Federal Enterprise Architecture framework (FEAF)
(iv) Gartner

(i) The Open Group Architectural framework (TOGAF)

TOGAF provides principle of designing, planning, implementing & government

IT architecture. The TOGAF framework helps business create a standardized approach to EA with a common vocabulary, recommended standards, compliance, methods, suggested tools and software & a methods to define best practices. The TOGAF Framework is widely popular as an enterprise architected framework & according to The Open Group it's been adopted by more than 80 percent of the world's leading enterprises.

(ii) The Zachman Framework for Enterprise Architecture: The Zachman Framework is named after one of the original founder of enterprises architecture & it's another popular EA methodology. It's better understood as a "taxonomy", according to CompTIA, & it spans in architectural focal points & in primary stake holders to helps standardize & define the IT architecture components & outputs.

(iii) Federal Enterprises Architecture Framework (FEAF) FEAF was introduced in 1996 as a response to the Clinger-Cohen act. which introduced mandates for IT ~~effectiveness~~ effectiveness in federal agencies. It's designed for the

U.S. goverment, but it can also be applied to private companies that want to use the framework.

(iv) Gartner: After acquiring The Meta Group in 2005, Gartner established best practices for EAP & adapted them into the company's general consulting practics. While it's not an individual framework, & CompTIA recognizes it as a "practical" methodology that focuses on bussiness out comes with "few explicit steps or components."

2) What are the different types of JAVA EE Frameworks to Build Enterprises Application. Describe in details about EJB.

⇒ Java is already one of the most popular & trusted programming languages for developers.

The different types of JAVA EE framework to Build Enterprises Application are:

1) Spring

The Spring, by pivotal, is the most used & well-known known framework. It is an inversion of the container and controlled by the Java programming

Language. This Framework has integrated advanced features, resources & utilities. Developers use these resources to create advanced types of applications. The spring framework runs on JVM & works well with other programming language like Groovy & Kotlin.

Highlights

i) provides efficient Eco-system & community
ii) Supports a large number of packages & classes
iii) Easy test-ability & Backward compatibility.

2) Hibernate

It is another most popular Java Framework. It is also called Object Relational mapping (ORM) Framework of Java & widely used to built database structure. It provide query language for database management called HQL.

Highlights

i) provides a secure & robust application base
ii) Simple to changes data into multiple database.
iii) HQL integrated with Indepent database commands

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3) Struts

Apache struts is a free, open-source & MVC framework which used to build elegant & attractive Java applications. It is used MVC, i.e, model view controller to develop interative JAVA web application. The framework intergrates with various plugins & many of these plugins will let you incorporate Struts with different Java frameworks like JSF, Spring etc.

Highlights

1) well-tested & stable framework.
2) Supports different types of templates & themes.
3) It works efficiently with SOAP, AJAX & Rest API's.

4) Java Server Faces

JSF is mainly used to build server-side UI components as well as in web applications. It contains a different sets of APIs, with these developers, can manage custom tag library & UI components for developing the JSF interface.

5) Google web kit (GWT)

GWT stand for Google Web kit & its one of the most popular web

Framework, & mainly used to develop client Java code & extend it to as Java script. It is completly open-source. This Framework supports developer to build & test Ajax application using Java.

6) play

play web Framework is a reactive, lightweight, user-friendly, & stateless structure enables to develop scalable web application quickly with Java & Scala. play Framework follows the principle of Reactive manifesto

Highlights

(i) Enormous Ecosystem.
(ii) Secure configuration.
(iii) Developer productivity is very high.

7) Grails

It is a Groovy-based Framework & means developers will be able to develops applications using Groovy Languages. And it is open-source. The main aim of Groovy Language is to enhance the developer productivity & enable the OOPs concepts to build application.

8) Vert.x

It contains broad capabilities. & supports many other languages but primarily built for Java. moreover, if you use Groovy, Ceylon, Ruby or JavaScript, then you are allowed to use those on vert.x framework

Highlights

(i) Event Driven run time, Non-blocking.
(ii) Easy to use scalability & concurrency.
(iii) Polyglot (Supports several languages)

9) Apache Wicket.

Wicket is also called as "Apache Wicket" because it is accessible through Apache Software Foundation. This Frame work contains powerful tool applications to enhance the productivity of development.

Highlight.

(i) Documentation & Support.
(ii) Support HTML & Java Language

EJB is an acronym for enterprise Java bean. It is a specification provides by Sun microsystems to developed secured, robust & scalable distributed applications.

To get information about distributed applications, visit RMI Tutorial first.

To run EJB application you need an application Server (EJB container) such as Jboss, GlassFish, Weblogic, websphere etc

5) what is continous Intergration? What do you mean by Integrated Testing.

Continous Intergration is a development practice which requires developers to integrate code into a common repository multiple times a day. Each check-in is then verified by an automated build, allowing developers to detect problems early By integrating in a regular basis, we can discover errors quickly & trace them effortlessly. we create/debug code as usual. we check the code & then CI system builds code, tests it, & reports back to us.

Intergration Testing is a level of Software testing where individual units are combined & tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. Test driver & test Stub are used to assist in integration Testing.

Acceptance Testing

System Testing

Integration Testing

unit Testing.

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Definition by ISTQB

Intergration Testing: Testing performed to expose defects in the interfaces & in the interactions between integrated compones or System. See also components integration testing, System intergration testing.

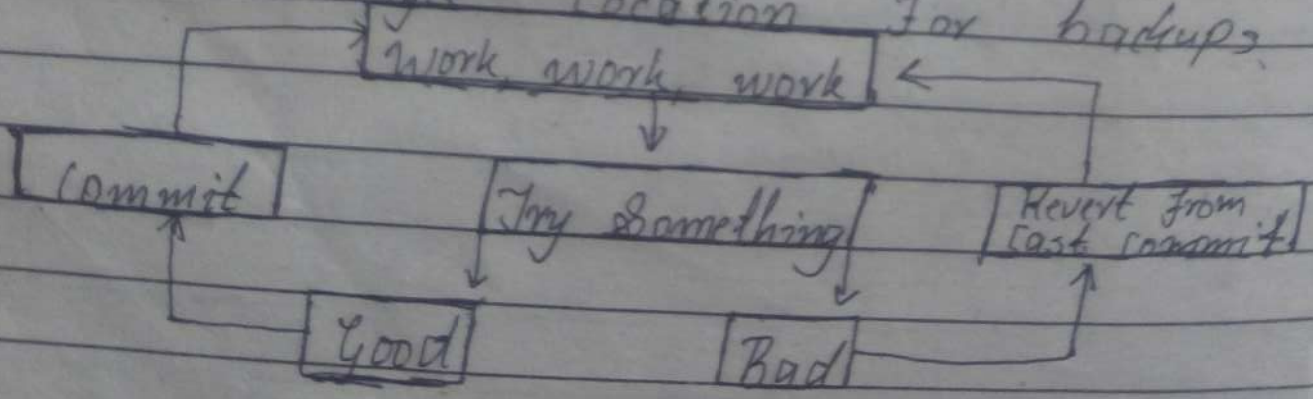
Intergration Testing is the second level of testing performed after unit Testing & before System Testing.

Developers themselves or independent tester perform Intergration Testing.

2) What is version control system? Define distributed version control system.

A VCS is a tool for managing a collection of program code that provides you with three important capabilities: reversibility, concurrency, & annotation. It is synonymously also known as source code management (SCM). VCS is a combination of technologies & practices for tracking & controlling changes to a protects files, in particular to source code, documentation, & web pages.

In software development, distributed version control is a form of version control in which the complete codebase, including its full history, is mirrored on every developer's computer. This enables automatic management branching & merging, speeds up most operations (except pushing & pulling), improved the ability to work offline, & does not rely on a single location for backups.



(b) why do we need design patterns? what are the different types of design pattern? Describe in details with suitable examples of Factory Design pattern, Singleton pattern & Lazy initialization.

→ A design pattern in architecture & computer science is a formal way of documenting solutions to a design problem in a particular field of expertise. The idea was introduced by the architect Christopher Alexander in the field of architecture & has been adapted for various other disciplines, including computer science. An organized collection of design patterns that relate to a particular field is called a pattern language. --- Christopher Alexander.

The diffrent types of design pattern are:-

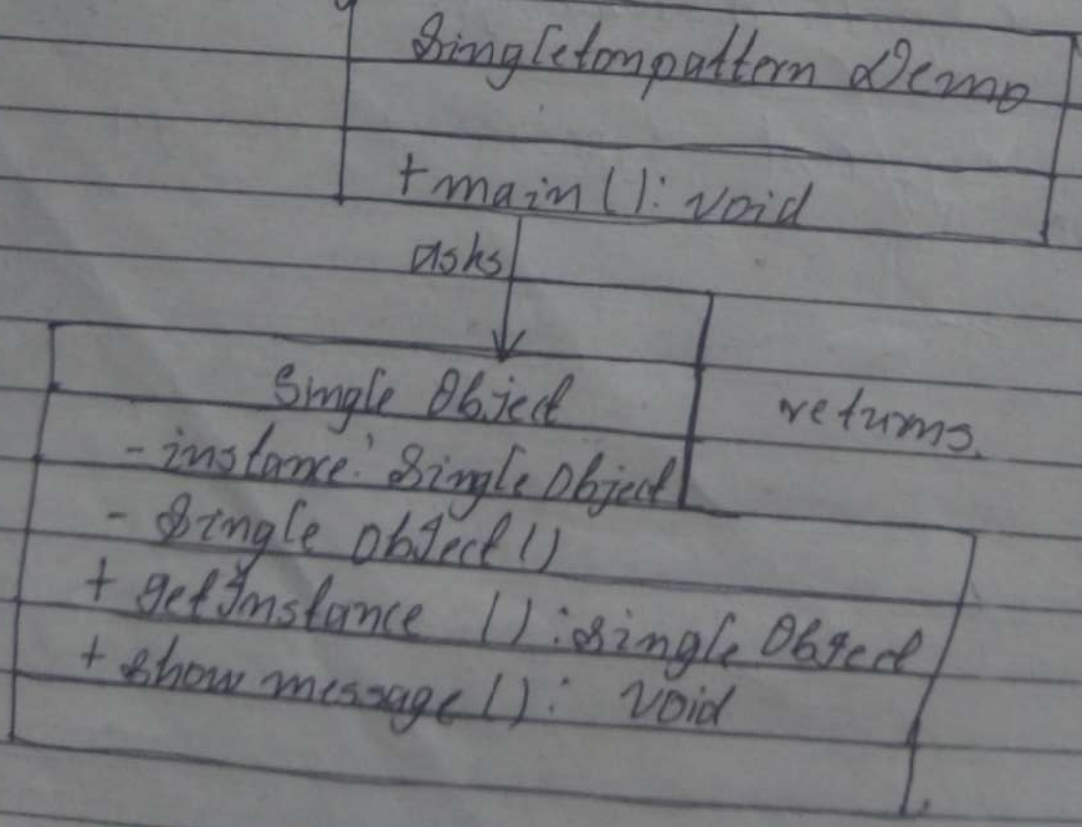
Singleton pattern

Singleton pattern is a design solution where an application wants to have one & only one instance of any class, in all possible scenarios without any exceptional condition.

Implementation

We're going to create a Single Object class. Single Object class have its constructor as private & have a static instance of itself. Single Object class provides a static method to get its static instance to outside world.

Singleton pattern Demo, our demo class will use Single Object class to get a Single Object object.



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Step 1

Create a Singleton class:

SingleObject.java

```
Public class SingleObjetS
// Create an OBJ of SingleObject
private static SingleObject instan

// make the constructor private so
// instantiated
private SingleObjet () {}

// Get the only object available
public static SingleObject getInst
    return instance;
}
public void Show message ()S
    System.out.println ("Hello world
```

Step : 2

Get the only object from the Singleton class

SingletonpatternDemo.java

```
public class SingletonPatternDemoS
    public static void main (String [] a

        // illegal construct
        // Compile Time Error: The const
        // SingleObject object = new Sin
```

// Get the only object available
SingleObject object = SingleObj

// Show the message
object.showmessage();

Lazy Initialization is the concept of deferring object creation until the object is actually first used. If used properly it can result in significant performance gains.

Personally, I've used Lazy intialization when creating my own hand-rolled ORM in .Net 2.0 when loading my collections from the database, the actual items in the collection were lazy initialized.

If you're familiar with the Singleton pattern, you've probably seen Lazy initialization in action as well.

```
Public Class SomeClassSingleton
{
Private static SomeClass __instance;
Private SomeClass Singleton()
  {
  }
Public static SomeClass Get Instance
{
```

```
if ( instance == null()
    instance = new Some Class
        return instance;
    }
```

1) what do you mean by web services? Define in detail about WSDL, WADL, SOAP web service, & SOAP vs REST.

A web service is a method of communications between two electronics device acc over the world wide web. It is a software function provided at a network address over the web with service always on as in the concept of utility computing (utility computing is the packaging of computing resources, such as computation, storage & services, as a metered service)

WSDL

Short for web services Description Language, an XML-formatted language used to describe a web service's capabilities as collections of communication endpoint capable of exchanging messages. WSDL was developed jointly by microsoft & IBM.

UDDI

Short for universal description, discovery & integration. It is a web-based distributed directory that enables business to list themselves on the internet & discover each other, similar to a traditional phone book's yellow & white pages. XML is used to tag the data, SOAP is used to transfer the data, WSDL is used for describing the services available & UDDI is used for listing what services are available.

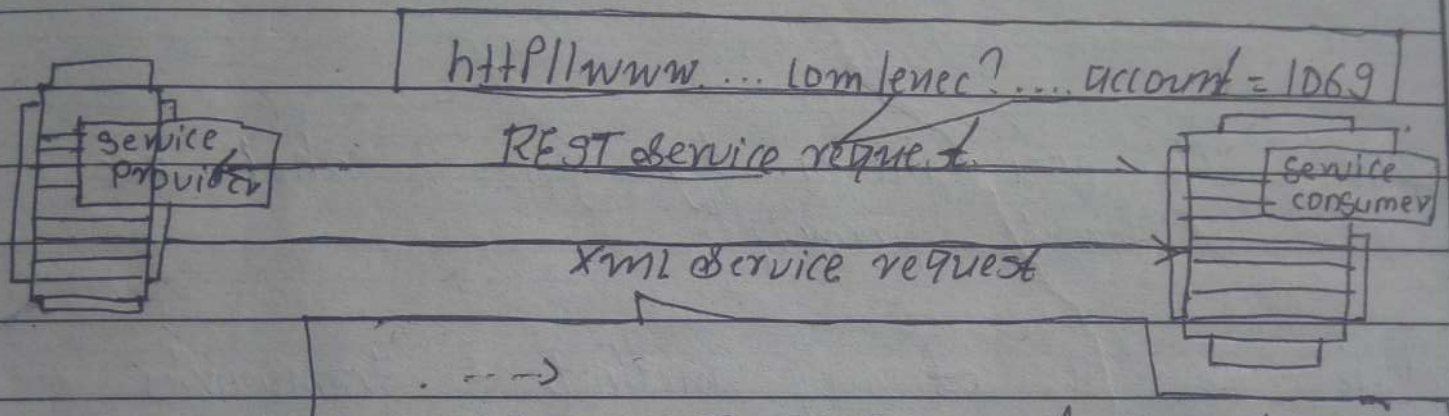
Soap web services

SOAP stands for Simple Object Access protocol. It is a XML-based protocol for accessing web service. SOAP is a W3C recommendation for communication between two applications SOAP is XML based protocol. It is platform independent & language independent.

SOAP	REST
(i) Via XML-based message protocol	(i) An architectural style
(ii) Invokes services by calling RPC method.	(ii) Simply calls services via URL path.
(iii) Does not return human readable result.	(iii) Result is readable which is just plain XML or Json.

13) what do you mean by REST API ? Define in detail

⇒ A REST API allows software programs to expose functionality & data to other program over the Internet in a consistent format.



It is a software architectural style for distributed hypermedia systems. This style was created by Roy Fielding & described in his dissertain from UC Irvine, by examining what made the web such a successful technology. Due to popularity of REST, Roy Fielding has the distinction of having one of the most widely

read Ph.D dissertations.

- Is not a standard but it does use standard. It uses HTTP, URL, XML
- REST puts "web" back into "web Services"
- The Internet is a REST System
- REST support all the common http operations & resources are accessed by URI.

4) what do you mean by agile ? what are it's different principle.

3) "Agile is a set of methods & frameworks that embody the principle & values of the Agile manifesto"

"Agile is a term used to describe approaches to Software development emphasizing incremental delivery, team collaboration, continual planning, & continual learning.

The principle of agile are:-

1) Customer satisfaction by delivering the Software early.
2) Accept the changing requirement, even late in development.
3) Business people & developers must work together daily throughout the project.

4) Working software is the primary measure of progress.
5) Continuous attention to technical excellence & good design enhances agility.
6) Simplicity - the art of maximizing the amount of work not done - is essential.
7) The best architectures, requirement, & designs emerge from self-organizing teams.
8) At regular intervals, the team reflects on how to become more effective, then tunes & adjusts its behavior according.
9) Agile processes promote sustainable development.
10) The most efficient & effective method of conveying information to & within a development team is face-to-face conversation.
11) Build project around motivated individuals.
12) Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.

15) Define E-Governance Framework in Detail?

→ E-Governance, expands to electronic governance, is the integration of information & communication Technology [ICT] in all the processes, with the aim of enhancing goverment ability to address the needs of the general public.

The basic purpose of e-governance is to simplify processes for all i.e. government, citizen, bussiness, etc. at National, State & Local level

Benefits of E-governance

- Reduced corruption
- High transparency
- Growth in GDP

Types of interaction in E-Governance.

1) G2C (Government to citizen)

The interaction consists the goverment & general public in G2C interaction. Here an interface is set up between goverment & citizens, which enables citizens to get access to wide variety of public services.

2) G2G (Government to Government)

when the exchange of information & services is within the periphery of the government is termed as G2G interaction.

3) G2B (Goverment to Bussiness)

In case of the e-governance helps the bussiness class to interact with the government seamlessly.

4) G2E (Government to Employees)

The goverment of any country is the biggest employer & so it also deals with employees on a regular basis as other employers do.

1) what is Dependency Injection & Inversion Control what are the different types of dependency injection? Implement dependency injection using Spring boot or any platform.

Dependency injection is a technique where by one object supplies the dependencies of another object. A "dependency" is an object that can be used. For examples as a service.

Inversion of control is a programming principle. IOC inverts the flow of control as compared to traditional control flow. Inversion of control is used to increase modularity of the program & make it extensible, & has applications in object-oriented programming & other programming paradigms.

Types of dependy injections:-

1) Constructor injection
The dependencies are provided through a class constructor.

2) Setter injection.
The client exposes a setter method that the injector uses to inject the dependency

3) Interface injection:
The dependency provides an injector method that will inject the dependency into any client passed to it.

of class diagram? Consider any two class diagram in UML like hotel management System & ATM System

A class diagram in the Unified modeling language is a types of static structure diagram that describe the structure of a system by showing the system's classes, their attributes, operations, & the relationship among objects.

Basic components of a class diagram are:

Upper Section

Contains the name of the class. This sections is always required, whether you are talking about the classifier of an object.

middle section

Contains the attributes of the class. Use this section to describe the qualities of the class. This is only required when describing a specific instance of a class.

Bottom section.

Includes class operation (methods). Displayed in list format, each operation takes up its own line. The operations describe how a class interacts with data.

1) Define Layered Architecture for web Applications & Three Layer model: The view Layer, the Business Logic layer & Data Layer

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The web relies strongly in the client-server model, & it uses markup languages such as HTML & XML to transfer & represent data. Under it there are many programming & scripting languages that can dynamically process, modify & generate data, or give an user interface. web application handle information from various sources (text, graphics, video, audio) dealing with structuring, processing, storing & presenting this information.

The view layer.

The outer most in this kind of model with the presentation of the content & interactions with the user. It can be called view, presentation, UI.

In this layer, the applications shows to the user what is needed to be seen & gives the tools for interaction. The exact kind of interaction depends on the application: one can create a web app that only shows informations to the user without any kind of interactions, not even hyperlinks to be clicked, but such a case does not need an advanced architecture. In most cases the user will generate some input, send it for processing & then receive a feedback, that can be the final result or a step for futher operations.

The Business logic layer.

The central layer of the model deals with the logic of the program. The Business logic layer contains the determinant part of the application Logic. It includes:

- performing all required calculations & validations
- managing workflow
- State management: to keep track of application execution.
- Session management: to distinguish among application instances.
- User identification.
- Services acess: to provide application services in a consistent way.

• managing all data acess for the presentation layer.

The Data layer

The deepest level in the layered architecture, the data layer deals with data retrieval from its sources. It is an abstraction to get the plain data, that can be in a wide variety of forms. Once again, it plays a huge role on the reusability & exchange of technologies: if one data source is changed to another, but the proper data is still the same, a good layered design can help by providing the same data to the upper level with the same interfaces, changing only its inner logic.

i) What do you mean by Test Driven Development? How would a team implement TDD in real life scenario give some examples.

Test Driven Development approach first, the test is developed which specifies & validates what the code will do. In simple terms, test cases are created before code is written. The purpose of TDD is to make the code clearer, simple & bug-free.

TDD comes from the world of unit testing
Its optimized for small pieces of code; small increments of functionality
BDD takes the test-first approach, adds functional & user semantics & tries to follow the same formula for the whole software.

Identify the important stories.
First we need to identify the main stories/flows we're going to write. If we have them in a form of BDD tests, great. If not, we need to at least have a list of the stories/requirements that are important.

Define the acceptance criteria.
This is extremely important, because if we just stick to "this flow should work" we're leaving it open ended. And with that, we'll be out of focus building thing we don't need.
Like with TDD, we specify how we except to execute & check the behavior we're interested in. & that requires that we know what the acceptance criteria is.

Identify the main components that the stories flow through.
They can already be complete, half written, or non-existent. A story flows through the components, & it may either use them as-is, may need interface modification or extension, new coding or a full rewrite

Re-prioritze the stories.

"wait now the developers prioritize?",
I know it's sounds a bit anti-scrum, but hear me out.
Even after someone (product owner or similar) had already prioritized the stories in term of value, there's still valid input that can come from the dev team.

A RESTful API is an application program interface (API) that use HTTP requests to GET, PUT, POST & DELETE data.

An API for a website is code that allows two software programs to communicate with each other. The API spells out the proper way for a developer to write a program requesting services from an operating system or other application.

A RESTful API — also referred to as a RESTful web service or REST API is based on representational state transfer (REST), an architectural style.

REST technology is generally preferred over the more robust simple object Access protocol (SOAP) technology because REST uses less bandwidth, making it more suitable for efficient internet usage

How RESTful APIs work

A Restful API breaks down a transaction to create a series of small modules. Each module addresses a particular underlying part of the transaction

This modularity provides developers with a lot of flexibility, but it challenging for developers to design their REST API from scratch. Community several companies provid models for developer to use; the models provided by Amazo S3, cloud Data mangement interface (CDMI) & openstack Swift are the most popular.

A RESTful API uses existing HTTP methodologie defined by the RFC 2616 protocol. They use GET to retrive a resource; Put to change the state of or update a resource, which can be an object, file or block; POST to create that resource; & DELETE to remove it.

Uses

Because the calls are stateless, REST is useful in cloud applications. stateless components can be freely redeployed if somethings fail, & they can scale to accommodate load change. This is because any request can be directed to any instance of component; there can be nothing saved that has to be remembered by the next transaction.

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Within the overall Agile environment, what is the purpose of BDD?

In general BDD, using user stories, describes the client's desired behavior of the planned software for each of the relevant roles and it is often accomplished by user roles rather than functional grouping. The general assumption is that different user within the organization will do different thing with the information. Some will capture the information (e.g. field agents), others will analyze the information (Area manager & state managers) & use it in reporting to the next level in the organization. Going back to the emergency relief example, consider the following scenario

A series of tornadoes has hit a mid-western area, knocking out power, & destroying hundreds of homes over a wide geographical area. The emergency (an Emergency Response Team) wants to use a data system to efficiently serve the impacted locales.

7) What is continuous integration? Define unit & Integrated Testing?

Continuous integration is the practise of merging all developers working copies to a shared mainline several times a day. It is the process of automating the build & testing of code every time a team member commits changes to version control.

Unit testing is a software development process in which the smallest testable part of an application, called units, are individually & independently scrutinized for proper operation. This testing methodology is done during the development process by the software developers & some time QA staff